

# Welcome to the AccessibilityOnline Webinar Series



A collaborative program between the  
ADA National Network and the  
U.S. Access Board



The Session is Scheduled to begin at 2:30pm Eastern Time  
We will be testing sound quality periodically

Audio and Visual are provided through the on-line webinar system. This session is closed captioned. Individuals may also listen via telephone by dialing 1-712-432-3100 code 930098 (This is **not** a Toll Free number)

The content and materials of this training are property of the US Access Board and the Great Lakes ADA Center and cannot be used and/or distributed without permission. This program is funded through a contract agreement with the U.S. Access Board. For permission to use training content or obtain copies of materials used as part of this program please contact us by email at [adata@adagreatlakes.org](mailto:adata@adagreatlakes.org) or toll free (877)232-1990 (V/TTY)

[www.AccessibilityOnline.org](http://www.AccessibilityOnline.org)

---

---

---

---

---

---

---

---



## Listening to the Webinar



- ▶ The audio for today's webinar is being broadcast through your computer. Please make sure your speakers are turned on or your headphones are plugged in.
- ▶ You can control the audio broadcast via the Audio & Video panel. You can adjust the sound by "sliding" the sound bar left or right.
- ▶ If you are having sound quality problems check your audio controls by going through the Audio Wizard which is accessed by selecting the microphone icon on the Audio & Video panel



2

---

---

---

---

---

---

---

---



## Listening to the Webinar, *continued*



If you do not have sound capabilities on your computer or prefer to listen by phone, dial:

1-712-432-3100

Pass Code:  
930098

This is **not** a Toll Free number

3

---

---

---

---

---

---

---

---

## Listening to the Webinar, *continued*



MOBILE Users (iPhone, iPad, or Android device and Kindle Fire HD)

Individuals may listen\*\* to the session using the Blackboard Collaborate Mobile App (Available Free from the Apple Store, Google Play or Amazon )



\*\*Closed Captioning is not visible via the Mobile App and limited accessibility for screen reader/Voiceover users

4

---

---

---

---

---


---

---

---

## Captioning



- ▶ Real-time captioning is provided during this webinar.
- ▶ The caption screen can be accessed by choosing the  icon in the Audio & Video panel. ↓
- ▶ Once selected you will have the option to resize the captioning window, change the font size and save the transcript.



5

---

---

---

---

---

---

---

---

## Submitting Questions



- ▶ You may type and submit questions in the Chat Area Text Box or press Control-M and enter text in the Chat Area
- ▶ If you are connected via a mobile device you may submit questions in the chat area within the App
- ▶ If you are listening by phone and not logged in to the webinar, you may ask questions by emailing them to [webinars@accessibilityonline.org](mailto:webinars@accessibilityonline.org)



Please note: This webinar is being recorded and can be accessed on the AccessibilityOnline website at [www.accessibilityonline.org/Archives](http://www.accessibilityonline.org/Archives) within 24 hours after the conclusion of the session.

6

---

---

---

---

---

---

---

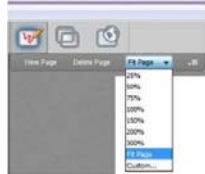
---



## Customize Your View



- ▶ Resize the Whiteboard where the Presentation slides are shown to make it smaller or larger by choosing from the drop down menu located above and to the left of the whiteboard. The default is “fit page”



7

---

---

---

---

---

---

---

---


---

---



## Customize Your View *continued*



- ▶ Resize/Reposition the Chat, Participant and Audio & Video panels by “detaching” and using your mouse to reposition or “stretch/shrink”. Each panel may be detached using the  icon in the upper right corner of each panel.

8

---

---

---

---

---

---

---

---

---

---



## Technical Assistance



- ▶ If you experience any technical difficulties during the webinar:
  1. Send a private chat message to the host by double clicking “Great Lakes ADA” in the participant list. A tab titled “Great Lakes ADA” will appear in the chat panel. Type your comment in the text box and “enter” (Keyboard - F6, Arrow up or down to locate “Great Lakes ADA” and select to send a message ); or
  2. Email [webinars@accessibilityonline.org](mailto:webinars@accessibilityonline.org) ; or
  3. Call 877-232-1990 (V/TTY)

9

---

---

---

---

---

---

---

---

---

---

# Accessible Playground Surfaces

10

---

---

---

---

---

---

---

---

## Presenters



Peggy Greenwell



Jennifer Skulski

11

---

---

---

---

---

---

---

---



## Session Agenda

- Study Background
- Review of Findings
- Questions and Answers



National  
Center on  
Accessibility

12

---

---

---

---

---

---

---

---

## Study Background

- Playground surfacing number one concern!
- Focus on “performance” measure for firmness and stability began in early 90’s
- ASTM Laboratory test

13

---

---

---

---

---

---

---

---

## Study Background

- Additional requirements for surface inspection and maintenance added to the final rule
- Lack of reliable product performance data for playground owners to make informed choices

14

---

---

---

---

---

---

---

---



**A Longitudinal Study of Playground Surfaces to Evaluate Accessibility**

Conducted by  
National Center on Accessibility

Funded by  
U.S. Access Board



---

---

---

---

---

---

---

---

## Purpose of Study

To evaluate a variety of playground surfaces, their ability to meet accessibility requirements, their costs upon initial installation and maintenance over 3-5 years.

