



*State of the Science*

# Creating Accessible Play Areas

ADA Audio Conference Series  
May 16, 2006

Presented by  
Jennifer K. Skulski, CPSI  
National Center on Accessibility  
[www.ncaonline.org](http://www.ncaonline.org)  
[jskulski@indiana.edu](mailto:jskulski@indiana.edu)

Copyright © 2006 National Center on Accessibility  
and the Trustees of Indiana University.  
All rights reserved. This document, or parts thereof, may not be reproduced in any form  
without the permission of the National Center on Accessibility acting on behalf of Indiana  
University.

National Center on Accessibility  
Indiana University Research Park  
501 N Morton St, Suite 109  
Bloomington, IN 47404  
(812) 856-4422 Voice  
(812) 856-4421 TTY  
[nca@indiana.edu](mailto:nca@indiana.edu)  
[www.ncaonline.org](http://www.ncaonline.org)

*Permission to Reprint for ADA Audio Conference Series  
May 16, 2006*

*Permission to reprint this document, or parts thereof, is granted by the National Center on  
Accessibility on behalf of Indiana University for the ADA Audio Conference Series, on the  
condition that appropriate written acknowledgement is given to the National Center on  
Accessibility-Indiana University, and the purpose of duplication is for the exclusive purpose of  
participating in the ADA Audio Conference Session on May 16, 2006.*



National  
Center on  
Accessibility

*Committed to the full participation in parks,  
recreation and tourism by people with  
disabilities*

- Indiana University
- Research, Education & Technical Assistance
  - Trails, outdoor recreation, swimming pools, playgrounds, golf, beaches, sports facilities, fishing & boating
- National Impact
  - U.S. Department of Justice
  - U.S. Access Board
    - 1993-1995 Recreational Access Advisory Committee
    - 1997-1999 Outdoor Developed Areas Regulatory Negotiation Committee
    - Research & recommendations on swimming pools serve as foundation for new ADA/ABA accessibility guidelines
  - U.S. Department of Interior Accessibility Committee
  - National Alliance for Accessible Golf Board of Directors
  - ASTM F08 Playground Surfaces Subcommittee & F1951 Workgroup
  - Outreach to Park & Recreation Professionals

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





U.S. Population

## Children with Disabilities

- 45 million U.S. children ages 5-15
- 2.6 million ages 5-15 with a disability (5.8%)
- 78 million U.S. families
- 20.9 million U.S. families have at least one family member with a disability (28%)
- 2 in every 7 families affected by disability

Source: *Disability & American Families 2000, July 2005*



## U.S. Playgrounds

SIC	Category	Existing Establishments In 1999	Percent with Play Areas		Number of Play Areas	
			Low	High	Low	High
5812	Eating Places	420,000	2	5	8,400	21,000
7011	Hotels & Motels	47,000	2	5	940	2,300
7032	Sporting & Recreational Camps	3,600	10	25	360	900
7033	Recreational Vehicle Parks & Campsites	7,000	40	60	2,800	4,200
7999	Miscellaneous Amusement & Recreation	32,000	10	25	3,200	8,000
n/a	Public Schools	65,000	80	100	52,000	65,000
n/a	Private Nonsectarian Schools	5,500	80	100	4,400	5,500
8351	Child Day Care Services	102,000	90	100	92,000	102,000
8641	Civic, Social, & Fraternal Associations	37,000	2	5	740	1,900
n/a	Municipal & State Parks	111,000	30	60	33,000	67,000
	<b>Total</b>	<b>830,000</b>			<b>200,000</b>	<b>280,000</b>

Source: *U.S. Access Board Economic Assessment (2000)*



## U.S. Playgrounds

- 200,000 to 280,000 est. existing playgrounds
- 13,000 to 18,000 est. to be replaced annually
- 4,100 to 5,300 est. new construction annually

*Source: U.S. Access Board Economic Assessment (2000)*



*Playground Safety*

## Primary Public Concern

- Annually 205,860 children receive emergency care related to a playground injury
  - 76% public playgrounds
  - 23% home playground equipment
- 17 children die annually on public playgrounds
- 147 deaths reported to CPSC from January 1990 to August 2000

