THE SCHOOL DISTRICT OF CLAYTON

# Playground Safety Surfacing Evaluation

May 9, 2018

Provided to the Board of Education

By the

Facility Services Department

INTRODUCTION:

This study will provide the Board of Education with information related to playground safety surfaces including options for the proposed playgrounds at Meramec Elementary School and the Family Center and their respective cost.

Three options will be addressed; Poured-In-Place rubber surfacing (PIP), Engineered Wood Fiber (EWF), and Artificial Synthetic Turf.

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Section I - Existing

## Section I – Existing Playgrounds

**Family Center –** Rubber Tiles and Sand

## Captain Elementary School

Combination of Poured-in-Place Rubber Surfacing and Engineered Wood Fibers

Kindergarten Play Areas ⬆ ⬇

## Glenridge Elementary School

Combination of Poured-in-Place Rubber Surfacing and Engineered Wood Fibers

**Meramec Elementary School**

Engineered Wood Fibers

Section II - PIP

## Section II – Poured-in-Place (PIP)

What is Poured-in-Place Rubber Surfacing (PIP)?

PIP is made of clean recycled rubber and a decorative top layer made of virgin rubber EPDM (Ethylene Propylene Diene Monomer) or TPV (Themoplasticvulanizates) granules held together by polyurethane binding agents. The type of rubber selected depends on the application, location and color selections for the project.

The sub-base onto which the PIP is poured must be at least four inches thick and have a gradual slope to promote drainage. These underlying foundations are usually asphalt or concrete.

The two layers of rubber are mixed and poured on-site in two layers: an impact-absorbing layer topped beneath the decorative TPV or EPDM wear, form a unitary (unbroken) sheet of shock-absorbing safety surface. The end result is a highly durable, permeable, slip-resistant, ADA compliant surface providing cushioned comfort. Because of its seamless surface, wheelchairs can more easily move over the surface.

Because it is a unitary surface, PIP does not move or shift around. Maintenance required is little more than a leaf blower, though using approved cleaning solutions for a more thorough wash-down may be a good idea on occasion.

Thickness of PIP varies depending on the Critical Fall Height (CFH) needed around the playground equipment. It is important to work with a reputable contractor when calculating and installing the PIP surface.

Finally, poured-in-place surfacing is one of the most versatile, durable and visually attractive surfacing options available. The typical lifetime of PIP surfacing ranges up to ten years, depending on how much use it gets and the climate exposure.

*Source: Playground Professionals.com May 22, 2017.*
*Is Poured-in-Place Robber Safety Surfacing Actually Safe?*
*A portion of this article was used in the above information.*

Pending Playground Projects: Meramec Elementary School and the Family Center.

Both projects were bid using Poured-in-Place Rubber Surfacing. Base bid includes equipment and surfacing.

| | |
|---|---|
| Meramec | $152,115.00 |
| Family Center | $48,500.00 |

Alternative surfaces and cost are addressed in Section VI of this report.

For more information on PIP see appendices.

PIP - Typical sectional view

Optional colors for most any custom design

## Section III – Engineered Wood Fiber (EWF)

What exactly is Engineered Wood Fiber?

All natural processed wood, ground to a fibrous consistency, randomly sized not typically over 2" in length, free of hazardous substances and meets ASTM F2075 standard for EWF. *(See appendices for ASTM F2075 abstract.)*

Engineered Wood Fiber is manufactured specifically for use in playgrounds using raw materials that are typically free of twig and leaf material. It is not chemically treated.

Typically insects are not a problem, but EWF neither attracts nor repels insects.

EWF can maintain its cushioning properties for the life of the playground, provided the depth is maintained by occasional top-offs. EWF does not decompose at the same rate seen in regular mulch.

Raking and tamping as usage dictates is necessary to keep the play area in good condition. According to usage, climate and the condition of the drainage system below, the surface will need to be topped off with fresh EWF periodically. Accessories like recycled rubber wear mats are available for high use areas to help maintain accessibility and limit maintenance.

To meet the American with Disabilities Act, more frequent maintenance is necessary. The amount of usage per day dictates how often daily raking and tamping are required to maintain the ADA properties necessary for compliance. Compliance related to after hours and weekends is an unknown at this time.

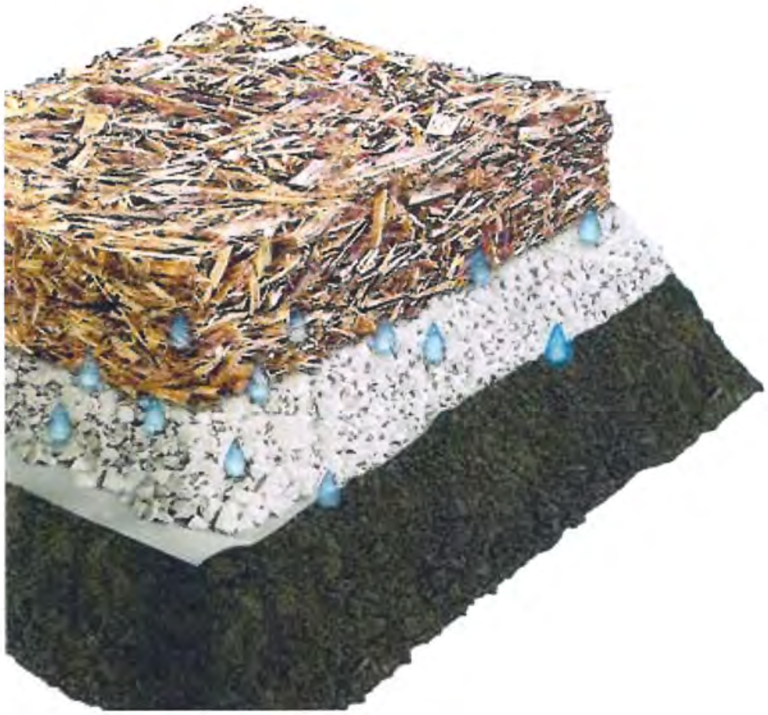
*Source:*
*The majority of this information was obtained from:*
www.acmesand.com/wp-content/uploads/2014/02/Wood-Chips-FAQs.pdf

Currently the District has Engineered Wood Fibers at three of its playgrounds. Each of these playgrounds is topped off with fresh EWF at least once per year.

Cost related to changing the pending projects from PIP to EWF at Meramec and the Family Center will be addressed in the Section VI.

For more information on EWF, see Appendices.

<u>Typical Installations:</u>



16 - 18” EWF

12” Clean Rock

Sub-Base: Soil

No External Drain

16 - 18” EWF

12” Clean Rock

Sub-Base: Soil

External Drain

## Section IV – Artificial Turf (Synthetic)

Sometimes referred to as Eco Turf or Play Grass.

Artificial Turf for playgrounds is made from a plastic material found in most households. For example; milk cartons, laundry soap containers, freezer bags, shampoo bottles, food beverage containers, cereal box liners, etc.

The turf is manufactured from a non-abrasive polyethylene specifically for outdoor use and treated with UV inhibitor and stabilizers to resist the effects of ultraviolet degradation, heat, foot traffic, water and airborne pollutants. The fiber contains no toxic substances or heavy metals.

Cushioning pad is made from 99% recycled, non-contaminated, post industrial cross link closed cell polyethylene foam. The product is 100% recyclable and free from lead and heavy metals. It is also completely free of rubber.

The highly porous design of the pad underneath the synthetic turf enhances field drainage vertically and laterally. Material does not absorb water or other liquids so it is ready for use shortly after the rain stops.

The most common infill for this system is sand.

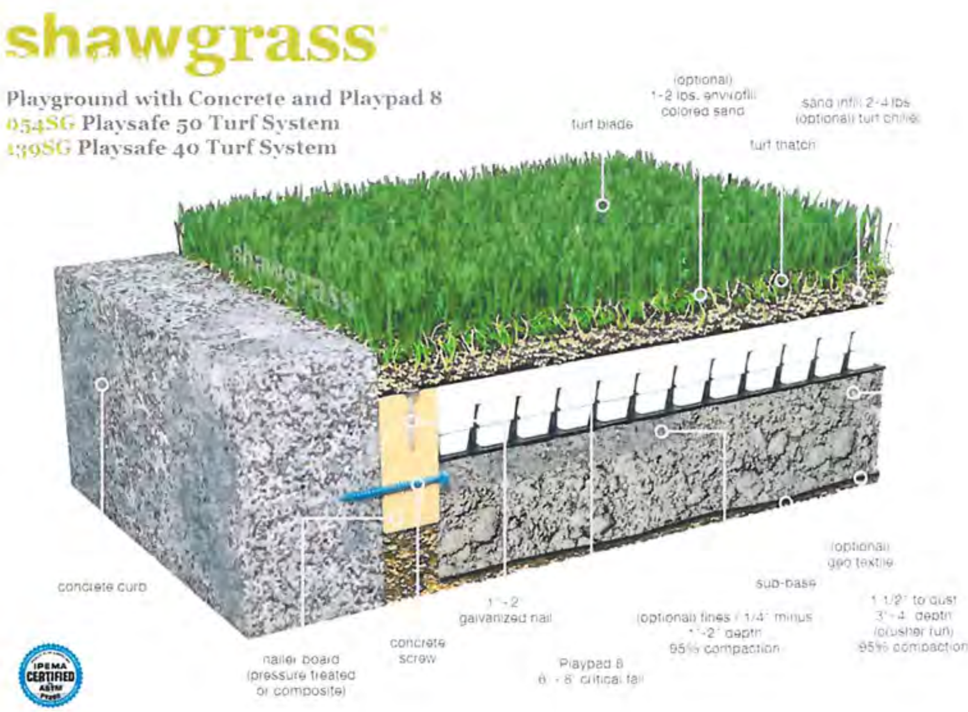
Other options are available:

(a) No sand infill, can change how the turf will look after time. Grass blades may tend to bend over sooner than that of a system with sand. Safety and ADA accessibility remain the same.

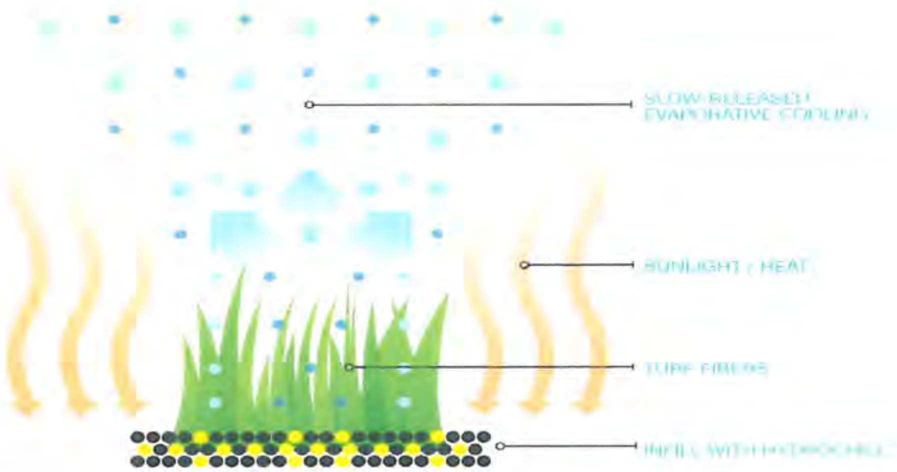
(b) Infill with a product known as HydroChill. Can help cool the turf during warmer days when hydrated by rain, dew or irrigation. HydroChill is a pre-coat that is applied to the sand infill. It is activated by adding moisture *(See next page for more information)*.

*Source:*

*The majority of this information was obtained from:*
*Eco Turf Product Data – www.ecoturfsurfacing.com*
*HydroChill – www.shawgrass.com/hydrochill/*
*Polyethylene – www.plasticsmakeitpossible.com*




HydroChill




## HOW DOES IT WORK

HydroChill is a patented technology that has been developed and vetted through years of research in both a laboratory, and real world, setting. HydroChill is a precoat that is applied to the sand infill. It is activated by adding moisture and can provide significant cooling for days, depending upon local conditions.

– HydroChill will not affect the durability or warranty of the turf.
– HydroChill is UV-resistant and should be retreated every two years for maximum effectiveness.

## Section V – Surfacing Evaluation of Existing Playgrounds

On April 20, 2018, Troy Balthazor, (TPB Enterprises LLC), reviewed the existing condition of playground surfaces at 5 playgrounds serving 4 schools. The purpose of the review was to evaluate current playground surfaces for compliance with federal civil rights legislation, specifically the regulations and standards of the American with Disabilities Act (ADA), and to provide recommendations regarding playground surfacing based on existing conditions.

Playground surfaces were evaluated through a measurement of level changes and slopes utilizing calibrated digital levels, tape measure, observation and evaluation of physical conditions when in use and when the area was free of activity.

*See Appendix 1 for complete report.*

## Section VI - Cost Estimates for Each Option

Family Center:

**Poured-in-Place** included in base bid $48,500.00 (includes equipment and surfacing). District to provide perimeter concrete curb.

Maintenance requires random cleaning with a leaf blower and occasional washing. Estimated at 1 hour per week: $20.00/hr. x 52 weeks = $1,040.
Minimal repairs are usually the case. Normally repairs are not necessary until after several years of use; however damage can occur. A conservative budget for any needed repairs would be $1,000 per year.

Estimated life span is 8 to 10 years which can be extended by re-coating the top surface. For example; Glenridge PIP was installed in 2006 and re-coated in 2016. Surface is performing as expected and estimated to last an additional 5 years or more.

Replacement cost of the surface will depend on future material cost. Estimate assumes a 3% inflation rate. Surface conditions will dictate replacement versus re-coating.

Best estimations: $32,000 at 10 yrs. Re-coating top coat approx. $20,000

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**Alternative 1** - Engineered Wood Fibers
Requires excavation of 24" of top soil, perimeter concrete curb, external drainage, 6 to 8" of 1/2'" clean rock and 16 to 18" of engineered wood fibers. Equipment support poles will need to be extended by 24" to compensate for excavation. District to provide perimeter concrete curb and EWF.

**Alternative 1 -** Estimated surface cost $8,000.

**Alternative 1a -** Include drain system. Add $4,000 to Alt. 1 cost.

Savings on initial installation in lieu of PIP - $8,000 to $10,000 (Estimated)
Verification with vendor is necessary.

Yearly replenishment cost $500
Labor cost for daily maintenance based on 60 mins/day = $20.00
$20.00 x 260 work days = $5,200 per yr.

Total Estimated Maintenance Cost: $5,700 per yr.
*(No maintenance cost figured in totals for after hours and weekends)*

**Alternative 2** - Artificial Turf – add $2,500 to base bid.
Requires excavation of 6" of top soil and a perimeter concrete curb.
District to provide perimeter concrete curb.

Maintenance requires occasional cleaning with a leaf blower.
Estimated at 1 hour per week: $20.00/hr. x 52 weeks = $1,040.
Minimal repairs are usually the case. Normally repairs are not necessary until after several years of use: however damage can occur. A conservative budget for any needed repairs would be $1,500 per year.

If sand infill is used, it should be examined quarterly.
Cost for replacement sand approximately $150.

Surface is warrantied for 8 years. Actually life expectancy will be determined by usage.

Replacement cost of the surface will depend on future material cost. Estimate assumes a 3% inflation rate.

Best estimation $35,000.

## Meramec Elementary:

**Poured-in-Place** included in base bid $152,315 (includes equipment and surfacing). District to provide perimeter concrete curb.

Maintenance requires random cleaning with a leaf blower and occasional washing. Estimated at 1 hour per week: $20.00/hr. x 52 weeks = $1,040.
Minimal repairs are usually the case. Normally repairs are not necessary until after several years of use; however damage can occur. A conservative budget for any needed repairs would be $1,000 per year.

Estimated life span is 8 to 10 years which can be extended by re-coating the top surface. For example; Glenridge PIP was installed in 2006 and re-coated in 2016. Surface is performing as expected and estimated to last an additional 5 years or more.

Replacement cost of the surface will depend on future material cost. Estimate assumes a 3% inflation rate. Surface conditions will dictate replacement versus re-coating.

Best estimations: $68,500 at 10 yrs. Re-coating top surface approx. $30,000

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**Alternative 1** - Engineered Wood Fibers - $35,000

Requires excavation of 24" of top soil, removal of asphalt and patching, perimeter concrete curb, external drainage, 6 to 8" of 1/2" clean rock and 16 to 18" of engineered wood fibers. Equipment support poles will need to be extended by 24" to compensate for excavation. District to provide perimeter concrete curb and EWF.

**Alternative 1** - Estimated surface cost $35,000.

**Alternative 1a** - Includes drain system. Add $6,000 to Atl. 1 cost.

Savings on initial installation in lieu of PIP - $0 to $12,000 (Estimated)
Verification with vendor is necessary.

Yearly replenishment cost $800
Labor cost for daily maintenance based on 60 mins/day = $20.00
$20.00 x 260 work days = $5,200 per yr.

Total Estimated Maintenance Cost: $6,000 per yr.
*(No maintenance cost figured in totals for after hours and weekends)*

**Option 2** - Artificial Turf – add $15,000 to base bid.
Requires excavation of 6" of top soil and a perimeter concrete curb.
District to provide perimeter concrete curb.

Maintenance requires occasional cleaning with a leaf blower.
Estimated at 1 hour per week: $20.00/hr. x 52 weeks = $1,040.
Minimal repairs are usually the case. Normally repairs are not necessary until after several years of use: however damage can occur. A conservative budget for any needed repairs would be $1,500 per year.

If sand infill is used, it should be examined quarterly.
Cost for replacement sand approximately $200.

Surface is warrantied for 8 years. Actually life expectancy will be determined by usage.

Replacement cost of the surface will depend on future material cost. Estimate assumes a 3% inflation rate.

Best estimation $76,000.

