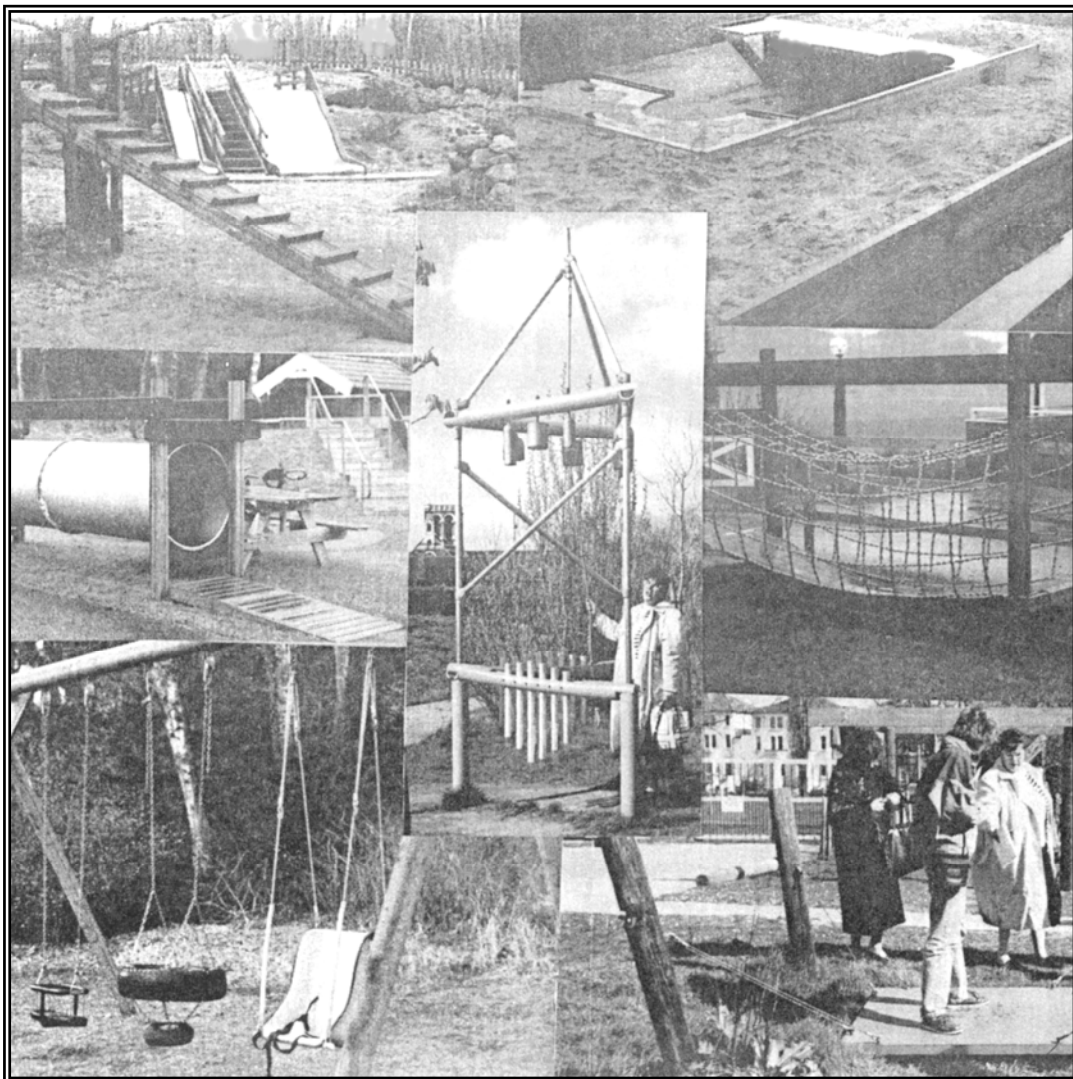


Guidance for Accessible Playground Design



Preface

Guidance for Accessible Playground Design is the result of an accurate study that was led by Dr. Gerencsér Kinga reader. She expressed the importance and necessity of this report and gave me her instruction during the work.