16

---

---

---

---

---

---

---

---

### Research Questions

## Installation & Maintenance

1. How well do various playground surfaces meet the accessibility requirements upon installation?
2. What are the costs for the various playground surfaces and are the costs related to performance?
3. What accessibility issues arise out of initial installation?
4. What accessibility issues arise out of long term use and require maintenance?

17

---

---

---

---

---

---

---

---

## Research Design

- The first site visit was conducted within 12 months of installation
- Annual site visits during summer months
- Piloted data collection
- National advisory committee

18

---

---

---

---

---

---

---

---

## Playground Selection

- Municipal park settings
- Limited within driving distances of IU-Bloomington;
- Accessibility to children with and without disabilities;
- Surface materials consistent with study;
- Geographic location;
- Seasonal weather conditions; and
- Willingness of owner/operator to participate.

19

---

---

---

---

---

---

---

---

## Study Sample

Surface Type	N
Poured in Place Rubber (PIP) (w/EWF)	14 (5)
Tiles (TIL) (w/EWF)	10 (8)
Engineered Wood Fiber (EWF)	6
Shredded Rubber (SHR)	0
Hybrid (HYB)	5

N = 35

20

---

---

---

---

---

---

---

---

## Limitations

- Sample size, recruiting technique and ability to generalize findings to general population
- Visitor use and impact on surface conditions
- Weather
- Liability associated with sites found to be non-compliant with the standards may affect the playground owner's willingness to participate in the study

21

---

---

---

---

---

---

---

---

## 5 Categories of Surfaces

1. Engineered wood fiber product
2. Shredded rubber / crumb rubber
3. Unitary rubber mat / tile surfaces
4. Unitary rubber "poured in place" surfaces
5. Combination or hybrid surface systems under development

22

---

---

---

---

---

---

---

---

## Surface Requirements

1. 2010 ADA Standard and Architectural Barriers Act Standard
  1. 1008.2 Accessible Routes
  2. 1008.2.6 Ground Surfaces
2. ASTM F1292-99 *Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment* as determined by the surface manufacturer in laboratory testing;
3. 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; and
4. ASTM F2075 *Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment*. VOLUNTARY

23

---

---

---

---

---

---

---

---

*On-site inspection*

## 9 Critical Areas

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
9. Other areas (i.e. water play elements, etc.)

24

---

---

---

---

---

---

---

---






---

---

---

---

---

---

---

---

## Instrumentation

1. Installation form
2. On-site visual inspection - form
3. Rotational Penetrometer measurements for firmness & stability
4. TRIAX 2000 measurements for impact attenuation (optional)

26

---

---

---

---

---

---

---

---

## Installation Form

- Completed by the playground owner
- Playground size, total surface area
- Equipment
  - Manufacturer and cost
- Surface
  - Manufacturer and cost
  - Base
  - Sub-base
  - Top layer
  - Installed in-house or by contractor, hours of labor 27

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

*1<sup>st</sup> On-site Measure*

### Surface Deficiency Score (SDS)

- Slope exceeds 1:16 (6.25%)
- Cross slope exceeds 1:48 (2.08%)
- Change in level greater than ½ inch
- Opening greater than ½ diameter

30

---

---

---

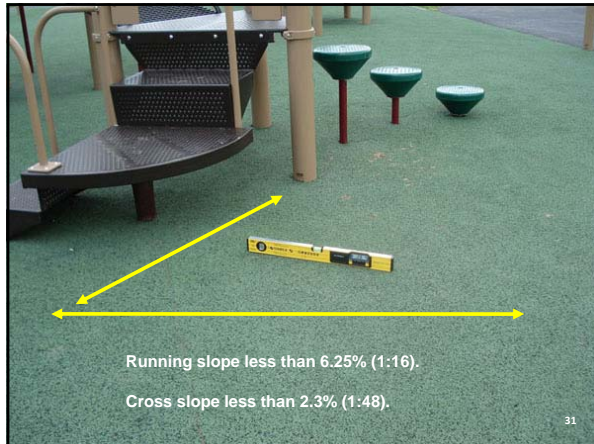
---

---

---

---

---




---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

**ASTM F1951-99**

- A lab test in a controlled environment
- Wheelchair work method
- 7% ramp used as baseline
- Measures work per sq. ft. for straight propulsion and turning
- Manual rehabilitation wheelchair with rider  
165 + 11 lbs
- Records data applied to pushrim over 6 1/2 ft. distance

36

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

### ASTM F1951-99

- The surface “passes in the lab” if the work to propel across the surface and to turn is less than the work required to propel across a 7% ramp.