## Estimated Safety Surface Cost Summary

### Family Center

| | Installation Cost | Annual Maint. Cost | 5 YR Maint Cost | 8 YR Maint Cost | 10 YR Maint Cost | Total 10 YR Cost | Replacement Cost |
|---|---|---|---|---|---|---|---|
| PIP | $20,000 | $2,040 | $10,200 | $16,320 | $20,400 | $40,400 | $32,000 |
| EWF | $12,000 | $5,700 | $28,500 | $45,600 | $57,000 | $69,000 | $5,000 |
| S-Turf | $20,000 | $2,540 | $12,700 | $20,320 | $25,400 | $45,400 | $35,000 |

### Meramec Elementary

| | Installation Cost | Annual Maint. Cost | 5 YR Maint Cost | 8 YR Maint Cost | 10 YR Maint Cost | Total 10 YR Cost | Replacement Cost |
|---|---|---|---|---|---|---|---|
| PIP | $40,000 | $2,040 | $10,200 | $13,320 | $20,400 | $60,400 | $68,500 |
| EWF | $41,000 | $6,000 | $30,000 | $48,000 | $60,000 | $101,000 | $6,500 |
| S-Turf | $52,240 | $2,540 | $12,700 | $20,320 | $25,400 | $77,640 | $76,000 |

Note:

S-Turf 8 yr. warranty; estimated life span 8 - 10 yrs.

PIP 5 yr. warranty; estimated life span 8 - 10 yrs.

EWF Continuous with proper maintenance.

Total 10 year cost includes: Year 1 installation cost plus the 10 year maintenance cost.

## Section VII – Conclusion

Due to concerns brought to the attention of the Board of Education regarding recycled rubber tire commonly known as crumb rubber, the Facility Services Department preformed extensive research and analysis on three types of playground safety surfaces.

From that analysis the Facility Services Department feels a good alternative solution is artificial turf. Installing artificial turf as a safety surface during the installation of the new playground at Meramec Elementary and the Family Center, balances the needs of the students with the District's obligation to adhere to the Federal American with Disabilities Act.

Note:

Since Pour-in-Place rubber safety surfaces are being proposed in the base bids for both new playgrounds, the appendices includes several articles on recycled rubber (Crumb Rubber).

The appendices also references information on Artificial Turf (synthetic turf), and Engineered Wood Fibers.

# Appendix 1

# SURFACING

## An Evaluation of Clayton School District Playground Surfaces and Recommendations for Future Action

Completed by Troy Balthazor, Principle and Founder
TPB Enterprises LLC

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**Troy Balthazor – Founder TPB Enterprises – Biography and Background**

TPB Enterprises, LLC provides a variety of Americans with Disabilities Act compliance services as well as unique and effective Universal Design solutions to governments, small businesses, not-for-profits, and multi-national corporations. TPB provides compliance reports that reflect the applicable provisions of Titles I, II and III of the ADA, ensuring holistic, efficient and targeted compliance outcomes which demonstrate good faith efforts toward meeting civil rights responsibilities related to disability. TPB provides more than just surveys; we tailor the information to your specific compliance needs with the goal of putting your organization in the best position possible to meet diverse needs in the marketplace, the workplace, and in the regulatory realm. We enhance these services through our expertise in implementing and highlighting effective Universal Design practices, approaches which aim to provide comfortable and welcoming environments for people of all diverse abilities and characteristics. In conjunction with Springboard Consulting Group, TPB Enterprises has provided comprehensive services to multinational corporations including New York Life, Merck, Shell Global, and GlaxoSmithKline Canada over the past three years.

Troy Balthazor, M.Ed. and Founder of TPB Enterprises, has worked in the disability field for over 25 years. He has spent much of his career advocating for the utilization of Universal Design in the built environment and in the classroom, his primary goal being the inclusion of all members of our diverse communities in the activities and environments everyone enjoys. Troy's passion is teaching and supporting those with diverse abilities in maximizing their potential and getting the most out of life.

Troy served as an Americans with Disabilities Act Specialist for the Great Plains ADA Center for over 10 years. The ADA Center is part of the University of Missouri's Architecture Department in the College of Human Environmental Sciences. Troy provides training, education and technical assistance on the ADA and related civil rights legislation to businesses, public entities, people with disabilities and their families, and a variety of other audiences. He helped plan and host the National ADA Symposium annually, providing the most comprehensive training available in the United States on the rights and responsibilities set forth under landmark civil rights laws aimed at providing equal opportunity to all citizens, regardless of ability level. Troy also spent several years teaching inclusive recreation courses at the University of Missouri in the Parks and Recreation Department and continues to be involved across campus helping Mizzou move toward providing a fully inclusive and welcoming college experience for all that attend the university.

Troy lives in Columbia, Missouri and enjoys fishing, hiking, and spending time with his wife and two wonderful children. He is active in many local and regional boards and organizations; he currently serves on the Columbia Disabilities Commission, supporting people of all abilities throughout Columbia. He has also served on the Board of Mid-Missouri Legal Services, which provides legal aid to citizens who struggle financially, and as the President of the PedNet Coalition, pursuing inclusive pedestrian and transportation policies in Mid-Missouri. Troy proudly provides extensive support to his local community in maximizing the rights and opportunities of people of all abilities and backgrounds.

## PROJECT OVERVIEW

On Friday, April 20, 2018, I, Troy Balthazor (TPB Enterprises, LLC), reviewed the existing condition of playground surfaces at 5 playgrounds serving 4 schools in the Clayton School District (CSD). The purpose of the review was to evaluate current playground surfaces for compliance with federal civil rights legislation, specifically the regulations and standards of the Americans with Disabilities Act (ADA), and to provide recommendations regarding playground surfacing based on existing conditions and bona fide research related to ADA minimum requirements. Playground surfaces were evaluated through measurement of level changes and slopes utilizing calibrated digital levels and tape measure, and observation and evaluation of physical conditions when in use and when the area was free of activity.

The five playgrounds reviewed are identified as follows:

**1- Family Center Playground**

Existing Playground Surfaces: Mix of asphalt, concrete, rubber tiles, engineered wood fiber, natural turf

Current Plans for Improvement: Higher elevation section (PHASE I) of playground will be removed and replaced, with new surfacing as part of plan. Lower elevation (PHASE 2) to be addressed at later date.

**2- Captain Elementary Lower Playground**

Existing Playground Surface: Engineered wood fiber

Current Plans for Improvement: Under evaluation.

**3- Captain Elementary Upper Playground**

Existing Playground Surface: Asphalt, poured in place recycled rubber

Current Plans for Improvement: Potential addition of repurposed play ground level play components.

**4- Glenridge Playground**

Existing Playground Surface: Mix of engineered wood fiber and poured in place recycled rubber

Current Plans for Improvement: Under evaluation.

**5- Meramec Playground**

Existing Playground Surface: Engineered wood fiber

Current Plans for Improvement: Existing playground to be removed, new playground and surfacing to be provided in area that currently is asphalt.

## AMERICANS WITH DISABILITIES ACT APPLICATION TO CLAYTON SCHOOL DISTRICT PLAYGROUNDS

As a local governmental entity receiving state funding in Missouri, the CSD is required by federal law (TITLE 28 PART 35—NONDISCRIMINATION ON THE BASIS OF DISABILITY IN STATE AND LOCAL GOVERNMENT SERVICES) to comply with the 2010 Americans with Disabilities Act Standards for Accessible Design ("2010 Standards") in all new construction projects. In existing facilities (e.g. playgrounds), CSD is required to ensure that its playground facilities and approaches provide "Program Accessibility" for all users in the district, regardless of level of ability. Program Accessibility is directly addressed in Subpart D of Title 28, Part 35. Pertinent excerpts are as follows:

***Subpart D***

***§35.149 Discrimination prohibited.***

*Except as otherwise provided in §35.150, no qualified individual with a disability shall, because a public entity's facilities are inaccessible to or unusable by individuals with disabilities, be excluded from participation in, or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any public entity.*

***§35.150 Existing facilities.***

*(a) General. A public entity shall operate each service, program, or activity so that the service, program, or activity, when viewed in its entirety, is readily accessible to and usable by individuals with disabilities. This paragraph does not—*

*(1) Necessarily require a public entity to make each of its existing facilities accessible to and usable by individuals with disabilities;*

*(2) Require a public entity to take any action that would threaten or destroy the historic significance of an historic property; or*

*(3) Require a public entity to take any action that it can demonstrate would result in a fundamental alteration in the nature of a service, program, or activity or in undue financial and administrative burdens.*

***§35.151 New construction and alterations.***

*(a) Design and construction. (1) Each facility or part of a facility constructed by, on behalf of, or for the use of a public entity shall be designed and constructed in such manner that the facility or part of the facility is readily accessible to and usable by individuals with disabilities, if the construction was commenced after January 26, 1992...*

*... (b) Alterations. (1) Each facility or part of a facility altered by, on behalf of, or for the use of a public entity in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities, if the alteration was commenced after January 26, 1992....*

*... (3) If physical construction or alterations commence on or after March 15, 2012, then new construction and alterations subject to this section shall comply with the 2010 Standards.*

The 2010 Standards are clear about the requirements for ground surfaces on both accessible routes and use zones in playgrounds developed by ADA Title II entities (State and Local Government Entities):

***1008.2.6 Ground Surfaces.*** *Ground surfaces on accessible routes, clear floor or ground spaces, and turning spaces shall comply with 1008.2.6.*

***Advisory 1008.2.6 Ground Surfaces.*** *Ground surfaces must be inspected and maintained regularly to ensure continued compliance with the ASTM F 1951 standard. The type of surface material selected and play area use levels will determine the frequency of inspection and maintenance activities.*

***1008.2.6.1 Accessibility.*** *Ground surfaces shall comply with ASTM F 1951 (incorporated by reference, see "Referenced Standards" in Chapter 1). Ground surfaces shall be inspected and maintained regularly and frequently to ensure continued compliance with ASTM F 1951.*

***1008.2.6.2 Use Zones.*** *Ground surfaces located within use zones shall comply with ASTM F 1292 (1999 edition or 2004 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1).*

Accessible route and use zone surfaces must consistently provide an accessible surface. The 2010 Standards requirements for an accessible surface include the following expectations:

***303.2 Vertical.*** *Changes in level of 1/4 inch (6.4 mm) high maximum shall be permitted to be vertical.*

***303.3 Beveled.*** *Changes in level between 1/4 inch (6.4 mm) high minimum and 1/2 inch (13 mm) high maximum shall be beveled with a slope not steeper than 1:2.*

***305.2 Floor or Ground Surfaces.*** *Floor or ground surfaces of a clear floor or ground space shall comply with 302. Changes in level are not permitted.*

***EXCEPTION:*** *Slopes not steeper than 1:48 shall be permitted.*

Thus, any surface that does not consistently ensure a level surface as defined within sections 303.2&3 does not comply with the new construction requirements of the ADA. This applies to both the accessible route in the playground as well as use zones. Clear ground spaces add the higher standard of slopes not steeper than 1:48 being allowed – changes in level are NOT permitted.

Use zones must also meet ASTM F 1292 (1999 or 2004 edition) for impact attenuation. This standard ensures the surface in use zones is designed to limit injuries from falls.

## SURFACING PRODUCTS AND MATERIALS

Several materials and products can be incorporated in an effort to meet the requirements of the 2010 Standards. The United States Consumer Product Safety Commission identifies many types of surfaces:

Loose-fill Surfaces: These surfaces include Engineered Wood Fiber (EWF) and recycled rubber mulch products.

Unitary Surfaces. These surfaces include unitary recycled rubber mat and "poured in place" rubber surfaces.

Hybrid Surface Systems. These surfaces employ a combination of surfaces systems under development, the most common and recognized being varying types of artificial grass systems.

In 2011, the U.S. Access Board, the federal group charged with developing the accessibility standards which are adopted by the U.S. Department of Justice (DOJ), teamed with the National Center on Accessibility to complete "A Longitudinal Study of Playground Surfaces to Evaluate Accessibility: One Year Findings" (the "Longitudinal Study). The purpose of the study was "to evaluate a variety of playground surfaces, their ability to meet accessibility requirements, their costs upon initial installation and maintenance over 3-5 years". This study evaluated four categories of playground surfaces:

- Engineered wood fiber product (EWF)
- Unitary rubber mat/tile surfaces (TIL)
- Unitary rubber poured in place (PIP)
- Combination and hybrid systems under development (HYB)

Shredded rubber/crumb rubber surfaces are recognized by the study as being a potentially compliant surfacing material, but researchers did not include such surfaces in their evaluation due to its low rate of incorporation by playground providers.

If installed and maintained properly, any of the surface materials identified here can meet requirements for impact attenuation (safety related to falls from equipment/areas to surface). Thus, <u>the primary ADA compliance issue is the effectiveness of the surface to meet the accessibility requirements and standards</u>. Unitary surfaces without seams or changes in level are the best options. When it comes to meeting the 2010 Standards, loose-fill surfaces fall for short of performance in comparison.

There is no perfect playground surface approach; all have advantages and drawbacks. The following section identifies pertinent findings of the U.S. Access Board/NCA Longitudinal Study of playground surfaces. The findings point to unitary surfaces as being most likely to meet the accessibility requirements identified in the ADA.

**U.S. Access Board/NCA Playground Study Findings:**

➢ <u>Performance and Surface Deficiency Score</u> – This score (SDS) addresses the degree to which each surface meets minimum requirements for accessible routes and clear ground spaces.

The study states:

*"Within 12 months of installation, analysis of the SDS among the sample sites indicated there was significant difference in the number of identified deficiencies between EWF and the other three surfaces....*

*within one year of installation PIP scored [best] with a Mean = 0.00, while EWF scored highest with a Mean = 2.16... An SDS of 0 shows no interruption of the accessible route or clear floor space at the location".*

PIP materials clearly performed best, showing no performance deficiency over the time of the study. HYB surfaces ranked second with an SDS Mean = 0.04. TIL was next with an SDS Mean = 0.36. EWF was by far the lowest performing surface researched.

- Performance for Surface Firmness and Stability – This score addresses the accessibility performance of each surface, which relates to the ease of use for people using mobility aids such as wheelchairs and scooters.

The study states:

*"When the standard deviation of measurements for firmness and stability are compared, the only statistical difference is between EWF and the other three surface types in the sample. There was no significant difference in standard deviation for firmness and stability among the three unitary surfaces in the study. This could suggest a statistical difference between unitary and loose-fill surface materials when their standard deviation for firmness and stability are compared. It also reiterates the research question for the longitudinal study as to whether [EWF surfaces] will require more maintenance over time."*

**The following are the predominant findings from the U.S. Access Board/NCA Playground Study:**

*1. Within 12 months of installation, playground sites in the sample with the loose-fill EWF were found to have the greatest number of deficiencies affecting the accessible route to play components.*

*2. Within 12 months of installation, playground sites in the sample with loose-fill EWF were found to have the highest values for firmness and stability, indicating greater work force needed to move across the surface, while playground sites with the unitary surfaces TIL and PIP were found to have the lowest values for firmness and stability– indicating less work force necessary to move across the surface.*

*3. Among the playground site sample with PIP, TIL and EWF, there was a correlation between the number deficiencies and the sum value for firmness and stability of the material in instances where both values are either very high or very low.*

*4. Occurrences were identified in the sample where the surface material installation did not parallel either the manufacturer's installation instructions or the procedural instructions on the laboratory test sample for ASTM F1951.*

*5. A playground surface with fewer accessibility deficiencies and a lower measurement for firmness and stability did not necessarily meet the safety standards for impact attenuation.*

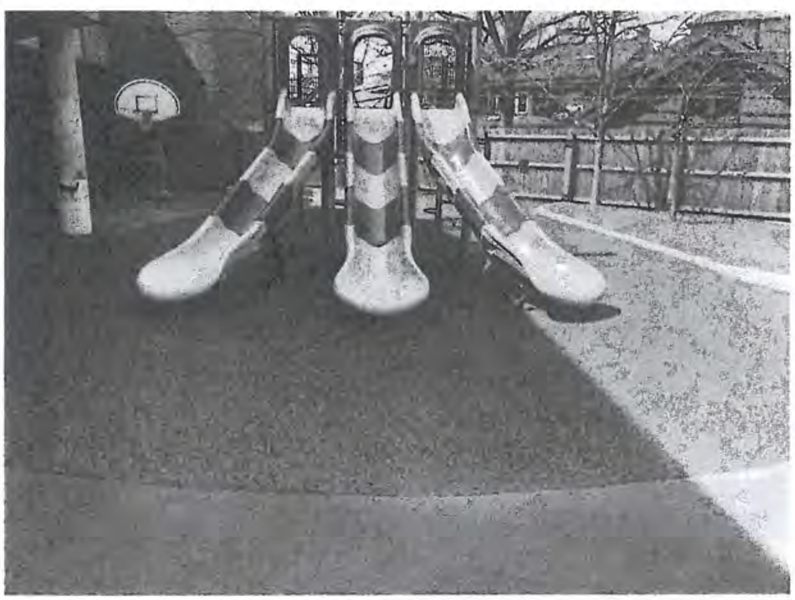
*6. The relationship between surface cost and performance in this sample was inconclusive and should be further investigated in the longitudinal study.*

**CSD PLAYGROUND EXISTING CONDITIONS – PHOTOGRAPHIC EVIDENCE AND COMMENTARY**

- Poured in place (PIP) surfaces are easy to level and maintain their level nature over time
- Easily meets 2010 Standards for cross slope and change in level requirements
- Allows choice in direction of approach and egress