The main thing that encouraged me to write this report was the recognition of the importance of play activity and the poor possibilities of disabled children for play. In addition, with the fact that in Hungary the disability policy has made huge steps towards the equalization of opportunity for all people in the last two years the report has got reality nowadays.

The main purpose of this report is to offer help regarding improvement of existing playgrounds and design of accessible ones. The report would like to give an overall picture about the possibilities of children with mobility problem to participate in the play nowadays and give some advice and recommendation to make it easier providing suitable play environment for this group of children.

It is my hope that information and suggestions being involved in this report may be useful for successful design of accessible playgrounds. It is likewise my hope that this report encourages designers to work in cooperation with families of disabled children and medical staff in order to be able to give the most suitable play facilities for the disabled children.

Acknowledgements

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INTRODUCTION

Background

Play is the most important activity for all children, which is mostly performed in playgrounds and other play areas. We can observe the children in countless times as they are playing anywhere in any time. The play area means not only the playground itself but the streets, gardens, and parks, outside and inside the house as well. When they get a small freedom they start to play immediately. Through the process of the play they gain a lot of experiences about surrounding environment and can develop their skills.

The play may be more important for disabled children than others. Disabled children require the same experiences than others, however it is necessary to have suitable playground because they have less opportunity for play. Experience has shown that there is not enough play facility for these children. Yet only few playgrounds are designed to be accessible for disabled children. The reason for that could be lack of knowledge, lack of information or insufficient interaction between families and creators of play equipment.

This situation and the fact that in Hungary the disability policy has made great stride towards equalisation of opportunity made this report topical.

Introduction of the play

Sometimes we ask ourselves: “Why can be the play so important?” Play is not only a simple turning off energy but also the most important part of the children’s development physically, cognitively, emotionally and socially. It cannot be changed to or replaced with another activities, as it was experienced in some institutional treatment because the play is the part of the young life.

The play means the same activity for children than the work for adults but there is a big difference. While we are working in order to reach a certain result, in case of the play the result is not so important. The process of the play itself, not the result of it, affords the pleasure. The play is going on within a certain range. It has rules but the children can change them and create new ones or they can quit from the play as well.

Through the process of the play they get in touch with both children and adults. Due to this continuously interaction they learn how to behave in a given situation, understand the cause-effect processes and obtain experiences and information about surrounding environment. This learning process is indispensable to the children.

The child acquires the skills to cope with disappointment, anxiety and fear. The children will be aware of their skills, strength and limitations.

In addition, the play increases the imagination, creativity and manipulative skills; improves problem solving and developing of thinking. It becomes easier to make their own decisions and fulfil the social requirements.

The ability to play can be the most important parts of the childhood. “A child who cannot participate in play activities is missing an opportunity to experiences normal development through play” (Musselwhite, 1986).

If suitable play facilities are not provided for children it can lead to the lack of information and can reduce the opportunities of normal development. The children with mobility problems have less opportunity to play because of the deficiency in their ability. During the play they can face more failures than other child, which result frustration and despair. Therefore the child gains less experience and fun. They become reluctant to try again and the serial disappointment leads to the loss of self-esteem.

The *self-directed* and *spontaneous* play is one of the several factors determining the good play facility. Sometimes, with the best of intention the children with mobility problems get too much help during the play. Parents or assistants control them and the adventure and challenge are reduced more than it would be necessary. In this way the play becomes less beneficial life experience.

Because of the above-mentioned it is essential to have appropriate way for play that gives the same experience for every child.

Chapter 1 Analysing of existing playgrounds

Before recommending some new elements and play equipment it is essential to observe and evaluate some existing playgrounds.