*Source: National Program for Playground Safety & U.S. Public Interest Research Group*



## Injury Statistics

- 79% Falls
  - 68% falls to surface
  - 10% falls to other parts of equipment
  - 1% falls to unknown
- 11% Impact
  - 8% impact with stationary equipment
  - 3% impact with moving equipment
- 10% Miscellaneous
  - Crush points, sharp edges, entanglement, head or neck entrapment

*Source: National Playground Safety Institute*



## Injury Statistics

### By Equipment

- 53% climbing equipment
- 19% swings
- 17% slides

### By Type of Injury

- 39% fractures
- 22% lacerations
- 20% contusions/abrasions
- 11% strains/sprains

*Source: National Program for Playground Safety*



## Standards & Guidelines

- Consumer Product Safety Commission (CPSC)
  - Federal guideline, regarded as standard of care in court
  - *Handbook for Public Playground Safety*  
(Publication # 325, see <http://www.cpsc.gov/CPSC/PUB/PUBS/playpubs.html>)
  - Written for the consumer
- American Society for Testing & Materials International (ASTM)
  - National voluntary standard with purpose to reduce life threatening and debilitating injuries, regarded as standard of care in court
  - Written for the manufacturer
- Americans with Disabilities Act
  - Civil rights law, enforceable by DOJ & in Federal court
  - Accessibility Guidelines for Play Areas (Chapter 10, Section 1006)



## Standards & Guidelines

- ASTM Standards
  - *ASTM F1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use*
  - F1292 Method to Test Impact Attenuation of Safety Surfacing for Playgrounds
  - F1951 Method to Test Accessibility of Safety Surfacing for Playgrounds
  - F2049 Guide for Fencing/Barriers for Playgrounds
  - F2075 Engineered Wood Fiber Safety Surfacing
  - F1918 Soft Contained Play Systems
  - F1148 Residential Play Equipment





## Access Routes

- Can either facilitate inclusion or become a physical barrier to it.
- Should be a primary consideration from the initial design phase throughout the lifespan of the playground.
- Should be designed to give children who use assistive devices a choice as to whether or not they leave their assistive device.



Concrete ramp extending into loose fill playground surface.



A concrete path leads into a loose fill playground surface with composite play structure. Adjacent to the path is a park bench with side clearance for wheelchair seating.



Large playground structure with unitary surface contained by concrete curb perimeter.





Curb cut from concrete sidewalk into unitary playground surface.



A concrete walkway and curbed containment border lead to a loose fill playground surface. There is a 6-12" drop from the concrete into the loose fill.



An asphalt route and landscape berm leads to a concrete ramp descending into a play area with unitary surfacing.



Large playground structure with engineered wood fiber surfacing and concrete sidewalk perimeter.





Concrete sidewalk treated with beveled edge into playground surface. Engineered wood fiber is filled to top of beveled edge. Some EWF has been kicked back to reveal beveled edge.



A landscaped berm access route, less than 1:20 with a concrete path, leads to the upper deck of a large composite play structure.



Left: An elevated balance beam with side barriers connects two platforms of an elevated composite structure.



Right: An elevated platform wide enough for wheelchair passage connects the same two platforms of the elevated composite structure.



Transfer system to elevated composite play structure.





Transfer system to elevated composite play structure. Transfer system is molded plastic to look as if the child is climbing up a mountain trail.



## Equipment

- Design for child development
- Design for “play value”
- Design for experience
- The equipment catalog is a resource, not necessarily the starting point of playground design.





*Selection & Purchasing Considerations*

## Equipment

- What makes the accessible element accessible?
- Has it been used and tested by children with disabilities?
- Are any of these elements located in your area that can be reviewed?
- Are all of the accessible play elements incorporated into the main path of travel and fully integrated throughout the play area so as not to create segregated situations?
- Are the accessible play elements joined to accessible routes?