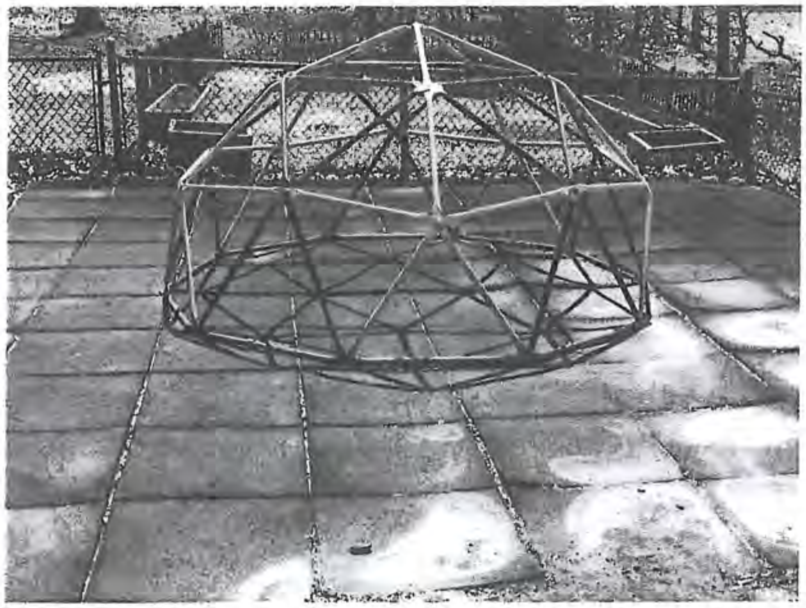
- Existing condition: Engineered wood fiber in place at Captain Elementary lower playground
- Does not meet requirements for slope or accessible route (Note 24% slope in clear ground area)
- Does not meet ADA requirements for level landing areas at clear ground spaces

- EWF evaluated after use by students during brief activity period
- Surface underwent maintenance by CSD personnel the same morning photo was taken
- Out of compliance for change in level
- Underscores amount of maintenance that would be required to maintain a compliant accessible route
- Result is a playground that is out of compliance with federal civil rights legislation every day it is in use



- Existing condition: PIP in Captain Elementary upper playground
- Smooth transition between firm surfaces (asphalt and PIP)
- Note mulch is separated by barrier to keep material off of accessible surface

- Expertly installed, attractive
- Does not require a user of a mobility device to use one specific route to access the composite structure; user can approach and access from any direction at any time



- Existing condition; recycled rubber tiles at Family Center Playground
- Evidence of washed out substrate compromises accessible route and clear ground spaces
- Many seams evident
- Water pools on concave tile surfaces
- Foreign objects lodged in material
- Tiles tend to require over ½" of rise to transfer from adjoining accessible routes

## RECOMMENDATIONS TO CSD BOARD FOR PLAYGROUND SURFACING MATERIAL

➢ Reviewer (Troy Balthazor) recommends CSD incorporate a seamless unitary surfacing product in all future renovation and new construction. The primary difference related to ADA compliance between the various surfaces is in the area of maintaining a compliant accessible surface within the playground. Seamless unitary surfaces is clearly the most effective surface discussed in ensuring legal compliance.
  - ✓ All identified surfaces can be compliant in impact attenuation if installed and maintained properly.
  - ✓ In addition to respect for and evaluation of research-based evidence in the field and communication with those who interpret and enforce federal civil rights legislation, my qualitative evaluation of surfaces over the past 15 years strongly supports the up-front investment in unitary surfacing for both compliance, usability, security against civil rights complaints and lawsuits, and long-term cost effectiveness.

- Avoid loose-fill materials and products in playground accessible routes and use zones. The research and studies conducted in the field clearly and inarguably identify that EWF is the least likely of reviewed surfacing materials to establish and/or maintain a surface that is compliant with the ADA.

- Choose a surface that has a strong research history. This will demonstrate CSD's "good faith effort" to utilize the best and most current information available on the likelihood of a surface meeting all standards and regulations of the ADA.

- Solicit multiple bids that address all CSD concerns related to accessibility, cost, safety, etc. Get references and talk to other districts that have been served by solicited contractors in the past. Ask for documentation of testing of product materials:
  - ✓ Inquire about LEED certification of product based on recycled content or otherwise-engineered product.
  - ✓ Inquire about surface curing and effectiveness in developing an inert surface that maintains consistency under varying weather conditions

- Engage in comprehensive planning with all involved in provision and installation of playground surfaces.

- Take a holistic view of costs; For example, PIP surface materials are far more expensive than EWF; however, PIP investment can be value added when the cost of substrate, site preparation, ongoing maintenance requirements, and hourly labor expenses are taken into account. Loose-fill materials must be maintained daily or even more frequently to ensure they maintain an accessible surface (as observed on-site during this review). In contrast, standard on-site maintenance of PIP surfaces involves occasional leaf-blowing and/or manual pick up of surface material that has made its way to the otherwise compliant surface. CSD professionals have begun to evaluate long term costs and are developing a clear and accurate assessment of economic pros and cons of various surfaces.

- Include in all contracts for playground surfacing materials and installation CSD expectations and ramifications for service provider to meet all CSD needs, including binding language addressing:
  - ✓ Long-term performance guarantees regarding quality and integrity of surface material
  - ✓ Compliant impact attenuation measurements in use zones
  - ✓ Long-term accessibility – maintaining initial install quality over time
  - ✓ Bona fide data on toxicity of each product
  - ✓ Repair and replacement expectations

**ADDITIONAL GUIDANCE RELATED TO PROGRAM ACCESSIBILITY**

- For any students or other users who are not able to utilize the lower playground at Captain Elementary School, provide access to the fully usable upper playground.
- Consider "repurposing" equipment from the Meramec Elementary playground (when removed) to provide more types and variance of play equipment options at Captain Elementary upper playground, primarily ground level, no-transfer play components that can be installed in currently mulched areas while providing clear ground space on existing asphalt or PIP surfaces. Examples include spinning tic-tac-toe games and gear-operating play components.
- For future planning, and to enhance program accessibility, consider PIP surface for use zone around the central, large composite play structure in Captain Elementary lower playground. The upper playground does not have a corresponding horizontal climber ("monkey bar") type play component.
- Engage in an evaluation/assessment of playground equipment to document compliance based on access to ground level and elevated play components as part of self-evaluation and transition plan process.
- At the Glenridge playground, for future planning and to enhance program accessibility, consider PIP accessible route and use zone serving swings. There is no accessible route to swing-type play components at the playground.

Report completed and submitted by: [signature] 4-23-18

Troy Balthazor, TPB Enterprises, LLC April 23, 2018

# REFERENCE MATERIAL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Appendix 2

# 7 Things Every Playground Owner Should Know About the Accessibility of Their Playground Surfaces

2014 A publication of the U.S. Access Board and the National Center on Accessibility

1 Start with comprehensive planning and site selection.

2 Follow the Accessibility Standards for Play Areas.

3 Review the research findings about accessibility issues for play surfaces.

4 Assess during the planning, installation and maintenance phases.

5 Compare surface options.

6 Recognize that proper installation of play surface systems is key.

7 Commit to ongoing maintenance of accessible playground surfaces as a responsibility of ownership.

## Selecting an Accessible Play Surface Is One of the Most Important Decisions

The U.S. Census Bureau's American Community Survey (2011) estimates there to be 2.8 million school-aged children with disabilities in the United States. The Census Bureau (2009) estimates that one in every seven American families is affected by disability. For children with and without disabilities, the community playground can facilitate a positive environment for physical activity and inclusion. Today, lack of physical activity is considered one of the leading factors contributing to poor health among children. The neighborhood playground fulfills a critical role in community wellness, enabling children to play with friends and burn calories at the same time.

When the playground has barriers prohibiting use by a child with a disability, the opportunity for play and physical activity is lost. Inaccessible surfaces can pose barriers for children with disabilities who may use canes, crutches, walkers or wheelchairs from ambulating through the play area. Pushing a wheelchair over loose gravel or sand requires tremendous physical effort. When so much effort is exerted, little to no energy is left for play.

The presence of physical barriers can prevent children with disabilities from accessing all play elements on the playground. Most significantly, inclusive play between children with disabilities and children without disabilities is threatened when the playground does not have accessible equipment and surfaces. Physical barriers also prohibit adult caregivers with disabilities from engaging with their children and/or responding when a child is in need of assistance.

Recreation professionals and playground owners are confronted with questions of how to install and maintain safe and accessible public playgrounds that are fun; promote inclusion and physical activity; are cost effective and able to withstand a full life cycle of public use.

Choosing play surfaces that are accessible and that can be maintained as accessible surfaces, becomes one of the most important decisions during the playground planning and design phases. The purpose of this guide is to provide practical information that every public playground owner should know about the accessibility of their playground surfaces.

*Surfacing the Accessible Playground:*

# 7 Things Every Playground Owner Should Know About the Accessibility of Their Playground Surfaces

From 2008 to 2012, the National Center on Accessibility (NCA) at Indiana University-Bloomington conducted a longitudinal study on the accessibility of playground surfaces. The research study was funded by the U.S. Access Board. The information presented in this publication is based on the research findings and presented as guidance to public playground owners and operators.



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# 1 All Successful, Inclusive Playgrounds Start with Comprehensive Planning

An economic assessment conducted during the development of accessibility standards for play areas estimated there to be 5,300 new public playgrounds constructed each year and more than 18,600 existing playgrounds that are renovated. The decision to build a public playground, whether it be in a park, school, mall or childcare setting, is an initial financial commitment of $60,000 to $100,000 and upward just for the purchase of equipment and construction (NCA Playground Surface Study, 2013). This cost can be overwhelming. Often times, new playground owners do not realize that owning a playground is not a one-time purchase. It is a commitment to maintain the equipment and surface for as long as it is open to the public. Most public playgrounds are designed to be in place for 10-20 years. At some point, the equipment will need to be serviced to meet revised safety standards and the surface will likely need to be repaired or replaced. A comprehensive planning process is essential to ensure everyone is educated on the safety requirements, the accessibility standards, design considerations, installation and ongoing maintenance needs.

An accessible playground starts with an accessible site plan. The site selection and layout of the accessible route should be considered alongside the selection of the play equipment. The accessible route must be designed as the main pedestrian route and connect all accessible equipment, both points of entry and egress. This means everyone enters and uses the site together.

A site survey may be necessary even on sites deemed "relatively flat." A site survey, even for sites considered "flat" or without substantial change in elevation, should be conducted to design for a continuous accessible route, with compliant cross slope and adequate site drainage. At playgrounds without site surveys, the National Center on Accessibility research found more instances of non-compliant accessible routes. Most often equipment was moved during construction, deviating from the original plan, to accommodate the use zones. These changes negatively affected the accessible routes.

The site plan should include the layout of equipment and the planned accessible route should be drawn on the site plan connecting entry and egress from each accessible elevated play component and each accessible ground level play component. It is highly recommended that the accessible route be clearly defined on the site plan and construction drawings. If the playground owner decides to go with a surface material, such as loose fill that has a higher degree of surface variability, designation of the accessible route on the site plan will give the installer and maintenance personnel specific guidance on the appropriate location of the accessible route, installation of the surface material, and its ongoing maintenance to meet the accessibility standards.

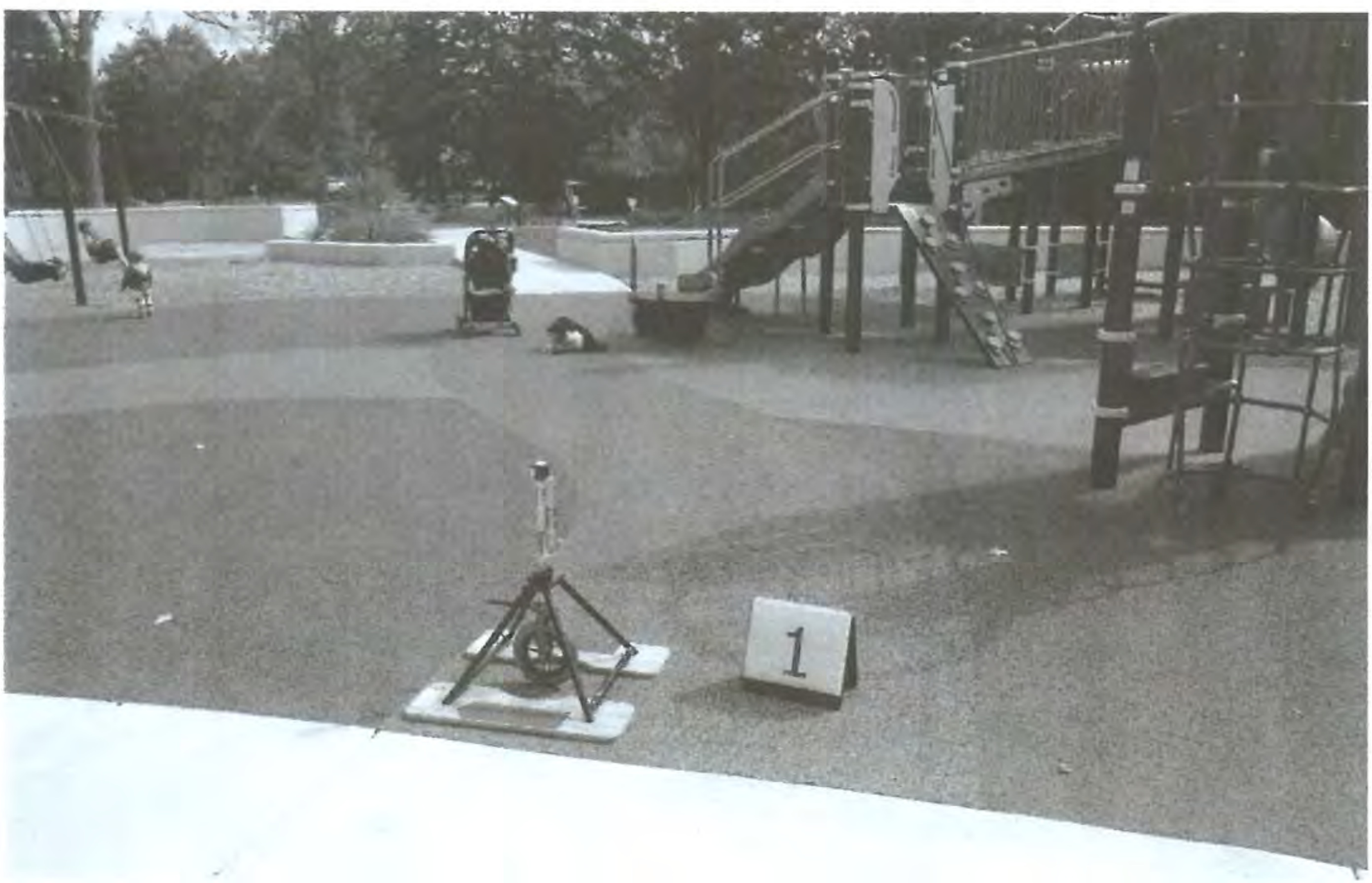
# 2 Follow the Accessibility Standards

The 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design apply to state and local governments (Title II) and places of public accommodation (Title III). The Architectural Barriers Act (ABA) Accessibility Standards apply to federal facilities. Both standards require newly constructed playgrounds and those existing playgrounds that are altered to comply with a series of technical provisions for accessible play components and the accessible route connecting these components.

The accessibility standards are minimum standards and do not require the entire play surface area to be accessible. The only required accessible surface area includes the accessible route from the entry of the play area, at least one connection to each accessible play component (points of entry and egress) and any clear space requirements adjacent to accessible play components. Children's play behavior indicates they spontaneously move throughout the play equipment, navigating on their own preferred routes. Designing the entire use zone as a congruent accessible route is recommended as a best practice to accommodate the free play behavior of all children navigating the play space.

Playground owners, designers and maintenance personnel must have a good understanding of the requirements for accessible routes within the play area and comply with the provisions of the accessibility standards. Outside of the play area, an accessible route must connect at the site arrival point, include parking, and the path to the main entrance of the play area. The accessible route must also connect all accessible elements and features of the play area within the site.

Within the play area, the clear width of the ground level accessible routes shall be 60 inches minimum. Two exceptions may be applied: 1) In play areas less than 1000 square feet, the clear width of accessible routes shall be permitted to be 44 inches minimum, if at least one turning space is provided where the restricted accessible route exceeds 30 feet in length; or 2) the clear width of accessible routes shall be permitted to be 36 inches minimum for a distance of 60 inches maximum provided that multiple reduced width segments are separated by segments that are 60 inches wide minimum and 60 inches long minimum.



Where accessible routes serve ground level play components:

- The vertical clearance shall be 80 inches high minimum.
- The running slope not steeper than 1:16 or 6.25%.
- The cross slope shall not be steeper than 1:48 or 2.08%.
- Openings in floor or ground surfaces shall not allow passage of a sphere more than ½ inch diameter.
- Changes in level between ¼ inch high minimum and ½ inch high maximum shall be beveled with a slope not steeper than 1:2.

For a playground surface to be compliant, both safe and accessible, it must meet the above mentioned technical provisions for running slope, cross slope, openings, changes in level, and vertical clearance. Public playgrounds must also meet referenced standards set by the American Society for Testing Materials (ASTM) related to resiliency for falls (ASTM F1292-99/04) and accessibility (ASTM F1951-99) around accessible equipment. Some jurisdictions and municipalities require surface systems to have certificates of compliance with ASTM standards. These certificates are often awarded through laboratory testing of surface samples. The standards require the actual site-installed surface systems to comply with ASTM F1292-99/04 and ASTM F1951-99.

The surface for the accessible route within the play area must meet the technical provisions of the standards as long as it is open for public use. Further, ground surfaces used for the accessible route are required to be inspected and maintained regularly and frequently to ensure continued compliance with ASTM F 1951-99. From the grand opening celebration to the coldest January day when parents bring their children outside to play and get some fresh air; as long as the playground is open for use, it must meet safety and accessibility standards.

## Applying the Accessibility Standards to the Plan, Installation, and Maintenance of Ground Level Accessible Routes for Playgrounds

The following questions can be used through the planning process, during construction and as part of routine maintenance.