After an accurate study it can be said that there are many playgrounds and play areas in Hungary but only few of them were created for disabled children. These playgrounds are generally located separately, often in the garden of an institute and they are available only for the children of the given institute. This separation prevents the disabled children to play together with others and learn how to accept their own disability. It can increase the discrimination and stigmatisation of disabled children and arrest their integration and participation in the process of the play.

The other very common thing regarding to the playground is that there is only one or two accessible play equipment in the playground but the environment is not accessible at all.

It is also observed that the play equipment is not adapted to the ability of the child and sometimes it offers really boring play activities.

At first we have to be aware of the consequences of different movement disabilities. It is necessary to know what the child is able to do which skills must be developed and which activities can work as a kind of physical treatment.

The found obstacles are often very simple and avoidable but sometimes require a bit more thinking to recognise them. Some barriers are already enough and the playground becomes unusable.

It could be very hard for an unprofessional to find out which parts of the play area will cause barriers in the future. Maybe this is the reason why there are not appropriate playgrounds.

In different playgrounds different barriers can appear but after analysing them we will get an overall picture about possible problems and their solutions.

It is worth to make a kind of checklist what can help to observe the playground. In the following, after the analysis, a kind of checklist will be offered.

1.1 PLAYGROUND IN THE VÁROSLIGET

(Budapest)

This playground was designed for every child with or without disability. Nowadays only children without disability use it.

The first idea being an accessible playground was excellent, but some mistakes were made.

Accessibility from outside:

The playground is integrated into a very worth urban area, in the middle of a beautiful natural park. This park is far from the motor road in this way far from the traffic noise as well. This location decreases the possibility of traffic injury.

The site is flat and spiced with mounds that serve a suitable base for slide located in. The designers thought that fact that the playground should be available by any kind of vehicle because the disabled children are almost always carried by car. So the playground is close to a well-measured parking place and the public transport as well.

A hard, smooth and continuous path that makes the use of wheelchair possible provides accessibility from the parking place to the play area. The path is wide enough for overtaking in this way it is not necessary to have overtaking spots along the path. The play area is in a fence site with more gates depending from where the child wants to get in. The gates are wide enough and easy to open from a sitting position so a wheelchair user can open and go through it.

Access to the structures:

The first thing which make impossible to get to the really play area inside of the playground is that the play areas are separated with round woods. These blocks are located round the whole play area and there is not gap between them. So the child can get in only with a big step over it and a wheelchair or any kind of walking aid user is not able to go in at all.

The surface of the ground causes the second problem. The ground inside of the play area is covered with bark chips. The bark chips are rated as a soft material, so it is not suitable just only to the fall zone. The bark chips cause barriers for a child with wheelchair or walking aid.

There is not path that leads from an “accessible” play elements to another.



Figure 1. Composite play structure

Structures:

There is one composite play structure where more play elements attached such as slides, rope-swing, climbing structures and rope-bridge.

The climbing structure contains alternative ways to climb up. There are nets ladders and climbing walls but there is not ramp.

The steps of the ladder are

not wide enough but it is just a small problem because there are some other ways to get up. It is a positive thing that at the top of the structure there are many handrails but at least one stair should also contain handrails to help the child in walk. Children with moderate movement disability may use this structure but it is completely unusable for children with wheelchair, for example. Because the wheelchair user is not able to get up, the analysing does not touch those problems regarding the wheelchair use that would appear on the structure.

It could be another way for a wheelchair user to play on this element without wheelchair. For this, transfer points would be necessary. It can be a kind of platform or seat in an appropriate height and than a kind of stairs on which the child can get up in sitting position, for example.



Figure 2. Swing

mentioned above. It does not provide appropriate surface for wheelchair user. It is worth to think of the seat's height. If it is in the same height than the seat of the wheelchair, it makes easier the transfer from it. During transfer a stable support is required.

Swings:

The swing that can be seen in this picture is a quite good solution for those who has mobility problem. It offers possibility more than one child to use it. In addition, the back support is missing. But it can be supplied easily, for example use of a deeper seat or two tyres (one for seat and other for back support).