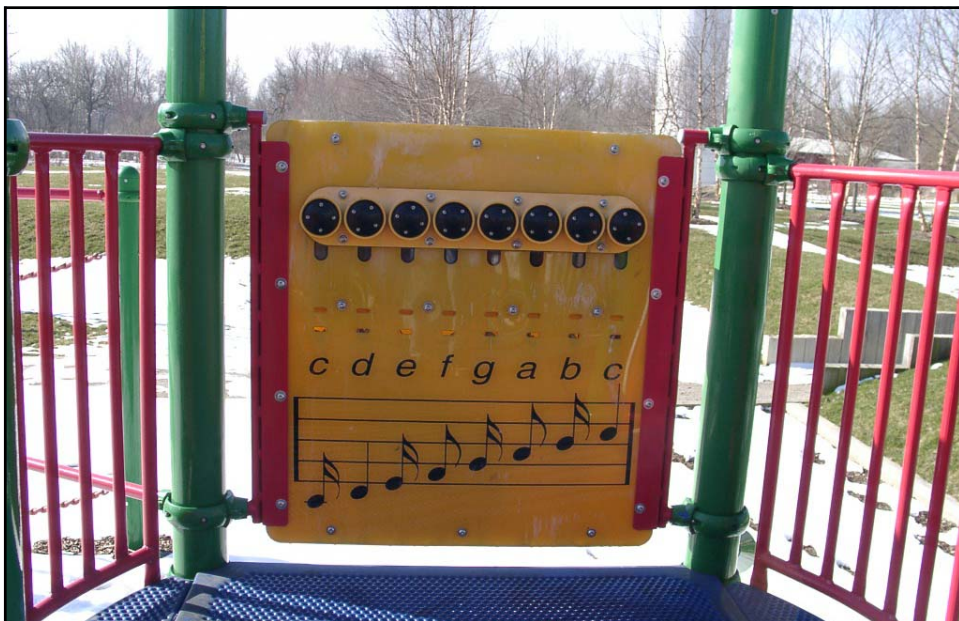
*Selection & Purchasing Considerations*

## Equipment

- What form(s) of access is provided to the play component?
  - Transfer systems?
  - Ramps?
  - Both transfer systems & ramps?
  - Other?
- For each element and experience at the play area that is not accessible, is at least one accessible element provided that will offer the same or similar experience?
- Are the reach ranges and clear widths appropriate for the designed age group and usable by children with disabilities?



An older girl with Down Syndrome stands next to a tic tac toe panel with a smaller boy.



A play panel on an elevated structure has large buttons that play musical notes when pushed.





Two ground level components meant for standing to hold on to pole and balance. One on left is modified with larger base.



Sand area with transfer system for lowering into sand and adjacent elevated sand table.



Raised sand area built into landscape and contained by wood timbers with adjacent sand table. Crawl tube from elevated play structure empties into raised sand bed.



Sand area contained by concrete curb border. Sand table and transfer system adjacent.





Two swing bays have belt swings for older children and bucket swings for toddlers. A dad is shown swinging mid-air with his daughter in motion next to him in the bucket swing.



Two swing bays have molded plastic chair swings and bucket swings. A dad is shown swinging with his toddler son on his lap.





Three swing bays, one with a canvas bucket and hand pump for larger children, two with wheelchair platform swings.



A boy swings mid air laying on the wheelchair platform swing while his grandmother pushes the front of the swing and dog moves to avoid being hit.



## Surfaces

- Safety
  - Impact attenuating for falls
  - *ASTM F1292 Method to Test Impact Attenuation of Safety Surfacing for Playgrounds*
- Accessibility
  - Accessible to reach and use equipment
  - *ASTM F1951 Method to Test Accessibility of Safety Surfacing for Playgrounds*
- Other
  - *ASTM F2075 Engineered Wood Fiber Safety Surfacing*



## ASTM F1951

- Wheelchair work method
- 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 ½ ft distance
- Currently under revision, proposed field test method
- Passing equivalent of work required to travel over 7% ramp
- Currently under REVISION



## Rotational Penetrometer

- Developed by Beneficial Designs
  - [www.beneficialdesigns.com](http://www.beneficialdesigns.com)
- Measures firmness & stability of surface
  - Firmness – the degree of surface resistance to deformation, especially by indentation or the movement of objects
  - Stability – the degree to which a surface resists change from contaminants or applied force, so that when the contaminant of force is removed, the surface returns to its original condition



The Rotational Penetrometer. A wheelchair caster on a spring loaded caliber is mounted on a metal tripod with plywood base.