- ✓ Is the surface for the accessible route, clear ground space and turning space compliant with ASTM F1951-99 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment?
- ✓ Does the playground surface comply with ASTM F1292-99/04 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment when ground surfaces are part of the accessible route and also located in the use zones?
- ✓ Is the accessible route part of the main circulation path and is it continuous to each accessible play component?
- ✓ Is the running slope for the ground level accessible route less than 1:16 or 6.25%?
- ✓ Is the maximum cross slope for the ground level accessible route less than 1:48 or 2.08%?
- ✓ Is there a minimum clear width of 60 inches for the ground level accessible route (some exceptions apply)?
- ✓ Are openings in the surface for the ground level accessible route no greater than .50 inch?
- ✓ Are changes in level along the ground level accessible route less than .50 inch beveled?
- ✓ Is the vertical clearance a minimum of 80 inches for the ground level accessible route?
- ✓ Does the clear ground space, 30 x 48 inches minimum, at egress of accessible equipment have a cross slope less than 1:48 or 2.08%?
- ✓ Are the ground surfaces inspected and maintained regularly and frequently to ensure continued compliance with ASTM F1951-99?

For more explanation on the application of the accessibility standards to public playgrounds, see A Summary of Accessibility Guidelines for Play Areas, www.access-board.gov/guidelines-and-standards/recreation-facilities/guides/play-areas.

# 3 Review the Research Findings to Learn More About Accessibility Issues for Surfaces

From 2008 to 2012, the National Center on Accessibility at Indiana University-Bloomington, conducted a longitudinal study on the accessibility of playground surfaces. The study was funded by the U.S. Access Board. The purpose of this study was to evaluate a variety of playground surfaces, their ability to meet accessibility requirements, their costs upon initial installation and maintenance issues over a 3-5 year period.

The research design for this study of playground surfaces began in 2005 with input from a national advisory committee. During the study, quantitative and qualitative data was collected through on-site inspections for a 3-5 year period. A national advisory committee provided feedback on the categories of surfaces to be evaluated, the criteria to be used for evaluation, the locations within each playground to be evaluated, data collection worksheets and on-site protocol. In addition, advisory committee members helped to expand the network for recruitment in the study and increase national awareness among playground owners.

The sample population for this study depended upon an established, or to be established, congenial relationship with the playground owner and the research team. The data for analysis required the research team to make a number of inquiries to the operation, planning, budgeting and maintenance procedures conducted by the playground owner. Most importantly, if there were any instances where locations on the playground were found to be in non-compliance with the accessibility or safety guidelines, the playground owner was to be informed and then carried the burden of bringing those instances into compliance.

Approximately 35 playground sites were recruited for participation during the evaluation period from October 2008 through May 2011. Data collection concluded in September 2012 so that all playground sites in the study would have a minimum of two years of data. All of the playground sites were located in public parks owned/operated by 16 different municipalities from Indiana, Illinois and Michigan. Sites included either neighborhood playgrounds or those located in regional parks. The 16 participating municipalities operated anywhere from 4 to 53 playgrounds each. None of the playground owners were "first time" owners. All of the owners had a history of managing playgrounds. They considered themselves somewhat knowledgeable of playground surface issues and eager to learn how they could improve upon their playground surface maintenance efforts for costs savings.

The playground surface products considered for this study had to initially meet the requirements of the accessibility standards for: accessible routes; ground surfaces; the ASTM F1292-99/04 Standard Specification for Impact Attenuation of Surface Systems

Under and Around Playground Equipment as determined by the surface manufacturer in laboratory testing; and the ASTM F1951-99 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment as determined by the surface manufacturer in laboratory testing. Information on the surface vendor, specifications, costs and labor for installation was then collected. In turn, the research team contacted each vendor to collect additional information on laboratory certification with ASTM F1951-99 for each surface.

Five categories of surfaces were studied: poured in place rubber (PIP), rubber tiles (TIL), engineered wood fiber (EWF), shredded rubber (SHR) and hybrid (HYB) systems. Nine critical areas were inspected within 12 months of installation and continued to be evaluated at least once a year for the longitudinal study:

1) Entry to playground where playground surface starts;
2) Accessible route connecting accessible play elements;
3) Egress point of slide(s);
4) Swings;
5) Entry point(s) to composite structure(s)/transfer stations;
6) Climber(s);
7) Ground level play element(s) such as spring rockers, play tables, interactive panels, etc;
8) Sliding poles; and
9) Other areas (i.e. water play elements, etc).

A preliminary accessibility assessment of the playground surface was conducted and the surface tested for firmness and stability with the Rotational Penetrometer. At the discretion of the playground owner, the playground surface was also tested for impact attenuation with the TRIAX (surface impact testing device). The playground owner was notified immediately of test results for both the Rotational Penetrometer (firmness/stability) and the TRIAX (impact attenuation) and given opportunity to correct surfaces where deficiencies or non-compliance with standards were noted.

## NCA Play Surface Study Findings

The most valuable lesson to be learned from this longitudinal study is that there is no perfect playground surface. Even within 12 months of installation, each type of surface had some type of issue or series of issues that affected the product's performance and contributed to the necessity and frequency of surface maintenance to assure accessibility and safety for use by children on a daily basis. A playground surface with poured-in-place rubber had a use zone found in non-compliance with the ASTM standard for impact attenuation. Playgrounds surfaced with tiles were observed with puncture holes, buckling and separating seams that created openings and changes in level on the accessible route. Inaccessible routes with undulating surface material were identified at playgrounds with engineered wood fiber. Each occurrence and event was weighed and balanced with the product's feature advantages and drawbacks. The information can serve as guidance to both future playground planning and priorities for designing new research. The following are the predominant findings from this study:

1. No single type of surface material/system was found to be the most accessible surface or better than others when comparing its ability to meet the accessibility standards with issues related to installation and maintenance.

2. Within 12 months of installation, playground sites in the sample with the loose fill EWF were found to have the greatest number of deficiencies, such as excessive running slope, cross slope, and change in level, affecting the accessible route to play components.

3. Within 12 months of installation, playground sites in the sample with loose fill EWF were found to have the highest values for firmness and stability, indicating greater work force needed to move across the surface, while playground sites with the unitary surfaces TIL and PIP were found to have the lowest values for firmness and stability– indicating less work force necessary to move across the surface.

4. Deficiencies (excessive running slope, cross slope, change in level, or openings) for PIP, TIL and HYB began to emerge 24-36 months after installation.

5. Occurrences were identified in the sample where the surface material installation did not parallel either the manufacturer's installation instructions or the procedural instructions on the laboratory test sample for ASTM F1951-99.

6. A playground surface with fewer accessibility deficiencies and a lower measurement for firmness and stability did not necessarily meet the safety standards for impact attenuation.

7. Surface cost for material cannot serve as an indicator or predictor of performance.

The full report *A Longitudinal Study of Playground Surfaces to Evaluate Accessibility: Final Report* is available on the National Center on Accessibility web site: ncaonline.org

# Comparison of Playground Surfaces Evaluated in NCA


## Poured in Place Rubber (PIP)

**DESCRIPTION**

Wear layer with larger rubber particles and finished with a custom top layer of granular particles. A binding agent is used and the material is poured out on site or "in place" as it gets its name.

**COST (Average market cost 2009-2012)(MATERIAL ONLY)**

$6.59 to $19/sq ft

**INSTALLATION**

Installer must be specially trained/certified by the manufacturer.

**REPAIRS**

Repairs must be conducted by trained installer.

**COMMON ACCESSIBILITY ISSUES**

Cracking or flaking of the top layer can lead to divots and openings greater than 1/2 inch. Top layer deficiencies are often accelerated in high use areas (under swings, slides, teeter-totters). Results in non-compliant routes and clear ground spaces at equipment. May also result in non-compliant cross slope at entry/egress. Surface deficiencies can be traced to improper binding agent ratio, inability for product to properly cure, and deterioration of product over years of exposure to the elements.

## Tiles (TIL)

**DESCRIPTION**

Bonded rubber constructed as 2 ft x 2 ft squares with interlocking sides.

**COST (Average market cost 2009-2012)(MATERIAL ONLY)**

$8.96 to $21/sq ft

**INSTALLATION**

Can be installed by contractor or park/facility personnel. Learning curve associated with installation.

**REPAIRS**

Repairs may be completed by contractor or park/facility personnel.

**COMMON ACCESSIBILITY ISSUES**

Puncture holes and shifting seams can create openings and changes in level along the accessible route and at clear ground space for equipment. Foreign particles can lodge in seams causing separation including lift from adhesive for subsurface. Instances of cracking may occur as the product ages. Settled or washed out subsurface may compromise structural integrity of individual tiles.

# Longitudinal Research Study

## Engineered Wood Fiber (EWF)

**DESCRIPTION**

ASTM defines EWF as processed wood ground to a fibrous consistency, randomly sized, approximately 10 times longer than wide with a maximum length of 2 inches. Free of hazardous substances. Not to be confused with wood chips.

**COST (Average market cost 2009-2012)(MATERIAL ONLY)**

$ 0.74 to $2.50/sq ft

**INSTALLATION**

Can be installed by contractor or park/facility personnel.

**REPAIRS**

Repairs may be completed by contractor or park/facility personnel.

**COMMON ACCESSIBILITY ISSUES**

Improper installation and/or maintenance can result in undulation across the horizon of the surface affecting running slope, cross slope and change in level. Product material should be installed in layers and compacted in order to achieve an accessible route and level clear ground space at equipment. Surface material is likely to displace at heavy use areas with motion, such as at swings, slides, sliding poles, climbers, spinners and teeter totters. Displaced material should be raked level and compacted before additional fill is added.

## Hybrid Surface Systems (HYB)

**DESCRIPTION**

Multi-layer system where the base layer may consist of either contained or loose particles like shredded rubber or carpet pad. The top layers may be outdoor carpeting, artificial turf, or rubber top mat.

**COST (Average market cost 2009-2012)(MATERIAL ONLY)**

$7.50 to $12.65/sq ft

**INSTALLATION**

Installer must be specially trained/certified by the manufacturer.

**REPAIRS**

Usually repairs must be conducted by the installer. In some cases, park/facility personnel may be trained to make smaller repairs.

**COMMON ACCESSIBILITY ISSUES**

Seams may separate or detach from the border creating changes in level and openings affecting the accessible route. Shifting of loose fill in the base layer may affect running and cross slopes. The artificial turf top layer may experience build-up of static electricity requiring application of anti-static solution.

# 4 Assess During the Planning, Installation and Maintenance Phases

**Quick Reference**

Running slope = 1:16 or 6.25% max

Cross slope = 1:48 or 2.08% max

Changes in level = 1/4 inch max (no bevel)
1/2 inch max (with bevel)

Openings = 1/2 inch max

Once the playground surface is installed, an on-site inspection of the surface system should be conducted along the accessible routes, at the clear ground spaces for entry/egress of equipment and required turning spaces. A digital level can be used to measure the running slope and cross slope. A 2 ft. digital level is most commonly used for accessibility assessments as it can measure greater variances within the cross slope than a longer level. A tape measure can be used to check any changes in level and openings on the accessible route. Changes in level should also be checked at transition points where the surface material changes. The firmness and stability of the playground surface along the accessible route can be measured in the field with a Rotational Penetrometer.

*The maximum running slope for the ground level accessible route must not exceed 1:16 or 6.25%. Using a digital level is one option for measuring the slope of the ground level accessible route.*

*Measure the clear ground space in all directions with a digital level to ensure it is less than 1:48 or 2.08%. The clear ground space at all accessible play components entry and egress must be level for a child to transfer safely from a wheelchair to the play component.*

*Openings or gaps in the surface cannot exceed a 1/2 inch.*

*Check for changes in level, especially at transitions between surfaces. Changes in level from 1/4 inch to 1/2 inch must be beveled.*


When conducting an assessment of the ground level accessible route, it helps to start with "the big picture" -- to view the play area in its entirety. Begin at the entry to the play area. Identify the accessible play components and the path to entry/egress for each piece of accessible equipment. Then focus in on the accessible route. Each segment of the route should be assessed for compliance with the accessibility standards. Look for the worst areas, those locations where the slope or cross slope may exceed the standard, where changes in level may be too high, or where openings may be too large.

One method to assess the ground level route using the photo above would be to look at each route segment, such as:

1. From the entry of the play area where the surface begins to the transfer system at the composite play structure.
2. The clear ground space at the transfer system.
3. Segments at each accessible elevated component egress to ground level, the clear ground space at egress, and the connector loop back to the transfer system, such as the segment from the right of the double slide and the clear ground space at the bottom of the slide to the transfer system; and
4. The segment to the right of the transfer system to the climbing wall including the transition from the poured in place surface to the engineered wood fiber and the clear ground space at the climber.
5. The segments from the entry and composite structure to the swings, including the clear ground space at a swing.
6. Segments to each accessible ground level play component.
7. Segments to other accessible play areas.

The purpose here is to look for deficiencies in order to make corrective actions. All of the technical provisions must be met through the entire route for it to be considered accessible. Thus, each segment should be assessed for slope, cross slope, change in level, openings, firmness and stability (which will be discussed in greater detail in the next sections). It would be inaccurate and incomplete to only measure slope at one segment, cross slope at another, or to average the data for three segments. Every segment of a route is used by people with disabilities, therefore it is critical that each segment meet the minimum standards.

# Measuring Up: Playground Surface Field Testing

Regular inspections of the playground surface and equipment should be conducted to ensure continued safety and accessibility for all users. These inspections should include safety checks, the accessibility assessment of the accessible route, and field testing of the playground surface. Field testing conducted on the playground surface in the use zone should measure the impact attenuation for children who may fall, along with firmness and stability for accessibility to people with disabilities. This field testing should be conducted upon installation and throughout the life cycle of the playground. The Accessibility Standards require the accessible route within the play area comply with two referenced ASTM standards: ASTM F1951-99 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment; and ASTM F1292-99/04 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.

## ASTM F1951-99: Lab Test

This is a laboratory test measuring the work force required for a 165 (+11 or -4.4) lb. individual in a manual wheelchair to propel across a given surface.

The lab test uses a 7 percent ramp as a baseline for the wheelchair rider. After the baseline is established, the rider conducts a series of straight propulsions over the sample surface for a minimum distance of 6.56 ft. The force needed to propel the wheelchair rider over the surface is measured. A second series of tests are then run where the wheelchair rider makes a 90 degree turn and the force is measured again. If the average work per foot for the sample surface is *less* than the work force to propel up the 7 percent ramp, the surface sample is considered as passing ASTM F1951-99. The advantage of the ASTM F1951-99 test procedure is that it provides a starting point to compare various surfaces by an objective measurement. However, the primary disadvantage and criticism of the protocol is that it is designed as a lab test in a controlled environment and cannot be easily replicated in the field or outdoors at multiple playground sites. Researchers have attempted to address the portability of this test protocol with the development of the Rotational Penetrometer (RP) described below.

## Firmness and Stability: Field Test

While the ASTM F1951-99 protocol does not include a procedure for field testing outdoors at a playground, a field test method has been developed by the same engineering company that developed the original lab test method. A portable instrument known as a Rotational Penetrometer (RP) has been designed to measure the firmness and stability of surfaces. For the purpose of the NCA study, the Rotational Penetrometer was used as the field instrument to measure firmness and stability in lieu of the costly equipment for ASTM F1951-99. Documented research has shown the Rotational Penetrometer to have a high degree of repeatability and reproducibility (ASTM, May 27, 2005; ASTM, September 2010). These research findings also correlate to the lab test.

*The "wheelchair test" is conducted on a sample test bed in the lab to determine the results for ASTM F1951-99.*

*A Rotational Penetrometer (RP) is used here to measure the firmness and stability of the surfaces.*

The RP design includes a wheelchair caster placed on a spring loaded caliber in a metal tripod frame which suspends the caster about 6 inches over the surface. When the caster is released, the spring load gauge replicates the force of an individual in a wheelchair over a given surface. The penetration into the surfaces is measured for readings of "firmness" and "stability." National experts recognize the use of the Rotational Penetrometer as a portable and relatively easy device to use for surface testing. The field test method with the RP can be added to the assessment process just as measurements for slope, cross slope, change in level and openings are taken along segments of the accessible route for the play area. The RP can measure those segments for firmness and stability. This can be valuable in assessing how an installed surface performs over time.

## Impact Attenuation: Lab & Field Test

In the field, ASTM F1292-99/04 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment is also known as the "head drop test." It is a test to make sure the surface is resilient enough to prevent a life-threatening injury from a fall. A 6 inch diameter aluminum hemisphere in the shape of a child's head is dropped from the top of a tripod based on the fall height of play components. The aluminum hemisphere, or missile as it is called, contains an accelerometer. When dropped, the impact attenuation of the surface is measured in G-max and by the Head Injury Criteria (HIC). G-max is a measurement of the maximum acceleration, while HIC measures an integral of the acceleration time. The maximum values allowable by the standard are 200 for G-max and 1,000 for HIC. A TRIAX is the instrument used to conduct this test in the field.

*A TRIAX is used here to test impact attenuation or the play surface's ability to absorb a fall and reduce severity of injury.*

## Playground Owners Can Utilize Field Testing to Get the Most Out of Their Surface Installation

The NCA surface study found the need to conduct field testing immediately following installation and throughout the life of the playground surface is critical to insure compliance with ASTM F1292-99/04 and ASTM F1951-99. A surface location can appear to be very accessible by the "look" of it. However, results may be surprising when the surface is actually field tested. This point is illustrated at NCA study sites managed by two different agencies.

One of the participating municipalities manages more than 30 park playgrounds, predominately surfaced with engineered wood fiber (EWF). The park maintenance personnel usually install the EWF by raking it level, allowing it to settle over time and topping off seasonally. The research team found the results for firmness and stability were not consistent with the manufacturer's ASTM F1951-99 results. The inconsistency was found in the installation process. The research team informed the playground owner of the field test results. Then the park maintenance crew changed their procedure for installation and also began compacting the surface material when it was topped off. Subsequent field testing yielded much better results for firmness and stability.