The problem with the surface is the same that was



Figure 3. Slide

Slide:

As it can be seen on the picture right, the slide is built in a mound. This special solution and the use of ramps could make it possible that a child with wheelchair uses it but the ramp has been forgotten. This is a small part, but it would increase the number of users significantly. At first it take into account that a disabled child almost always has assistant or parents with him/her to help.

Thus they can carry the different walking aids from the entry point to the exit. The children with moderate mobility problems can use this element almost independently.



Figure 4. Sandpit

Sandpit:

The sand is a very important and popular play element for children.

It can seem easy to provide suitable sandpit. The designers think that it is enough to put it higher and that is all. In this picture we can see a wrong example. The sandpit was lifted in order that a wheelchair user also can play but the environment

prevents it. The ground is covered with sand that makes it hard or impossible to drive the wheelchair. Accessible path to the tables also would be necessary.

It is worth to consider the space between the legs of the table. In this case it is not wide enough for a wheelchair. The edges of the table should have indenture for wheelchair user, in order to give place to get closer to the tables. Sometimes a kind of back support may be required for those children who have balance problem.

The sandpit is combined with water channel. This channel is built in the level of ground, so the child must bend down. The child who wears prosthesis or braces is not able to do it.



Figure 5. Climbing structure

Climbing structure:

This is a good example of an unusable play element. This provides only one way to climb that requires big effort even from those who have a smaller movement disability. When I was there nobody used it what shows that it serves boring play activity.

In this playground the play elements and play events are located too far from each other; both prevent the interaction between children. It can be the reason why some play elements are used and others are not.

The children with mobility problems can become tired soon when go from one element to another. In addition, there is not rest area along the path that would make it possible to spend a little time with relaxation.

All the above-mentioned produce that this playground is not so popular between disabled children and it shows why the assistance, parents and caregivers are loath to carry their children there.

1.2 PLAYGROUND IN THE SCHOOL FOR CHILDREN WITH MOVEMENT DISABILITY

(Budapest, Mexikói street)

This playground differs from the public playgrounds in two things. The first thing is the place of this playground. It is located in the garden of the School and only children with movement disability use it. There is now possibility for other children to go in and play because of the separation and the type of the play elements.

The type of the play elements is the other very important difference. The play facilities are designed for various treatments. It means that there is only a slide, a swing, some steps and walking bars. Forming of the playground in this way presents another kind of approach, the treatment based approach against the play based approach. This distinction can result in separation of the disabled children from their non-disabled peers.

Accessibility from outside:

The accessibility from the building to the playground is provided in two ways, with ramp and steps.

The "really play elements" (slide, swings) are located in the way that the child must use ramp or steps to get there. Wheelchair users can use the ramp, others with moderate movement disability can cope with different kind of steps. The surface of the accessible pathway is hard, continuous and smooth, so it is well usable by wheelchair.



Figure 6. Stairs for treatment

The stair presents different kind of steps, which can be found in real life, like bus, underground, escalator steps, and so on. It could be very important, because the great number of children are living in this institute and they have never tried stairs, like these earlier. Every stairs

have different slope and the children can choose between them depending on their ability. Of course, handrails are jointed to the stairs.

This solution of stairs could be very useful but it does not serve an enjoyable activity. Director of the institute confirmed this fact.

Structures:

There is not composite play structure in the site of the institute garden because it would be hard and expensive to create it in accessible way and it is not so important in a treatment-based approach.

Because all children have a kind of movement disability and the stand and walk cause problems for almost all of them, they enhance the importance of development regarding the ability of walk. In this way lots of parallel bars are placed which make the walk easier.



Figure 7. Walking bars

The bars are located in different height and between them different surfaces are installed. Different materials give experiences for the children and they can learn the features of them very quickly. Professionals accept this method of development as a very good and useful method. It means that it would be necessary

to install it in every play area. The only small problem is the quantity of the bars. If it is too much it becomes boring and uneconomical. The same happened in this playground.