**PASS = WORK on surface sample < WORK on 7% ramp**

---

---

---

---

---

---

---

---

### 2<sup>nd</sup> On-Site Measure Firmness & Stability

- Rotational Penetrometer
- Developed by Beneficial Designs as a portable field test to replace ASTM 1951.
- Wheelchair caster set in spring loaded caliper.
- Measures the vertical displacement of the penetrator.

 A photograph showing a person in a blue shirt and white cap using a rotational penetrometer on a surface. The person is leaning over the device, which is mounted on a tripod. The device has a wheel and a spring-loaded caliper.

---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

Sample Values for Various Surface Types\*

Surface Type	Firmness	Stability
Concrete	.15 - .17	.17 - .19
Turfgrass	.55 - .65	.69 - .79
Carpet <small>(<math>\frac{1}{8}</math> inch cut pile w/ <math>\frac{1}{8}</math> inch pad)</small>	.32 - .43	.41 - .55
Sand	1.13	< 1.13

\*The values are from sample surfaces that are not part of a playground installation.

---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---





## Key Findings

- Cost per square foot
- Surface Deficiency Score (SDS)
- Firmness & Stability
- Qualitative data

49

---

---

---

---

---

---

---

---

## Playground Sites

	Surface Area	Cost / sq ft	Total
PIP	755 to 7,720 sq ft	\$6.59 to \$19.80	\$30,019 to \$136,065
Tile	740 to 2,571	\$8.96 to \$21	\$15,950 to \$29,971
EWf	1,920 to 12,510	\$1 to \$2.50	\$4,200 to \$12,500
Hybrid	6,031 to 8,500	\$7.50 to \$12.65	\$74,000 to \$111,626

*N = 35 sites*

50

---

---

---

---

---

---

---

---

## Review of Values

- Surface Deficiency Score (SDS)
  - Slope, cross slope, openings, changes in level
  - 0 to 4 points
  - 0 = no deficiencies identified
  - Up to 4 max deficiencies for each location
- Firmness & stability
  - Measured in tenths-hundredths of an inch penetration into the surface

51

---

---

---

---

---

---

---

---

PIP  
\$6.59 -  
19.80


SDS  
Mean = .04  
Mode = 0

Firmness  
.34531

Stability  
.38357

Sum  
.72888

Failure for  
impact  
attenuation



52

---

---

---

---

---

---

---

---



53

---

---

---

---

---

---

---

---

Tiles  
\$8.96-21

SDS  
Mean = .50  
Mode = 0

Firmness  
.27504


Stability  
.30989

Sum  
.58493

Changes  
in level

Separation  
at seams

Punctures



54

---

---

---

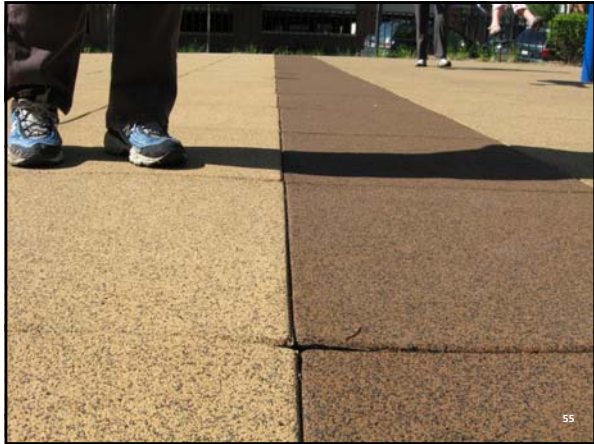
---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

<b>EWF</b> \$ .74 – 2.50	A photograph of a playground with various structures on a wood chip surface. The number 59 is visible in the bottom right corner.
<b>SDS</b> Mean = 1.94 Mode = 2	
<b>Firmness</b> .34227	
<b>Stability</b> .78242	
<b>Sum</b> 1.12469	
<b>Undulating running &amp; cross slope</b>	
<b>Displacement</b>	
<b>Installation instructions</b>	

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

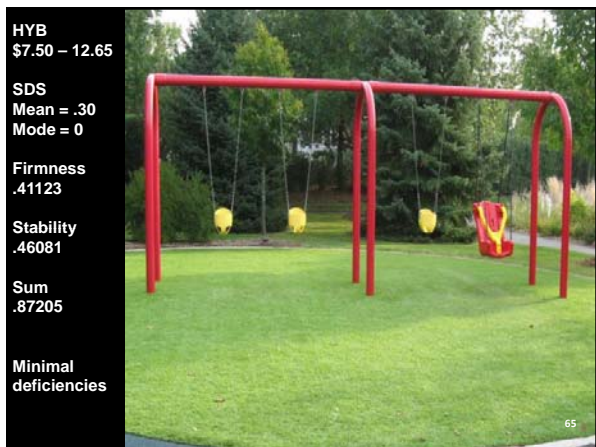
---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

## Key Finding(s)

No surface type was found better than others when comparing ability to meet accessibility standards with issues related to installation and maintenance.