Another playground owner opted to also have the surface tested for impact attenuation and compliance with ASTM F1292. Drop heights from composite equipment up to 8 ft. high passed the field test. But it was the poured in place (PIP) surface at two swing bays that was found in non-compliance with HIC scores well over the 1,000 HIC allowable under the standard. The playground owner used the terms of the warranty and purchase order as a binding agreement requiring the manufacturer, at its own expense, to return to the site and repair the surface installation. Approximately 2,000 sq. ft. at the swing bays was resurfaced to add more depth to the PIP. When the surface area was retested, the HIC ranged from 650-750 at the swings, well under the 1,000 maximum allowable by the standard. Had the playground owner not discovered the non-compliant surface area until after the warranty had expired, it would have cost the agency in excess of $35,000 to correct the surface area serving four swings. During the course of the longitudinal study, at least two additional playgrounds surfaced with PIP were found in non-compliance with ASTM F1292. In each case, the playground owners required the installers to return to the site to make corrective actions.

The only way to verify the surface is installed similar to that in which it passed the laboratory test is to conduct field testing.

# 5 Comparing Surface Options Can Assist Planning Team in Selection Process

Like any big ticket purchase, comparison shopping is essential in the planning process. The planning team should embark on a purposeful mission to determine the playground surface system most appropriate for their site and operational resources. Some agencies may have more capital dollars at the front of the project for a surface system that costs a little more but requires less maintenance. Others may have a smaller project budget for a less costly surface, but have more operational funds for daily/ weekly maintenance.

The planning team should engage with all representatives from all surface systems under consideration. Decision-makers should dialogue with the surface supplier regarding realistic, objective measurements to evaluate surface performance and maintain the surface material over the life span of the playground. Decision makers must ask very specific questions to fully benefit from the advantages and costs-savings of a surface system. The dialogue with the manufacturer or sales rep should address:

- Specific written instructions for installation.
- Written description of the base, sub-base and required drainage system.
- Results of ASTM F1951-99 laboratory tests, including the values for the baseline, straight propulsion and turning runs. The test results should also include a description of how the surface was prepared for the lab tests and should be consistent with the installation instructions.
- Results of ASTM F1292-99/04, with written confirmation of the critical fall height for the surface material. These test results should include the depth of the surface material for drop heights. The critical fall height shall be higher than the fall height of the highest equipment on the playground.
- Written description of the maintenance and frequency necessary to maintain the accessible route and clear ground spaces.
- The field test procedures to assess the surface for impact attenuation and accessibility upon initial installation and periodically through the life of the product. This should include selection of an independent testing agent and optimum values for ASTM F1292-99/04 and ASTM F1951-99 when field tested.
- A minimum 5-year warranty that stipulates compliance with ASTM F1292-99/04 and ASTM F1951-99, field testing strategy, limitations, exclusions or preconditions, remedies available to the playground owner, and process for making a claim.

The playground owner should also ask the manufacturer for a list of customers in the area that have installed the surface material in the last 5-10 years. The planning team should talk to those customers and visit older installations to find out what issues may have come up with installation and maintenance.

If the surface system is to be installed by a contractor, those customer sites should also be visited to view the contractor's expertise and craftsmanship. It is important to visit older installations to see how the product has aged and what maintenance issues may have arisen over time.

The chart provided on pages 8-9 describes the playground surfaces included in the NCA surface study: poured in place rubber, rubber tiles, engineered wood fiber and hybrid systems. Other surface materials such as sand, pea gravel and shredded rubber have been used in playground construction. However, if used as part of the ground level accessible route, these surface materials must meet the accessibility standards, including the referenced ASTM standards. Many manufacturers continue to use technology and research to develop new and improved surface systems. The planning team should be on the lookout for new innovations, but at the same time ask questions and visit site installations. This inquiry will give the decision makers a greater understanding of what to expect from different products over the lifespan of the playground.

# 6 Proper Installation of Playground Surface is Key for Long Term Use and Maintenance

An accessible surface system can be rendered useless if it is not properly installed. Installation of surface systems should be performed by individuals knowledgeable of the accessibility standards and with expertise working with the surface materials. Surface materials/systems can be installed by both contractors and the playground owner's maintenance staff. Some manufacturers require contractors/installers to have special training and/or certification. Poured in place rubber (PIP) is almost exclusively installed by contractors specializing in the surface material. Some playground owners believe the intensive installation requirements for PIP, from mixing the binder to troweling the material level, are best completed by contractors experienced with the surface material. On the other end of the spectrum, engineered wood fiber (EWF) is most frequently installed by park maintenance crews and perceived as relatively easy compared to other surface materials. Somewhere in the middle, tile (TIL) and hybrid systems (HYB) are known to be installed by both contractors and park maintenance personnel.

*The playground site has been graded with earth-moving equipment. The concrete base has been prepared and is awaiting the application of the poured-in-place rubber (PIP) system. At this site, the playground equipment and surface system will be installed by a contractor specializing in playground construction.*

There is a perception among playground owners that installation of surface systems by their own park crew will produce cost savings for the agency. However, there is a learning curve with the installation process that can prove to be challenging. During the NCA surface study, a playground owner selected a surface based on the perception it would be easy for park crews to install. The first installation was perceived as so difficult for the park maintenance crew that any cost savings was mitigated by the lengthy learning process. By the time the playground owner had installed its fourth playground with TIL, the agency had decided to transition to a different surface. On the contrary, another playground owner that contracted the installation to a preferred manufacturer's installer was very pleased. Intensive installation may mean the contractor is the only one able to make repairs such as those due to vandalism or patches at locations where equipment may have been removed. The costs for return repairs or patches can be dependent upon whether the project is covered under the warranty.

*The base layer of crumb rubber has been installed. The top layer, a rubber mat system, is fit around equipment and the seams are joined. Both the equipment and surface system at this site will be installed by the park maintenance crew.*

Critical details must be communicated between the design and construction phases, regardless of whether the installation is by contractor or park/facility personnel. Site plans and construction drawings should provide details like maximum running slopes and cross slopes, beveled edges, transitions, adjoining seams and affixing the surface material to the border. Preparation of the base and sub-surfaces should be explained. Lack of attention to drainage or omission of weed barriers between layers can lead to sub-surfaces being washed away, base layers infiltrating top layers, and excessive moisture contributing to the growth of mold and vegetation. All of these issues can affect the usability, the safety and the accessibility of the playground surface. Accessibility deficiencies arising out of installation were associated with all of the surfaces in the NCA study.


## Poured in Place Rubber (PIP)

Accessibility deficiencies at PIP sites were commonly found in areas where the granules from the top layer had started flaking off. This flaking condition has been linked to either inadequate ratio of bonding agent to granules when mixed on site; and/or failure of the bonding agent to properly cure when installed at 40 degrees Fahrenheit and falling. The manufacturer installation instructions show the preferred atmospheric temperature for installation to be 40 degrees Fahrenheit and rising. Left unattended over time, areas where the top granular layer has flaked away can lead to non-compliant clear ground space at play equipment such as swings, transfer systems and the egress of slides. Deficiencies related to installation methods may not become evident for months or even years. Thus, it is necessary for the playground owner to prepare for these situations prior to purchase through the terms of the warranty and/or specified funds for maintenance.

## Tiles (TIL)

The NCA study identified accessibility deficiencies with TIL most often related to puncture holes ranging from .50 inches to more than 2 inches in diameter and locations where the seams had started to shift or buckle creating openings and changes in level along the accessible route. The puncture holes may be products of intentional vandalism or unintentional damage from users stepping on rocks and other foreign objects with enough force to penetrate the surface. Loose particles are also known for lodging in the TIL seams causing separation at the seams. Left unattended, the particles can lodge so deep in the seams that the adhesive can degrade and the TIL can separate from the concrete subsurface. As the product continues to age, instances of cracking have been identified where either the subsurface or structural integrity of the surface product is compromised. Because TIL are made from rubber product, the surface should continue to be monitored throughout its life cycle for its ability to meet the impact attenuation requirements of ASTM F1292.

## Engineered Wood Fiber (EWF)

Sites installed with EWF were found to have the highest number of accessibility deficiencies within the first year of installation. Because EWF is a loose fill surface, it is frequently observed with accessibility deficiencies related to running slope, cross slope and change in level. EWF has been observed with undulation across the horizon of the surface area. The undulating surface material creates changes in level, running and cross slopes exceeding the maximum allowable standards resulting in non-compliant accessible routes to play components. It is critical for the manufacturer/supplier and the playground owner to communicate the process for installation. In most instances it is necessary for the loose material to be installed in layers, watered and compacted in order to achieve an accessible route and level clear ground space at equipment. Some playground owners consider the installation of EWF as an opportunity to use volunteers to assist in compaction by running drum roller teams across the surface area.

## Hybrid Surface Systems (HYB)

Two of the three different types of HYB systems (outdoor carpet and artificial grass) were installed by contractors representing the manufacturers. These surface systems required installers experienced with laying the sub-surface, adjoining seams, and affixing the surface material to the border. Separation at the seams appeared to be the most prevalent concern following installation. Repairs to seams must be made by the contractor and costs are dependent upon the terms of the product warranty.

# 7 Commitment to Ongoing Care and Maintenance

Maintenance is one of the greatest factors affecting the accessibility of playground surfaces. The accessibility standards require ground surfaces to be inspected and maintained regularly and frequently to ensure continued compliance with ASTM F1951-99. Therefore playground owners should have a thorough understanding of the care and maintenance required for their selected surface systems. Some surface materials may only require seasonal maintenance, while others may require weekly or daily maintenance. The frequency of maintenance is dependent on the surface material and number of users.

The NCA surface study showed there was a lack of installation/ maintenance information provided by the manufacturer to the playground owner prior to purchase and there was a steep learning curve related to working with various surface systems. Each of the 16 participating municipalities had maintenance personnel trained through either the National Recreation and Park Association's Certified Playground Safety Inspector program or the Illinois Park District Risk Management Association (PDRMA). The participating agencies recognized maintenance as a critical need in order to provide a safe environment for the public to recreate. All of the municipalities had "playground crews" responsible for visiting each playground site, making visual inspection of the area, collecting trash, and completing repairs as needed. The playground crews ranged in number from 1-3 staff, usually with one full-time employee and 2-3 seasonal staff during the summer months. At least 30 minutes was spent on site. However, the frequency of visits to each site varied among the different agencies. Large playgrounds at regional parks and sites where programming occurred were most often visited. Some were visited daily during peak summer months. Smaller neighborhood parks may have been visited 1-3 times per week or two times per month.

Surface deficiencies were found to exist at each site regardless of the frequency of visits by the playground crew. Maintenance crews should receive training both on the accessibility standards and the care specific to the surface material. Over the course of the longitudinal study, the research team found that where the playground crews became more engaged in the study, the maintenance specific to accessibility began to improve. At least three EWF sites had improved accessibility where the surface material was observed as more level and better compacted than previous site visits. One site utilizing PIP as the primary access route and EWF as the secondary access route was assessed with less than 1 percent slope at the transition between the two surface materials. This was observed as the most improved and maintained transition between surface materials of the sample.

*Over time, the unitary surface may separate at the seams or from the border creating gaps, openings or changes in level that will require repair.*

*Loose fill materials, like EWF, may experience undulation of the surface material and or displacement under heavy use areas with motion such as at swings, slides, sliding pools, climbers, spinners and teeter totters. This will require the surface material to be raked level, filled and compacted so that the clear ground space is level in all directions for a safe transfer onto and off the equipment.*

## Poured in Place Rubber (PIP)

PIP was recorded as the surface material requiring the fewest instances of maintenance. Maintenance areas were noted where the surface had cracks, buckles, openings or a granular layer had worn away under high traffic areas like swings, transfer steps and the egress at slides. While PIP had the fewest instances requiring maintenance, it is still notable because the surface repairs can be extensive. Repairs must be done by either the original installer or professional certified by the manufacturer resulting in added costs. The patch repairs also necessitate cutting away a larger section of surfacing in order to fill and level the deficient area.

## Tiles (TIL)

TIL sites were recorded with a high number of locations in need of maintenance. TIL deficiencies included punctures holes ranging from .50 inches to more than 2 inches in diameter; and instances where the seams had started to shift or buckle creating openings and changes in level along the accessible route. It was unclear whether the puncture holes were products of intentional vandalism or unintentional damage from users stepping on rocks and other foreign objects with enough force to penetrate the surface. Playground owners in the NCA study reported their maintenance crews were able to replace the TIL with puncture holes. Deficiencies were also identified at sites surfaced with a combination TIL and EWF. The intent of the playground design was to use the TIL as the primary accessible route to points of entry/egress and fill the remaining use zone with EWF. The loose fill particles of EWF were scattered throughout the play area, across the tiles, concrete walkway and in the grass. Some of the particles had started to lodge in the TIL seams causing separation at the seams. There were even instances where the particles had lodged so deep in the seams that the adhesive had degraded and the TIL had separated from the concrete subsurface. Over time, these areas would be identified with changes in level and openings requiring repair or replacement of the individual tiles.

## Engineered Wood Fiber (EWF)

EWF sites were recorded in need of maintenance most frequently and earliest in the NCA study. Sites surfaced with EWF were commonly found to have an undulating surface material creating changes in level, along with running and cross slopes exceeding the maximum allowable standards. This would result in non-compliant accessible routes to play components. Large areas where the loose material had been displaced under heavy use areas with motion such as at swings, slides, sliding poles, climbers, spinners, and teeter totters were observed at all of the sample sites with EWF. A kick-out area at a swing could be as large as 3 ft. x 8 ft. with a depth of more than 5 inches. The accessibility standards require the minimum 30 x 48 inch clear floor space for transfer to/from the accessible play components to have a level surface with less than a 2.08 percent cross slope in all directions. The displaced surface material at locations such as the bottom of slides, a swing, or ground level play component rendered the accessible route to the play component non-compliant with the accessibility standards. Maintenance issues at sites began to emerge where the product was filled at the kick-out area rather than the raked level, compacted and then filled and compacted. Where the kick-out areas had been filled, the surface material would eventually be displaced. Over time this created higher undulating mounds at the front and back of the kick-out area and greater cross slopes within the required clear floor space.

At locations where the EWF was paired with a unitary surface, deficiencies were identified at the transition between the two surface materials. The EWF had settled by 1-5 inches creating a change in level and excessive running slope up to 16 percent at the transition. This was most prevalent at sites installed with PIP as the primary access route. At locations where TIL was intended as the primary accessible route and EWF was used as secondary safety surfacing, the EWF particles began contaminating the TIL seams.

To the layman, the terms EWF and woodchips are often, incorrectly, interchanged. The difference between EWF and wood chips are the additional processes beyond the typical landscape chipper. Unlike woodchips out of the chipping equipment, EWF is shredded again, stamped/flattened and made pliable to the extent that the particles will weave together to create a traversable, impact attenuating surface. In addition, there is an ASTM standard specification for EWF (ASTM F2075) further distancing the material from any product made on site or purchased from a nursery or home improvement store. The ASTM standard for EWF requires the particles be small enough to pass through a series of three sieves, ¾ inch, 3/8 inch and No. 16 (0.0469 inch). The sample is considered compliant if no more than 1 percent residue is left on any individual sieve. Large wood particle chips, chunks and shredded twigs were found at all of the EWF sample sites. The observable quantity of large wood particles raised into question whether a test sample from any of the sites would comply with the ASTM standard specification for EWF and specifically the sieve test. In addition to the large particles, there were instances where vegetation and mold were found growing in the surface material.

## Hybrid Surface Systems (HYB)

As tested within 12 months of installation, all three HYB surface systems were observed to have minimal deficiencies, comparable to PIP. One of the most commonly noted deficiencies among the HYB was separation at the seams that created openings and changes in level greater than ½ inch. A build up of static electricity was also found to occur seasonally with the artificial grass hybrid system.

# What Every Playground Owner Should Know About the Accessibility of Their Playground Surfaces

1 All successful, inclusive playgrounds start with comprehensive planning. The site selection and layout of the accessible route should be considered alongside the selection of the play equipment. A site survey may also be necessary.

2 The accessibility standards apply to playgrounds in parks, malls, schools, child care facilities and other public accommodations covered by the ADA and the ABA. Playground owners, designers and maintenance personnel must have a good understanding of the requirements for ground level accessible routes within the play area.

3 Accessibility assessments of the play area should be conducted during planning on paper, installation on site, and for ongoing maintenance. The assessment should include the accessible route throughout the play area along with clear ground space at entry/egress to accessible equipment. The areas should be checked for compliance with running slope, cross slope, changes in level and openings.

4 Comparison shopping is essential in the planning process. Decision makers should engage with suppliers to gather information on various surfaces and evaluate surface options. The sales rep should provide documentation on installation, field testing, maintenance and a minimum 5-year warranty. The planning team should talk to customers and visit installations to find out what issues may have come up with installation and maintenance.

5 The research findings tell us there is no perfect surface. Each type of surface requires the playground owner understand its characteristics and what is required with installation and maintenance.

6 Proper installation of the playground surface is critical for long term use and maintenance. An accessible surface system can be rendered useless if it is not properly installed. Installation should be performed by those knowledgeable of the accessibility standards and with expertise working with the surface materials. Field testing should be conducted following installation and periodically through the life of the surface system.

7 Playground ownership is a commitment to ongoing care and maintenance. Maintenance is one of the greatest factors affecting the accessibility of playground surfaces. Playground owners should have a thorough understanding of the care and maintenance required for their selected surface systems.

Adapted from *7 Things Every Playground Owner Should Know About the Accessibility of Their Playground Surfaces*, a publication of the U.S. Access Board and the National Center on Accessibility.

IPEMA INTERNATIONAL PLAY EQUIPMENT MANUFACTURERS ASSOCIATION

# *Maintenance for Engineered Wood Fiber (EWF) to meet ADA Requirements*

## Maintenance:

Maintaining your EWF surface is critical to keeping your surfacing ADA compliant. The frequency of the maintenance information below should be conducted in accordance with the manufacturers' recommendations.