Vegetation has grown up through playground surface made of wood chip.



Above left: Three piece of wood chip measure at 4", 10" and 2" in length.

Bottom left: A woodchip measures 1" high.

Above: A woodchip measures close to 1" high.



The gravel sub-base has mixed in with the shredded rubber playground surface under a climber.



A rubber tile path affixed to a concrete base leads to a composite play structure.





The corner of the rubber tile has broken away to expose the concrete base.



Large piece shredded rubber is mixed with a binding product to make a unitary surface.





The large piece bound shredded rubber has a beveled transition meeting with loose fill wood product.



Unitary surfacing, painted in multiple colors, leads to a large composite structure with green wave slide. SMARTE Surface System.





Two workers lay out bags filled with shredded rubber in a grid as part of the base for the SMARTE Surfacing System. Two other workers fill the creases with loose rubber.



Poured in place rubber surface system in multiple colors, leads to composite structure and swing bays. From the City of Detroit.



### *Comparison Shopping*

## Purchasing Considerations

- Does the manufacturer have certification for ASTM F1292?
- Does the manufacturer have certification for ASTM F1951 – lab?
- Has the manufacturer tested the surface for firmness & stability in a field installation?
  - Reported values?
  - How consistent?
- What type of maintenance is required to consistently meet the reported value?
- What is the initial cost of the surface material and installation?
- What is the cost to maintain the surface to ASTM F1292 and ASTM F1951 standards seasonally, monthly, weekly or even daily?



### *Comparison Shopping*

## Purchasing Considerations

- What is the process for installation? Are there installation issues or concerns that may affect the surface performance with ASTM F1292 and ASTM F1951?
- Can the park staff install the surface or does it require installation by a certified professional?
- How will weather conditions, seasons and heavy use affect the surface material?
- Are special considerations given to heavy use areas like at the bottom of slides and under swings?
- What is the product warranty?
- Does the vendor have a list of customers that have purchased and installed the surface material within the last 5 years and can be contacted for questions on customer satisfaction?



*Before Writing the Check*

## Purchasing Considerations

- Bid requirements
- Purchase agreements
  - Field test surface for compliance with ASTM F1292 and field accessibility with Rotational Penetrometer, XX days upon initial install
  - Repeat field tests seasonally or more frequently based on usage



## Funding

- Avoiding the “telethon” approach to building “the special playground” for “special kids”
- Federal, state and local sources
  - Community of Science, [www.cos.com](http://www.cos.com)
- NCA Monograph
  - “Funding Accessibility Projects: In Search of the Money Tree”  
[www.ncaonline.org/monographs/11funding.shtml](http://www.ncaonline.org/monographs/11funding.shtml)





## On the horizon....

- Revision to ASTM F1951
- U.S. Access Board developing online training module
- Partnership between Access Board & National Playground Safety Institute



## Key Points

- Successful playground design incorporates play value and inclusion from the start.
- Play areas designed with choice and a variety of experiences (physical, sensory, social, imaginative) can facilitate development for children of all abilities.
- A playground requires ongoing maintenance for the lifespan of the playground...no matter what the surface is.



## Resources

- See supplemental handout
  - Standards & guidelines
  - Recommended readings
  - Organizations
- For a complete listing of playground equipment manufacturers and surface vendors, see the NCA web site [www.ncaonline.org](http://www.ncaonline.org)



If play is child's work,  
our work as adults is to ensure their play!

*-Jennifer Skulski, CPSI  
National Center on Accessibility*