71

---

---

---

---

---

---

---

---

## Key Findings

- Within 12 months of installation, loose fill EWF had greatest number of deficiencies affecting accessible route (excessive running slope, cross slope, change in level).

72

---

---

---

---

---

---

---

---



## Key Findings

- Loose fill EWF had the highest values for firmness and stability, indicating greater work force needed to move across the surface.
- Unitary surfaces PIP and TIL had the lowest values for firmness and stability, indicating less work force necessary to move across the surface.

73

---

---

---

---

---

---

---

---

## Key Findings

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

74

---

---

---

---

---

---

---

---

## Key Findings

- Occurrences were identified where the installation did not parallel the manufacturer's installation instructions or procedures for the laboratory test sample for ASTM F1951.

75

---

---

---

---

---

---

---

---

## Key Findings

- A surface with fewer accessibility deficiencies and lower measurement for firmness and stability does not necessarily meet the safety standards for impact attenuation.

76

---

---

---

---

---

---

---

---

## General Findings – Design Issues

- Inaccurate application of the accessibility standards.
- Inefficient use of the intended accessible surface.
- Lack of initial site survey to address changes in site elevation.
- Deviations from design plan during construction.

77

---

---

---

---

---

---

---

---

## General Findings – Installation

- Intensive installation requirements require contractor specialization
- Learning curve for park personnel
- Costs for contractor return for repairs or patches
- Installation temperature & bonding agents

78

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

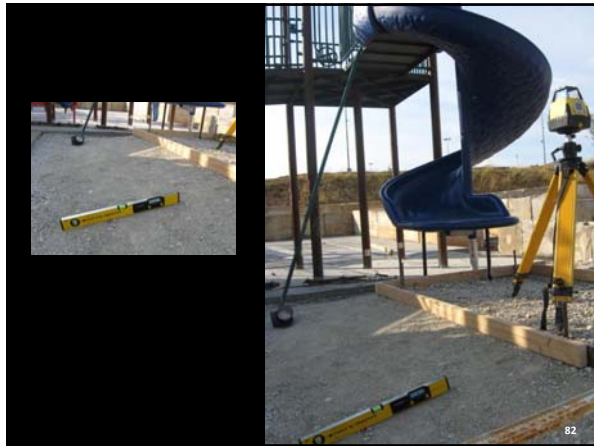
---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

- ### General Findings – Maintenance
- Surface wear
  - Over-filling loose fill material without leveling and compacting
  - Puncture holes, separation at seams
  - Cross-contamination between surface materials
  - Vegetation growth in the surface material
  - Exposure of sub-base like geo-textile fabric
  - Learning curve on maintenance of various surface materials
  - Lack of maintenance information/instructions provided to owner upfront
- 86

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

## General Findings – Product

- Owner/consumer concerns with chemical composition of surface materials and whether they are truly “eco-friendly” or “green”

94

---

---

---

---

---

---

---

---



95

---

---

---

---

---

---

---

---

## Positive Outcomes From Study

- Creating greater awareness amongst participating owners and perspective buyers
  - ▣ Purchasing specifications
  - ▣ Surface testing
  - ▣ Maintenance forecasting
- IPEMA position statement on installation of EWF
- Encouraging innovation for surface product research & development

96

---

---

---

---

---

---

---

---



# Questions?

You may type and submit questions in the  
Chat Area Text Box or press Control-M  
and enter text in the  
Chat Area

97

---

---

---

---

---

---

---

---



## U.S. Access Board

(800) 872-2253 (voice)  
(800) 993-2822 (TTY)

E-mail: [ta@access-board.gov](mailto:ta@access-board.gov)  
[jskulski@indiana.edu](mailto:jskulski@indiana.edu)

[www.access-board.gov](http://www.access-board.gov)

98

---

---

---

---

---

---

---

---

Thank you for participating  
in today's webinar



Next session:

*"FINAL RULE - Architectural Barriers Act (ABA) Accessibility  
Standards for Trails, Picnic and Camping Facilities, and  
Beach Access Routes"*

November 8, 2013

2:30 - 4:00 (ET)

[www.accessibilityonline.org](http://www.accessibilityonline.org) (877) 232-1990 (v/TTY)

99

---

---

---

---

---

---

---

---