1. Visually inspect the entire playground area. Remove all foreign material (i.e. trash, tree branches, etc.).

2. Rake the EWF to keep the surface level and the thickness to the original recommended depth. A level surface is necessary for wheelchair access and compliance with ADA requirements. Wear mats can reduce or eliminate the need to rake the EWF in high traffic areas such as swings and slide exits. Be sure the transition between the wear mats and the EWF is level.

3. At accessible entrances onto the playground surface, ensure that the surface material, accessible route or the top of the access ramp is within ¼" of the top of the play area border. An ADA compliant access ramp into the play area will help reduce maintenance in this area.

4. In the highest use areas and around equipment footers, dig down to the subsurface or drain system and measure the depth of the EWF. Ensure that the depth is sufficient for the fall height of the structure or at the manufacturer's original recommended depth, whichever one is greater. Add EWF as necessary, level, wet and compact. The use of markings on the play structure supports or on the containment barriers is also recommended as a means to ensure depth of surface is kept to original thickness.

5. Visually inspect all wear mats for tears, cracks and general wear. Add EWF around the wear mat to ensure a smooth transition from wear mat to surface. Turn wear mats over periodically and add EWF beneath them to bring wear mats up to original grade.

6. Check the performance of the drain system by ensuring that water is flowing from a drain system outflow pipe immediately after rain. Also, make sure there is no standing water on the playground surface. It is important to have a functioning drainage system to improve EWF life expectancy and the resilience of the surfacing.

*Note: This is a technical document and in no way is an endorsement for any particular surfacing. It is intended to assist the playground owner in making their playground a well-maintained and accessible area. It does not imply that an injury cannot occur. For more information about the IPEMA certification program, go to www.ipema.org.*

INTERNATIONAL PLAY EQUIPMENT MANUFACTURERS ASSOCIATION

# ***Installation for Engineered Wood Fiber (EWF) to meet ADA Requirements***

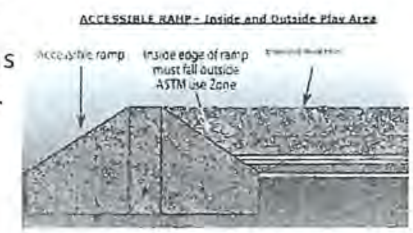
IPEMA believes that following the installation and maintenance recommendations below will result in greater accessibility and compliance with ADA requirements for EWF accessible surfacing under and around playground equipment. EWF accessible surfacing should meet the ASTM F1951 surface accessibility standard. Request a copy of the manufacturer's ASTM F1951 surface testing report to confirm that the product meets the maneuverability performance requirements of the accessibility standard.

## Installation:

1. Please visit the IPEMA website (www.ipema.org) to print a certificate showing the engineered wood fiber is IPEMA certified for ASTM F1292-impact attenuation within the use zone of the playground equipment, F2075- sieve analysis, tramp metals and hazardous metals.


2. Prepare the site in accordance with the project engineer's directions and project specifications.

3. Install drainage as recommended by the manufacturer of the engineered wood fiber (EWF). Drainage installation is recommended to increase the life of EWF, reduce mold and fungus issues and help retain resiliency during cold temperatures. Different drainage systems are available. Pictured to the right is a typical gravel drainage model.




4. Installing one or more compliant ADA ramps into the play area is recommended to allow an accessible entrance to and from the play area.

5. Once drainage is installed, proceed to install the EWF at the recommended thickness per the equipment manufacturer's recommendations. Be sure the surface is level & compacted. Optional: To speed up the natural compaction process, once drainage is installed, install the EWF in layers, 6-8" at a time. Rake, level and wet the surface before compacting with a mechanical compactor after each layer is installed. Change direction 90 degrees between each layer. Repeat these steps until the desired surface thickness is achieved.

6. In kick-out areas, such as swings and slides, install wear mats on top of the EWF to prevent holes and to maintain a level surface. Be sure these mats are installed in such a way as they do not have an edge above the surface that will create an accessibility issue. Tapered edges are recommended.

**Typical wear mats installed in kick-out areas.**

*Note: This is a technical document and in no way is an endorsement for any particular surfacing. It is intended to assist the playground owner in making their playground a well-maintained and accessible area. It does not imply that an injury cannot occur. For more information about the IPEMA certification program, go to www.ipema.org.*

Appendix 4

# Installation and Maintenance for Engineered Wood Fiber (EWF) by Building Products Plus

IPEMA believes that following the installation and maintenance recommendations below will result in greater accessibility and compliance with ADA requirements for EWF accessible surfacing under and around playground equipment. EWF accessible surfacing should meet the ASTM F1951 surface accessibility standard.
Request a copy of the manufacturer's ASTM F1951 surface testing report to confirm that the product meets the maneuverability performance requirements of the accessibility standard.

Installation:

1. Please visit the IPEMA website (www.ipema.org) to print a certificate showing the engineered wood fiber is IPEMA certified for ASTM F1292-impact attenuation within the use zone of the playground equipment, F2075- sieve analysis, tramp metals and hazardous metals.

2. Prepare the site in accordance with the project engineer's directions and project specifications. Remove all vegetation, rocks, roots and other protrusions to bare soil. Grade and level so that the area drains consistently and quickly after a rain. Do not use herbicides, insecticides, fungicides,or any other chemicals. Avoid using land that has been treated with chemicals in the past. The wood fiber material should be contained within borders which meet safety standards designated by the Consumer Product Safety Commission. Railroad ties are not suitable, neither is any kind of lumber which has been treated with chromated copper arsenate (CCA). A professional playground installer can guide the consumer to the purchase of proper border materials. A border is essential to keep the wood fiber in place and at its proper depth.

3. Install drainage as recommended by the manufacturer of the engineered wood fiber (EWF). Drainage installation is recommended to increase the life of EWF, reduce mold and fungus issues and help retain resiliency during cold temperatures. Different drainage systems are available. Pictured to the right is a typical gravel drainage model.

4. Installing one or more compliant ADA ramps into the play area is recommended to allow an accessible entrance to and from the play area.

5. Determining depth of material: We recommend 12" (twelve inch) compacted depth of wood fiber surfacing for all public play areas. "Compacted depth" takes into account the natural settling of wood fiber products. Our wood fiber compacts at a uniform 25%. Maximum practical impact attenuation is achieved with 12" (twelve inch) compacted depth of material, and this is the standard we recommend for all public play areas. This is also referred to as 16" „straight" (non-compacted) depth

6. In kick-out areas, such as swings and slides, install wear mats on top of the EWF to prevent holes and to maintain a level surface. Be sure these mats are installed in such a way as they do not have an edge above the surface that will create an accessibility issue. Tapered edges are recommended.

7. Spread the playground surfacing evenly into the play area with shovels and rakes, either on the prepared sand or soil, or into the laid-out geotextile. Make sure there are no thin, shallow places lacking in wood fiber, which would cause it to fall short of providing sufficient impact attenuation.

We do not recommend placing playground surfacing over any sort of asphalt or pavement area, and specifically caution against it. We do recommend placing it upon sand, pea gravel,or properly prepared soil.

Spread the material to a uniform thickness to the appropriate depth. Take care when transporting the material to use only clean, chemical-free, grease-free wheelbarrows and tools.

Do not use any pesticides,herbicides, or fungicides on the wood fiber, except under the care of a licensed, bonded, professional exterminator or horticulturalist who is fully aware that this is a play area used by children as compared to a landscape area. Products that may be generally accepted as safe for lawn and garden use may not be safe for playground use. We do not endorse the use of any chemicals whatsoever on our wood mulch.

Our wood fiber has excellent drainage and longevity due to the removal of loose sawdust which holds moisture. It features the natural antimicrobial and antibacterial characteristics of both pine (aromatic resins) and oak(tannins)in its composition

## Maintenance for Engineered Wood Fiber (EWF) Maintenance:

Maintaining your EWF surface is critical to keeping your surfacing ADA compliant. The frequency of the maintenance information below should be conducted in accordance with the manufacturers' recommendations.

1. Our playground wood fiber settles naturally into a stable play surface, but with use the material will most likely shift around. We recommend weekly inspection and maintenance under high-traffic toys, such as slides and swings, to make sure that the material has not been kicked out or ground down in those places. Wear mats designed specifically for use under playground structures are available through professional playground installers, and can help to keep down material loss.

2. Weekly inspection should also be done to remove any foreign object from the play area. Fallen branches, toys, or other objects could get worked down into the wood fiber and present an unseen potential hazard if not removed. Rakes or shovels may be used to move additional material into any worn down areas, taking it from lower traffic areas where it has not compacted.

3. Rake the EWF to keep the surface level and the thickness to the original recommended depth. A level surface is necessary for wheelchair access and compliance with ADA requirements. Wear mats can reduce or eliminate the need to rake the EWF in high traffic areas such as swings and slide exits. Be sure the transition between the wear mats and the EWF is level.

4. At accessible entrances onto the playground surface, ensure that the surface material, accessible route or the top of the access ramp is within ¼" of the top of the play area border. An ADA compliant access ramp into the play area will help reduce maintenance in this area.

5. In the highest use areas and around equipment footers, dig down to the subsurface or drain system and measure the depth of the EWF. Ensure that the depth is sufficient for the fall height of the structure or at the manufacturer's original recommended depth, whichever one is greater. Add EWF as necessary, level, wet and compact. The use of markings on the play structure supports or on the containment barriers is also recommended as a means to ensure depth of surface is kept to original thickness.

6. Check the performance of the drain system by ensuring that water is flowing from a drain system outflow pipe immediately after rain. Also, make sure there is no standing water on the playground surface. It is important to have a functioning drainage system to improve EWF life expectancy and the resilience of the surfacing.

7.Depending upon climate and usage, the material may need to be "topped off" with fresh playground surfacing at any time, but typically from every 2 (two) to 5 (five) years. In arid climates, the material may maintain its depth and integrity even longer. To determine if a playground needs additional material, first rake or shovel it into an even surface, filling in the highest traffic areas such as under swings and slides. Measure the overall surface of the playground at several places, and if the overall depth is less than the recommended depth for its usage, then we recommend topping off the playground with additional material.

8. Determine how many inches short of the necessary depth that figure comes to and that is the amount you need to add. Depending upon climate and drainage, under some circumstances when the material is frequently waterlogged, it may be necessary to remove the remaining material and completely replace it fresh. As a natural wood fiber, our playground surfacing will eventually decompose if left wet for long periods of time, and this factor is part of its natural life span. It remains a useful and wholesome product, but no longer provides the impact attenuation necessary for playground use.

Note: This is a technical document and in no way is an endorsement for any particular surfacing. It is intended to assist
the playground owner in making their playground a well-maintained and accessible area. It does not imply that an injury cannot occur. For more information about the IPEMA certification program, go to www.ipema.org.

Appendix 5

ASTM F2075 - 15

# Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment

Active Standard ASTM F2075 | Developed by Subcommittee: F08.63

**Book of Standards Volume:** 15.07

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**Abstract**

This specification covers engineered wood fiber for use as a playground safety surface under and around playground equipment. This specification establishes minimum requirements for the factors that determine particle size, consistency, purity, ability to drain, and heavy metal concentrations considered hazardous to children. This specification does not imply that an injury cannot be incurred if the engineered wood fiber complies with this specification. The performance requirements for (1) sieve test analysis, (2) hazardous metal test (for antimony, arsenic, barium, cadmium, chromium, lead, mercury, and selenium), and (3) magnetic and nonmagnetic tramp metal tests are specified. The sieve test apparatus shall include balances, sieves, sieve shaker, and oven. The test apparatus for hazardous metal test shall include metal sieve, pH, membrane filter, reagents, hydrochloric acid solution, Type 3 water, centrifuge, and container. The test apparatus for magnetic tramp metal test shall be an industrial grade magnetic wand with a cylindrical neodymium iron-boron rare earth magnet at the end of the probe. A schematic diagram of the magnetic probe is provided. The sampling method, sample test preparation, test procedure, and test report for the three test methods are detailed.

*This abstract is a brief summary of the referenced standard. It is informational only and not an official part of the standard; the full text of the standard itself must be referred to for its use and application. ASTM does not give any warranty express or implied or make any representation that the contents of this abstract are accurate, complete or up to date.*

**1. Scope**

1.1 This specification establishes minimum characteristics for those factors that determine particle size, consistency, purity, and ability to drain.

1.2 Engineered wood fiber that meets the requirements of this specification must comply with Specification F1292, if the surface is in the use zone as defined in Specification F1487.

1.3 A sample of wood fiber that meets the requirements of this specification may be designated engineered wood fiber and be suitable for playground safety surfacing.

1.4 This specification does not imply that an injury cannot be incurred if the engineered wood fiber complies with this specification.

1.5 To meet the requirements of this specification, the material shall perform as follows:

1.5.1 The material shall meet particle size requirements.

1.5.2 The material shall meet the requirement for metal particles.

1.5.3 The material shall meet the allowable heavy metal concentrations considered hazardous to children.

1.5.4 The material shall meet the requirements of Specification F1292.

1.6 The values stated in inch-pound units are to be regarded as standard. The values in parentheses are mathematical conversions. SI units, which are provided for information, are not considered the standard, except in 8.4.

1.7 **Warning**—Mercury has been designated by EPA and many state agencies as a hazardous material that can cause central nervous system, kidney, and liver damage. Mercury, or its vapor, may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury-containing products. See the applicable product Material Safety Data Sheet (MSDS) for details and EPA's website (http://www.epa.gov/mercury/faq.htm) for additional information. Users should be aware that selling mercury or mercury-containing products, or both, in your state may be prohibited by state law.

1.8 The following precautionary statement pertains to the test method portions only, in 7.4, 8.4, and 9.4 of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health* *practices and determine the applicability of regulatory limitations prior to use.*

**2. Referenced Documents** *(purchase separately)*

**ASTM Standards**

C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates

D1193 Specification for Reagent Water

D2217 Practice for Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

F963 Consumer Safety Specification for Toy Safety

F1292 Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment

F1487 Consumer Safety Performance Specification for Playground Equipment for Public Use

**Keywords**

Consistency - Particle Size - Particle Size Distribution - Performance Characteristics - Playground Equipment - Playground Surfaces - Playing Surfaces - Purity - Vegetable Fibers - Wood Fibers

**ICS Code**

ICS Number Code 79.080 (Semi-manufactures of timber); 97.200.40 (Playgrounds)

**UNSPSC Code**

UNSPSC Code 11122000(Engineered wood products)

## Referencing This Standard

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# Appendix 6

**SFGATE** https://www.sfgate.com/bayarea/article/CONTRA-COSTA-COUNTY-Wood-chips-ruled-unfriendly-2596721.php

# CONTRA COSTA COUNTY / Wood chips ruled unfriendly to disabled kids

By Bob Egelko Published 4:00 am, Saturday, May 5, 2007

A **Contra Costa County school** district's use of wood chips in play boxes makes it harder for boys and girls in wheelchairs to get to swings and slides, a violation of the disabled children's rights, a federal judge has ruled.

The decision by U.S. District Judge **Claudia Wilken** of Oakland could lead to replacement of wood chips with firmer surfaces in public playgrounds at other schools and parks around the country, said a representative of the group that sued the Mount Diablo Unified School District in central Contra Costa.

"Our experts and people with disabilities tell us that wood chip surfaces are not accessible," said **Larry Paradis**, executive director of **Disability Rights Advocates**. "They constantly form mounds and gullies ... and they're impossible to maintain. Little kids in wheelchairs are already struggling to get around, they have less muscular strength, and it's important that play structures be easily accessible for them so they can be mainstreamed (with other children) as much as possible."

Wilken ruled this week that the Mount Diablo district, which has 32 elementary schools and 16 middle and high schools, was violating a 2000 agreement to make its playgrounds accessible to the disabled because it uses wood chips. She gave school officials a month to work out a replacement plan with Disability Rights Advocates, representing a student who sued the Concord-based district in 1998.



Paradis said Friday that he would like the district to install rubberized play box matting, which he said costs more to put in than wood chips but less to maintain.

Attorneys for the school district were unavailable for comment on the ruling. In a recent court filing, district lawyer **Gregory Widmer** said there was "no evidence that any student with a mobility disability ever complained about the accessibility" of play boxes with wood chip surfaces. He also said rubberized mats are eight times as expensive as wood chips and would cost the district more than $2.7 million if installed in 32 play boxes.

But Paradis said wood chips don't meet disabled children's needs for a firm and stable surface, with little or no sloping, to wheel themselves to swings, slides and sandboxes. He said wood chip manufacturers have been boosting their sales and misleading customers by asserting that their product meets the standards of disability laws.

**RELATED STORIES**

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However, a playground designer said Friday that federal regulators have found that engineered wood fiber, the product used in schools and parks, complies with accessibility standards if properly compacted and maintained.

"Most places can't maintain it to that level, and they're probably better off with rubber," to reduce maintenance costs and the likelihood of lawsuits, said **Susan Goltsman**, whose Oakland firm, MIG, also designs schools and zoos. She said both products are safe, although wood chips are more yielding and may cushion falls better.

Aesthetically, though, a mix is best, Goltsman said. "If you've got a monoculture of the same surfacing material everywhere, you've got a boring environment," she said. "It's like having asphalt everywhere."

Wilken's ruling follows a report by an MIG consultant who studied the play boxes and their use by disabled children in the 2005-06 school year. Both sides said the consultant's findings supported their position.

Paradis said he hopes the case encourages other districts in California and elsewhere to quit installing new wood chip play boxes and gradually replace the old ones.

"We want districts to learn from Mount Diablo's mistake," he said.

# Appendix 7

# 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.

Chevy Chase resident Jamie Davis Smith, whose daughter uses a wheelchair, has been raising concerns about the Lafayette play surface since the playground's $1.5 million renovation in early 2015. Her complaint about the park at 5900 33rd St. NW was bolstered by a January 2016 opinion by the D.C. Office of Disability Rights and a July 2016 legal challenge by the independent Disability Rights DC agency — both of which said the wood chips failed to meet current ADA standards for playgrounds because wheelchairs can get bogged down in the loose pellets or even tip over on the uneven surface.

But the Lafayette Park play surface hasn't yet changed, and Kalorama's $800,000 playground renovation debuted last spring with the same issue.

"Inexplicably, not only have they not remedied the problem at Lafayette playground, but they continued to build new playgrounds with the same issue," Davis Smith said in an interview, "which to me demonstrates not only disregard for federal law but also a lack of respect and disregard for the dignity of individuals with disabilities."

D.C. Department of Parks and Recreation spokesperson Gwendolyn Crump told The Current last summer that city agencies would review the ADA concerns but that community stakeholders had "overwhelmingly preferred" wood chips at Kalorama and Lafayette because they stay cool in the heat. In January the city agreed to replace the play surfaces at the two parks, though the promised spring start date for that work hasn't yet materialized in action.

"We continue to urge DC to adhere strictly to its timeline for removing the inaccessible surfaces at both playgrounds," Kristina Majewski, an attorney for Disability Rights DC, wrote in an email to The Current last month. "Without accessible routes and surfaces, DC continues to deny children with disabilities equal access to the playgrounds." Disability Rights DC is a federally funded organization that ensures disability access as part of the University Legal Services nonprofit.

Responding to some residents' preference for the more natural wood-chip material, Majewski said last summer that the ADA regulations on playground surfaces are "an obligation where there's no wiggle room."

Stanley said the Lafayette artificial turf is still on track to be replaced at some point this spring. Asked why the work hasn't taken place already, she replied that "the replacement of the surface is weather-sensitive."

Meanwhile, in Kalorama, the Department of General Services and the Department of Parks and Recreation haven't yet chosen a path forward.

"The Kalorama community has asked for additional consideration for the type of surface to be installed at the Kalorama playground," Stanley wrote. "Our partners at DPR will work the community to ensure that all of their comments are received before a final decision is made. DGS, as the implementing agency, will install the surface after DPR's community engagement is completed."

Hector Huezo of Advisory Neighborhood Commission 1C (Adams Morgan) said neither he nor Ted Guthrie, the two ANC 1C members representing areas around Kalorama Park, was aware of the discussions.

"I want to hear more about it from DGS," Huezo wrote in an email. "However, I can say that I am disappointed that they have not reached out to either Commissioner Guthrie or me about it."

In Chevy Chase, Davis Smith was also outraged when two of Lafayette Elementary School's renovated playgrounds opened early this year with the same non-compliant wood chips.

Stanley said that the wood chips there were always intended as an interim solution until the weather was warm enough, and the planned poured-in-place rubber surface was installed at both school playgrounds during spring break.

**Brady Holt**

Appendix 8

## Synthetic Turf Fields, Crumb Rubber, and Concerns about Cancer

*Archie Bleyer, MD**

In addition to a significant number of prior studies in the U.S. and Europe that do not identify any reason for concern around playing on synthetic turf fields with recycled rubber infill, there are three other reasons to be reassured that synthetic turf does not cause cancer.

1 ) While Chair of the world's largest pediatric cancer research organization during the 1990s, I was responsible for millions of dollars of research on what caused cancer in children, adolescents and young adults. **None of the studies that we conducted, nationally and in multistate surveys, within homes and with environmental sampling, of childhood and prenatal exposures, and of many other variables, showed evidence that an environmental factor caused these cancers. The cancers we studied included the lymphomas implicated in the crumb rubber controversy**

For middle and later adulthood, we know that cancer can be caused by cumulative exposure over many years to carcinogens like tobacco, radiation, asbestos, ultraviolet ray (sun and tanning machines) and alcohol. For cancer in youth, however, none of our extensive research efforts could "*identify environmental exposures that might explain more than a small fraction of the observed cases*".[1,2] We concluded that virtually all cancer in the young is a mistake of nature—*spontaneous mutation to malignancy* is the biologic term—and not due to an exogenous, potentially preventable cause. Since our studies, no valid scientifically-conducted research has been published that has uncovered external causes of cancer in children, adolescents or young adults.

2) **It's human nature to blame.** When unfortunate events occur for which there is no known cause, we want to assume that there has to be a reason that hopefully can lead to prevention. Blaming autism on vaccines is a recurrent example, and one that illustrates another human behavior: refusal to believe objective, scientific, irrefutable evidence.[3] This human need and attendant denial causes unnecessary alarms, especially when cancer is the event. The notion that synthetic turf fields cause cancer in the young is another example of need to attribute blame.

3) **The cancers that have been reported to occur in soccer players are precisely those cancers that are expected to occur in the age group that's being discussed.** Moreover, they are consistent with the race/ethnicity and socioeconomic status of those who have access to synthetic fields. When these factors are taken into consideration (click here or paste the URL[4] to review), the incidence of the implicated cancers in no higher than in those who do not have access to synthetic turf fields.

4) Regular physical activity has been clearly demonstrated to prevent cancer. Not participating in physical activity increases the risk of cancer and hence lack or removal of facilities that allow exercise increase the incidence of cancer.

**In conclusion, we naturally have a need to find something to blame but it's not the crumb rubber or anything else in synthetic turf that caused the cancers. On the contrary, physical activity should be encouraged and promoted by year-round, weather-resistant fields to help prevent cancer and other chronic diseases. Limiting field development could in the long run actually increase cancer incidence.**

Archie Bleyer, MD
Pediatric and Young Adult Oncologist

**Dr. Bleyer is Clinical Research Professor in Radiation Medicine at the Oregon Health and Science University, and founding member of the Critical Mass Young Adult Cancer Alliance and founder of DEFEATcancer.[5] Dr. Bleyer chaired the Children's Cancer Group for 10 years, then the world's largest pediatric cancer research organization, the Department and Division of Pediatrics at the University of Texas MD Anderson Cancer Center, and Community Oncology in the Department and Division of Medicine at the M.D. Anderson Cancer Center. At the University of Washington School of Medicine, he was the American Cancer Society Professor of Clinical Oncology and in charge of the cancer curriculum. Dr. Bleyer has been awarded research grants totaling more than $75 million as a principal investigator from the National Institutes of Health, the American Cancer Society, and the Leukemia Society of America. His research has been published in more than 300 peer-reviewed articles, chapters, and books. His current personal clinical research is dedicated to adolescents and young adult (AYA) oncology.*

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[1] Buckley JD, Buckley CM, Breslow NE, et al. *Med Pediat Oncol* 26:223,1996.
[2] Olsen JH, Boice JD Jr, Seersholm N, Bautz A, Fraumeni JF. *N Engl J Med.* 333(24):1594-9,1995.
[3] The most recent study, performed because there are still doubters, by the University of Washington's Center on Human Development and Disability, the University of Texas Southwestern; and the Texas A&M Health Science Center & Central Texas Veterans Health Care System, documents no evidence for adverse behavioral effects in infant monkeys
administered the suspect vaccine (http://hsnewsbeat.uw.edu/sites/default/files/sites/default/file s/documents/PNAS-2015-Gadad-1500968112.pdf).
[4] http://comedsoc.org/index.php?m=47&s=486
[5] http://www.stcharleshealthcare.org/Our-Services/Cancer-Care/DEFEATCancer

Appendix 9

# Independent Clinical Lab Study Re-Confirms The Health And Safety of Crumb Rubber

Admin January 13, 2015 Uncategorized Leave a comment

Synthetic Turf™ COUNCIL

A new independent lab study conducted by a world renowned laboratory in Paris, France concludes that crumb rubber is safe for children of all ages. Lower Canada College, a K-12 private school located in Montreal Canada, initiated an independent lab study of crumb rubber after growing concerns regarding the safety of their school's new synthetic grass sport field. The independent laboratory test was to measure and analysis the potential toxicity levels of crumb rubber against rigid toy safety standards that are part of Europe's Toy Safety Directive. In 2013, the European Union developed a children's toy safety standard called the EN 71-3. This standard, which is widely recognized as the most advanced standard in the world, sets strict safety limits for different elements found in children's toys.

The crumb rubber was tested against these strict standards and passed on every level. The laboratory test results can be seen here.

**What do the professional have to say about crumb rubber?**

- **Dr. Robert Hayashi, the Director of Pediatric Hematology and Oncology at St. Louis Children's Hospital** stated to KSDK –TV in St. Louis *"there's no scientific evidence to believe it's true. Despite all the things we do all of us are at risk for developing cancer every day and I think we still have to be able to live our lives and let our children thrive in a healthy environment."* He went on to say, *"if you consider the other dangers of playing sports, like traumatic brain or bone and joint injuries, those risks far outweigh the risk of participating on a crumb rubber field."*
- **Dr. Northfelt, an Oncologist at the Mayo Clinic in Mesa, AZ** told Fox 10 News *"Parents should be more concerned about pesticides on natural grass. Lowering exposure to pesticides is one reason schools say they installed [synthetic] turf fields."*
- **Dr. Wendy LeBolt physiologist, soccer coach, mother, and founder of Fit2Finish.com**, stated in a recent blog, *"Turf allows kids to play more games and coaches to hold more practices. This mean our kids are more active, and that is a very good thing. Because the risk of not playing means more sitting at home watching TV or screen-surfing. With those come overweight, obesity, diabetes, heart disease, stroke, arthritis, other joint ailments, just to name a few. In short, I say the benefit to spending more time in the game far surpasses the risk."* (of playing on a synthetic turf field with crumb rubber infill)

Synthetic grass sport fields make it possible for millions of children and people of all ages the opportunity to be active year-round in all types of weather. Synthetic turf is a sustainable product that can be used to help the environment in multiple ways. One way is that a synthetic sport fields conserve billions of gallons of water each year and avoids the use of harmful pesticides and fertilizers. Pesticides and fertilizers pollute our water supply. In addition, artificial grass helps in the recycling effort and 25 million used car and truck tires are recycled that would otherwise by dumped in a landfill.

You can read the press release from the Synthetic Turf Council regarding this information.

Appendix 10

# STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

Jewel Mullen, M.D., M.P.H., M.P.A.
Commissioner

Dannel P. Malloy
Governor
Nancy Wyman
Lt. Governor

**EHS Circular Letter #2015-02**
**(Follow up to Circular Letter #2014-26a)**

DATE: January 20, 2015

TO: Local Health Departments and Districts

FROM: Brian Toal, Gary Ginsberg
Environmental and Occupational Health Assessment

RE: Recent News Concerning Artificial Turf Fields

**Brief Video Clip for Local Health Departments – *Click Here* →**

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This letter and video clip are being sent to update you regarding the news story that has circulated since last spring regarding potential cancer risks at artificial turf fields. Various media outlets have continued to run this story and a number of local health departments have inquired as to its validity. Since many Connecticut towns have installed or are considering artificial turf fields an elevated cancer risk would be an important consideration. However, this news story is still based upon very preliminary information and does not change CTDPH's position that outdoor artificial turf fields do not represent an elevated health risk.

The Connecticut Department of Public Health has evaluated the potential exposures and risks from athletic use of artificial turf fields. Our study of 5 fields in Connecticut in 2010-2011 was a comprehensive investigation of releases from the fields during active play. This study was conducted as a joint project with the CT DEEP and the University of CT Health Center and was peer-reviewed by the Connecticut Academy of Science and Engineering. Our study did not find a large amount of vapor or particle release from the fields confirming prior reports from Europe and the US. We put these exposures into a public health context by performing a risk assessment. Our risk assessment did not find elevated cancer risk. These results have been published as a set of 3 articles in a peer review journal and are available on the DPH artificial turf webpage (http://www.ct.gov/dph/cwp/view.asp?a=3140&q=464068 ).

The news story suggests soccer players and especially goalies may have an elevated cancer risk from playing on artificial turf fields. This is based upon anecdotal observations of a university soccer coach (http://www.komonews.com/news/local/Soccer-coach-Could-field-turf-be-causing-cancer-259895701.html ). Reportedly the coach is developing a list of soccer players who have contracted cancer. However, the types of cancer are undocumented and so it is impossible to say whether they

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represent a common effect and there has been no reporting on how long the goalies played on artificial turf fields to see if there was plausible exposure and latency. There are many reasons why someone collecting a list of cancer cases may appear to find a cluster including the fact that when you have a single-minded focus on finding cases you do not capture all the non-cases that would tend to disprove the cluster. Documentation of an increased rate in soccer players would require an epidemiological study in which the total number who play on turf fields in a given region was also known so that a cancer rate could be established and compared to those that do not play on artificial turf fields. The current news report does not constitute epidemiological evidence and thus is very preliminary.

Our risk assessment did cover carcinogens that are known to be in recycled tires and the crumb rubber used to cushion fields. Once again, we found there to be very little exposure of any substances, carcinogenic or not, in the vapors and dust that these fields generate under active use, summer conditions. Background levels of chemicals in urban and suburban air from heating sources and automobile traffic are much more significant sources of airborne carcinogens. The fact that we sampled 5 fields (4 outdoor and 1 indoor) of different ages and composition suggests that the results can be generalized to other fields, a conclusion supported by the fact that results were similar to what was found in California, USEPA and European studies. Our study did not evaluate ingestion of the crumb rubber itself as players are unlikely to ingest an entire rubber pellet. However, two studies, one in California and one at Rutgers University did evaluate the cancer risk if children ingested a mouthable chunk of playground rubber (10 gram), using laboratory extraction methods to estimate the amount of chemicals that might become available in the stomach and absorbed into the body. Both studies found very low cancer risk from this scenario (Cal OEHHA 2007; Pavilonis et al. 2014). Thus, CT DPH finds no scientific support for a finding of elevated cancer risk from inhalation or ingestion of chemicals derived from recycled tires used on artificial turf fields. US EPA has a similar position: "At this point, EPA does not believe that the field monitoring data collected provides evidence of an elevated health risk resulting from the use of recycled tire crumb in playgrounds or in synthetic turf athletic fields." (http://www.epa.gov/epawaste/conserve/materials/tires/health.htm)

In summary, federal and state authorities have taken seriously the concerns that artificial turf fields may present a health risk due to contaminants in recycled rubber. The best way to investigate these concerns is via an exposure investigation. Studies conducted in Connecticut and elsewhere have shown a very low exposure potential, less than from typical outdoor sources of air pollution. The current news reports of a list of soccer players with cancer does not constitute a correlation or causality and thus raises a concern that currently lacks scientific support. Thus, the CT DPH position expressed in 2011 at the conclusion of the Connecticut study, that outdoor artificial turf fields do not represent an elevated health risk, remains unchanged. For further information please contact Brian Toal or Gary Ginsberg at 860-509-7740.

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Appendix 11

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# New York Studies Validate Safety of Crumb Rubber Infilled Synthetic Turf



*Independent Tests Show No Health Concerns at Synthetic Turf Fields*

NEW YORK, June 3 /PRNewswire/ -- In response to the public's desire for more scientific data, the New York State Department of Environmental Conservation (DEC) and New York State Department of Health (DOH) released a new study on May 29 which validated the safety of synthetic turf fields with crumb rubber infill. The findings, available at http://www.dec.ny.gov/chemical/46856.html (http://www.dec.ny.gov/chemical/46856.html), concluded that "crumb rubber material used in synthetic turf fields poses no significant environmental threat to air or water quality and poses no significant health concerns."

"This report provides compelling new scientific evidence about the safety of synthetic turf that should help answer the responsible questions being asked by parents, legislators and community activists," said Rick Doyle, President of the Synthetic Turf Council. "Increased playability, safety, low maintenance and significant environmental benefits have made synthetic turf an increasingly popular option."

The New York State DEC and DOH conducted a series of studies to collect laboratory and field sampling data to "assess the potential impact to both surface and ground waters due to leaching of chemicals, assess potential public health impact from air release of chemicals and evaluate surface temperature and indicators of heat stress." Other recent findings verifying the safety of synthetic turf with crumb rubber infill include a March 2009 air quality study by the NY City Department of Health and Mental Hygiene (DOHMH) and a May 2008 independent review of available research commissioned by DOHMH into the potential exposures and health effects due to inhalation, ingestion, and dermal absorption. These documents and more are available at - http://www.syntheticturfcouncil.org/displaycommon.cfm?an=1&subarticlenbr=91 (http://www.syntheticturfcouncil.org/displaycommon.cfm?an=1&subarticlenbr=91).

In July 2008, a U.S. Consumer Product Safety Commission (CPSC) Staff report also concluded that 'young children are not at risk from exposure to lead [used in certain pigments to color synthetic turf fibers] in these fields.'" To further the long-term objectives of the Environmental Protection Agency, CPSC, and Centers for Disease Control to eliminate the use of lead in all products where feasible, the Synthetic Turf Council announced in July 2008 its commitment to voluntarily reduce lead levels in accordance with the same strict standards that Consumer Product Safety Improvement Act of 2008 imposes on the children's toy industry.

Synthetic turf fields are affording millions of children and people of all ages the opportunity to be active year-round and in virtually all weather conditions. About half of all NFL teams currently play their games on synthetic turf, and it has been approved by FIFA for World Cup soccer matches. In 2008, growth in all sectors of the industry -- sports fields, landscape, golf, municipal parks, and airports - also helped conserve billions of gallons of water, avoid the use of millions of pounds of pesticides and fertilizers, and recycle 25 million used tires that would otherwise end up in landfills.

About the Synthetic Turf Council:

Based in Atlanta, the Synthetic Turf Council was founded in 2003 to promote the industry and to assist buyers and end users with the selection, use and maintenance of synthetic turf systems in sports field, golf, municipal parks, airports, landscape and residential applications. The organization is also a resource for current, credible, and independent research on the safety and environmental impact of synthetic turf. Membership includes builders, landscape architects, testing labs, maintenance providers, manufacturers, suppliers, installation contractors, infill material suppliers and other specialty service companies. Visit www.syntheticturfcouncil.org (http://www.syntheticturfcouncil.org/) for more information.

SOURCE Synthetic Turf Council

RELATED LINKS
http://www.syntheticturfcouncil.org (http://www.syntheticturfcouncil.org)

Appendix 12

PubMed

Format: Abstract

Full text links

Cancer Epidemiol. 2018 Apr;53:129-136. doi: 10.1016/j.canep.2018.01.010. Epub 2018 Feb 8.

# Incidence of malignant lymphoma in adolescents and young adults in the 58 counties of California with varying synthetic turf field density.

Bleyer A[1], Keegan T[2].

Author information

Abstract

**BACKGROUND:** Case reports of cancer among soccer players raised concerns that the **crumb rubber** infill in synthetic turf fields may cause malignant lymphoma. One prior epidemiologic study on the topic found no association.

**METHODS:** An ecologic evaluation of county-level incidence of lymphomas by race/ethnicity and socioeconomic status for the state of California with data obtained from the National Cancer Institute Surveillance, Epidemiology, and End Results Program. Synthetic turf field density by county was obtained from the Synthetic Turf Council. During 2000-2013, 7214 14- to 30-year-old Californians were diagnosed with malignant lymphoma.

**RESULTS:** Annual lymphoma county incidence trends were not associated with the county-level synthetic turf field density. None of 20 sub-analyses by race/ethnicity, sex and county median household income indicated a correlation of lymphoma incidence with synthetic turf field density. In California, there was no evidence at the county-level that synthetic turf fields are associated with an increased incidence of lymphoma in adolescents and young adults.

**CONCLUSION:** Our findings in the state with the greatest number of such fields and a large, diverse patient population are consistent with those of a prior study observing no association between individual-level exposures to turf fields and cancer incidence. Avoidance of synthetic turf fields for fear of increased cancer risk is not warranted.



**KEYWORDS:** **Crumb rubber**; Lymphoma; Synthetic turf fields

PMID: 29427968 DOI: 10.1016/j.canep.2018.01.010

LinkOut - more resources

Appendix 13

PubMed

Format: Abstract

Full text links

Environ Res. 2018 Jan;160:256-268. doi: 10.1016/j.envres.2017.09.019. Epub 2017 Oct 12.

# Comprehensive multipathway risk assessment of chemicals associated with recycled ("crumb") rubber in synthetic turf fields.

Peterson MK[1], Lemay JC[2], Pacheco Shubin S[3], Prueitt RL[3].

Author information

Abstract

**BACKGROUND:** Thousands of synthetic turf fields in the US are regularly used by millions of individuals (particularly children and adolescents). Although many safety assessments have concluded that there are low or negligible risks related to exposure to chemicals found in the recycled **rubber** used to make these fields, concerns remain about the safety of this product. Existing studies of recycled **rubber**'s potential health risks have limitations such as small sample sizes and limited evaluation of relevant exposure pathways and scenarios.

**OBJECTIVE:** Conduct a comprehensive multipathway human health risk assessment (HHRA) of exposure to chemicals found in recycled **rubber.**

**METHODS:** All available North American data on the chemical composition of recycled **rubber**, as well as air sampling data collected on or near synthetic turf fields, were identified via a literature search. Ingestion, dermal contact, and inhalation pathways were evaluated according to US Environmental Protection Agency (US EPA) guidance, and exposure scenarios for adults, adolescents, and children were considered.

**RESULTS:** Estimated non-cancer hazards and cancer risks for all the evaluated scenarios were within US EPA guidelines. In addition, cancer risk levels for users of synthetic turf field were comparable to or lower than those associated with natural soil fields.

**CONCLUSIONS:** This HHRA's results add to the growing body of literature that suggests recycled **rubber** infill in synthetic turf poses negligible risks to human health. This comprehensive assessment provides data that allow stakeholders to make informed decisions about installing and using these fields.



**KEYWORDS:** **Crumb rubber**; Recycled **rubber**; Risk assessment; Synthetic turf

PMID: 29031215 DOI: 10.1016/j.envres.2017.09.019

[Indexed for MEDLINE]

MeSH terms, Substance

LinkOut - more resources

Appendix 14

PubMed

Format: Abstract

Full text links

ACS Publications

Environ Sci Technol. 2014 Feb 18;48(4):2114-29. doi: 10.1021/es4044193. Epub 2014 Feb 6.

# Environmental and health impacts of artificial turf: a review.

Cheng H[1], Hu Y, Reinhard M.

Author information

Abstract

With significant water savings and low maintenance requirements, artificial turf is increasingly promoted as a replacement for natural grass on athletic fields and lawns. However, there remains the question of whether it is an environmentally friendly alternative to natural grass. The major concerns stem from the infill material that is typically derived from scrap tires. Tire rubber crumb contains a range of organic contaminants and heavy metals that can volatilize into the air and/or leach into the percolating rainwater, thereby posing a potential risk to the environment and human health. A limited number of studies have shown that the concentrations of volatile and semivolatile organic compounds in the air above artificial turf fields were typically not higher than the local background, while the concentrations of heavy metals and organic contaminants in the field drainages were generally below the respective regulatory limits. Health risk assessment studies suggested that users of artificial turf fields, even professional athletes, were not exposed to elevated risks. Preliminary life cycle assessment suggested that the environmental impacts of artificial turf fields were lower than equivalent grass fields. Areas that need further research to better understand and mitigate the potential negative environmental impacts of artificial turf are identified.

PMID: 24467230 DOI: 10.1021/es4044193

[Indexed for MEDLINE]

Publication types, MeSH terms, Substances

LinkOut - more resources

Appendix 15

PubMed

Format: Abstract

Full text links

SpringerLink

Environ Sci Pollut Res Int. 2013 Jul;20(7):4980-92. doi: 10.1007/s11356-012-1390-2. Epub 2013 Jan 18.

# Environmental-sanitary risk analysis procedure applied to artificial turf sports fields.

Ruffino B[1], Fiore S, Zanetti MC.

Author information

Abstract

Owing to the extensive use of artificial turfs worldwide, over the past 10 years there has been much discussion about the possible health and environmental problems originating from styrene-butadiene recycled rubber. In this paper, the authors performed a Tier 2 environmental-sanitary risk analysis on five artificial turf sports fields located in the city of Turin (Italy) with the aid of RISC4 software. Two receptors (adult player and child player) and three routes of exposure (direct contact with crumb rubber, contact with rainwater soaking the rubber mat, inhalation of dusts and gases from the artificial turf fields) were considered in the conceptual model. For all the fields and for all the routes, the cumulative carcinogenic risk proved to be lower than 10(-6) and the cumulative non-carcinogenic risk lower than 1. The outdoor inhalation of dusts and gases was the main route of exposure for both carcinogenic and non-carcinogenic substances. The results given by the inhalation pathway were compared with those of a risk assessment carried out on citizens breathing gases and dusts from traffic emissions every day in Turin. For both classes of substances and for both receptors, the inhalation of atmospheric dusts and gases from vehicular traffic gave risk values of one order of magnitude higher than those due to playing soccer on an artificial field.

PMID: 23329128 DOI: 10.1007/s11356-012-1390-2

[Indexed for MEDLINE]

MeSH terms, Substances

LinkOut - more resources

Appendix 16

Press Release | Tue Nov 25, 2014 8:00am EST

# New Independent Lab Testing of Synthetic Turf Crumb Rubber Infill Re-Confirms Health and Safety



**New Independent Lab Testing of Synthetic Turf Crumb Rubber Infill Re-Confirms Health and Safety**

Lower Canada College in Montreal Funded Analysis of Its Own Field and Is Sharing Results

ATLANTA, GA--(Marketwired - November 25, 2014) - Lower Canada College (LCC), a leading K-12 private school in Montreal, Canada today announced that the crumb rubber infill used in its new synthetic turf athletic field is safe for continued use by children of all ages. This comes as a result of testing that the school conducted using an independent, highly-sophisticated laboratory in Paris, France to test its crumb rubber. The analysis measured potential toxicity levels of the crumb rubber against the European Union's EN 71-3 standards, which set strict limits for various elements in children's toys. These standards, set in 2013 as part of Europe's Toy Safety Directive, are widely recognized as the most advanced in the world.

"We are happy with the results because, together with the chemical science and research that is readily available, they confirm for us, our Board, and the parents of our students that our turf field is safe for children of all ages for play and competition," said Christopher Shannon, Headmaster, Lower Canada College. "We offer this information to the entire Montreal community and to the Synthetic Turf Council to not only offer context and clarity to this issue, but to take on an advocacy role that relies on science, technology, research, testing and factual data."

"When we first considered installing a synthetic turf field, we conducted extensive due diligence investigating the safety of synthetic turf with crumb rubber infill. We knew we weren't going to find one study that definitively proved their safety, so we reviewed the numerous studies that had been conducted in North America and Europe, all of which validated the human health and environmental safety of synthetic turf and crumb rubber infill. Nevertheless, in the wake of recent unfounded media speculation regarding the safety of this material and the concerns raised by parents as a result of that speculation, we decided to fund our own laboratory analysis using a toxicology test that simulates the ingestion of the crumb rubber, and benchmarks the results against tough European standards for heavy metals in toys. The lab report clearly shows that the results were negligible compared to the standards. As a school with a strong focus on developing a global perspective, we felt we should seek the world's highest standard. The results are very comforting."

Synthetic turf fields allow millions of children and people of all ages the opportunity to be active year-round in virtually all weather conditions. There is tremendous growth in all sectors of the industry -- sports fields, landscape and recreation, municipalities and many other uses. In addition, a synthetic turf field conserves billions of gallons of water each year, avoids the use of pesticides and fertilizers, and recycles 25 million used car and truck tires that would otherwise end up in landfills.

Special Acknowledgement:

- *Carpell Surfaces, an Act Global Partner, Field Builder*
- *Francois Hebert, DSSS Landscape Architect, Field Architect*
- *Labosport International, Testing Lab*

About the Synthetic Turf Council

Based in Atlanta, the Synthetic Turf Council was founded in 2003 to promote the industry and to assist buyers and end users with the selection, use and maintenance of synthetic turf systems in sports field, golf, municipal parks, airports, landscape and residential applications. The organization is also a resource for current, credible, and independent research on the safety and environmental impact of synthetic turf. Membership includes builders, landscape architects, testing labs, maintenance providers, manufacturers, suppliers, installation contractors, infill material suppliers and other specialty service companies. For more information, visit www.syntheticturfcouncil.org.

**The following files are available for download:**

- PDF

Terrie Ward
Synthetic Turf Council
678-385-6720

Appendix 17

*Typically this grant is for rubber tiles.*

Last updated May 4, 2018

Get Updates on this Issue

## Scrap Tire Surface Material Grants Cycles

During the 2014 legislative session, the **Missouri General Assembly** renewed the 50-cent scrap tire fee collected on the sale of new tires. Revenues generated from the scrap tire fee are deposited into the Scrap Tire Subaccount of the Solid Waste Fund. These funds are then made available as follows:

- Up to 50 percent for enforcement, permitting and inspection
- Up to 45 percent for grants
- Up to 5 percent for education

During Fiscal Year 2017, there were two scrap tire surface material grant offerings being made for the cost and delivery of scrap tire surface material.

Non-Playground Scrap Tire Surface Material Grants were available for running tracks, walking trails, equine/livestock stalls/riding areas and other similar projects. Award recipients have been announced.
Playground Scrap Tire Surface Material Grants are available for playground projects only. For additional information, see the information below.

Grant applicants will be notified of award and a Financial Assistance Agreement will need to be executed between the department and the grant recipient prior to any work being done on the project.

### NEW 2018 Scrap Tire Surface Material Grant notice, application forms and instructions

- PUB 2425 Playground Scrap Tire Surface Material Grant Application Instructions for Form 780-2143
- MO 780-2143 Playground Scrap Tire Surface Material Grant Application Form
- PUB 2426 Non-Playground Scrap Tire Surface Material Grant Application Instructions for Form 780-2144
- MO 780-2144 Non-Playground Scrap Tire Material Grant Application Form

Missouri Department of Natural Resources

# PLAYGROUND SCRAP TIRE SURFACE MATERIAL GRANT APPLICATION INSTRUCTIONS FOR FORM 780-2143

Solid Waste Management Program fact sheet
Division of Environmental Quality Director: Ed Galbraith

04/2018
PUB2425

Information on who may apply for playground scrap tire surface material grants
- A description of playground scrap tire surface material grants
- The amount of available funding
- Detailed requirements and procedures for applying for a grant
- Application instructions
- Evaluation criteria
- A list of approved scrap tire material vendors
- A Solid Waste Management District map and list of Solid Waste Management District contacts

**Types of projects eligible for funding upon award under this announcement**
Playground projects only.

**Who may apply for a playground scrap tire surface material grant?**
Public school districts, private schools, park districts, nonprofit day care centers, other nonprofit entities and governmental organizations other than state agencies are eligible to submit applications. Privately owned, residential backyard areas, and private in-home day care centers **are ineligible**.

Assistance is available only for those projects located **within the state of Missouri**. Applications may come from an individual school within a public school district or individual park within a park district or city/county boundary; however, the Missouri Department of Natural Resources reserves the right to limit the number of grants a school, park district, city/county can receive.

Prior recipients of scrap tire surface material grants **are ineligible** during this grant cycle **unless** an expansion to the prior surfaced area is planned or a different location or area will be surfaced. Prior surfaced areas **cannot** be repaired or upgraded with grant funds.

**Evaluation**
Evaluation criteria are used to score all applications. Once all grant applications are evaluated and scored should multiple applications receive the same score the department shall break such tie by assigning each application a number and selecting numbers in a random draw until grant funds are exhausted.

Please reference the general terms and conditions located in Attachment 1.

**Note**: The department reserves the right to deny funding to anyone convicted of defrauding the department; has failed to honor a previous contractual agreement or covenant with the department; has substantially failed to meet the minimum performance criteria of a previous project funded by the department due to mismanagement, deception or negligence; or has documented less than satisfactory performance in the administration of a previous department grant.

**Information about eligible playground scrap tire surfacing materials**
The department is accepting applications that promote the use of recycled scrap tires for playground surface materials.All grant recipients will be required to purchase scrap tire material from manufacturers that use at least 40 percent Missouri generated scrap tires in their surface material.A list of known vendors is provided with these instructions. Mats/tiles, pour-in-place material and molded product(s) must be placed on asphalt, concrete or other suitable surfaces. All surface material projects must conform to the manufacturer's specifications and be approved by the department.

**Amount of playground scrap tire surface material funding available**
Approximately $600,000 is available during the FY18 grant cycle for playground scrap tire surface material grants. Grant recipients requesting mats/tiles or pour-in-place surface material will be eligible to receive up to $30,000.

**Financial assistance agreement and reimbursement of allowable expenditures**
Playground scrap tire surface material grants are paid on a reimbursement basis. Purchases and expenditures of grant funds cannot occur until a Financial Assistance Agreement (FAA) between the grant recipient and the department has been signed.

The grant recipient is responsible for making all payments for the project. Reimbursement may then be requested solely for the purchase, vendor installation and delivery of the playground scrap tire surface material. Grant recipients will be reimbursed only after the playground scrap tire surface material is installed and verified by a department inspector and all required documentation is submitted and approved by the department project manager. Failure to comply with project quarterly status reporting requirements will result in a delay or non-reimbursement by the department. The term of all playground scrap tire surface material grants is one year as indicated in the FAA.

Funds for these grants must be appropriated and made available to the department by the Missouri General Assembly. The department then determines the total amount of funds available for grant award during the grant period.

**Submission of application**

The original and two complete copies of the application and supporting documentation must be submitted if submitting hard-copy applications; one copy is required if submitting via on-line portal at https://modnr.force.com/. To be eligible for evaluationensure the person who is listed as the authorized official signs and dates the application document.

**Mailed applications must be postmarked by Friday, June 1, 2018. Hand-delivered applications must arrive at the department by 5 p.m. on Friday, June 1, 2018. On-line applications must be submitted at https://modnr.force.com/ by 5 p.m. on Friday, June 1, 2018.**

**Mail your application to:**
Missouri Department of Natural Resources
Solid Waste Management Program
P.O. Box 176
Jefferson City, MO 65102-0176

**Hand-deliver your application to:**
Missouri Department of Natural Resources
Solid Waste Management Program
1730 E. Elm St. (Lower Level)
Jefferson City, MO 65101-0176

Submit On-line applications at **https://modnr.force.com/** .

Applications will not be accepted via fax or email. Applications and supporting documents received after the deadline indicated above are ineligible for evaluation and funding.

**Playground scrap tire surface material vendors**

The following is a list of vendors known to the department whose scrap tire material uses at least 40 percent Missouri tires in their product. The department in no way endorses the services of these businesses, but provides this list for your information. The businesses are listed in no specific order. The department assumes no liability or responsibility for the quality of scrap tire material. Applicants should require from the manufacturer that the scrap tire material be relatively free of foreign material such as protruding metal, loose wire, rocks, wood, etc. The department suggests applicants request samples of the scrap tire material and consult with vendors regarding proper depth, containment, support and site preparation. Because manufacturers use different processes and feed stocks, the scrap tire material from each vendor may vary.

**NOTE: If a quote is received from a vendor not on this list, it is possible scoring points will be deducted as vendors not provided on this list have not been verified by the department as using at least 40 percent Missouri tires in their product.**

MISSOURI VENDORS

**All Inclusive Rec, LLC**
P.O. Box 72
Farmington, MO 63640
573-701-9787
573-701-9312 fax
air@allinclusiverec.com

**Rooster Rubber**
1720 Wabash Ave.
Kansas City, MO 64127-2505
816-241-6400
816-241-6404 fax
www.roosterrubber.com

**Entire Recycling Inc.**
13974 US Highway 136
Rock Port, MO 64482
660-744-2252
877-209-7345

**Constructive Playthings**
13201 Arrington Road
Grandview, MO 64030
800-448-2972
816-761-8225 fax

**S. Bollinger & Associate, LLC**
P.O. Box 856
Hillsboro, MO 63050
636-797-5820
Sbollingerandassociates.com