Slide:

The slide is located in the same way as we could see in case of the playground in the Városliget.

It is fitted into a small mound and even a ramp is installed, so it can be said that this solution of the slide seems the best.

Swings:

In every playground the most problems occur with the swings. At first we must be aware that the most children with mobility problem has also a certain degree of balance problem. It means that the children need more back support than others. In this case the swing is the same than an average one nowadays, without any kind of back support. It makes almost impossible to use them.

This playground shows that the designers thought the accessibility features over but the essence of the play was forgotten. Some play activities are presented in many times and others, which are very important for developing give boring activity. There are also some elements that are not use at all.

1.3 SUMMARY

After analysing two absolutely different approach of playground design it can be said that none of them serve blameless solution and play facilities for children with and without disability together. The playground based on the play activity itself leaves the children's different ability out of consideration. On the other hand the playground based on the physical treatment seems deficient. It is the place of „hard” work rather than an area for recreation and free play.

The best solution would be the mixing of these two kinds of playground design.

It means that every playground must contain elements, which suitable for a simple physical "treatments" and at the same time serve interesting and enjoyable play activity for all children.

It should not be required from a public playground to offer special elements for treatment, because every child has different needs but the basic requirements must be provided.

The main purpose of this mixed solution is that the children repeat those basic movements through the process of the play, which promote their physical development. Children should be positioned in that way which prevent the come about of further injuries, like contractures or deformities

It cannot be mentioned enough times that the contact with occupational therapists or other professional medical staff is essential. Otherwise we can make a mistake in design, which can cause further injury for the children.

Chapter 2**Guide for recognition of problems****2.1 CHECKLIST**

Name of the playground:.....

Location/address:.....

Further information:

(Y – yes, N – no, P – partly)

Arrival:

Check	Y	N	P	Comment
Is there space for parking?				
Is there accessible pathway from parking place to the play area?				
Is there notice board close to the gate to sign, the playground is accessible?				
Gate: <ul style="list-style-type: none"> • It is easy to find? • Is it possible to open it easily? • Is it secured when shut? 				
Further information:				

Around the site:

Check	Y	N	P	Comment
Is the entrance or gate wide enough for a wheelchair user?				
Are paths wide enough for a wheelchair user?				
Are the used surface materials of the path accessible/appropriate?				
Are there rest areas for disabled children?				
Are there overtaking spots?				
Is the signed boundary of site accessible?				
Are some pathways on different level?				
Further information:				

Consider, that:

- Accessible surface for a wheelchair user is a hard continuous surface. Look at it in the Surfacing part

- The surface can offer challenge for wheelchair user. In this case the surface can contain small barriers that is surmountable (bumpy, unsteady...and so on)

Access to structures:

<i>Check</i>	<i>Y</i>	<i>N</i>	<i>P</i>	<i>Comment</i>
Is there solid surface for wheelchair user to get to structures?				
Is there continuous accessible/solid surface from accessible equipment to another one?				
Are there handrails where it is necessary to help the child with movement disability?				
Are there ramps or any accessible ways to the elevated parts of the equipment?				
Does the ramp have gentle slope?				
Is the ramp wide enough?				
Further information:				

- Consider, that:**
- At least one accessible route must be provided and it is required to connect accessible play components, including entry and exit points of accessible elements
 - Many disabled children with disabilities require some assistance in moving mobility aid to the exit points of accessible play components. So accessible route must be provided for parents and care givers as well

Structures:

Check	Y	N	P	Comment
Are steps wide enough but not too deep for easy use?				
Are steps or changes of level clearly marked? (Use colour, different texture)				
Are handrails positioned near steps?				
Do ladders have wide treads?				
Are there alternative ways of climbing on and off?				
Is there manoeuvring space on the level of the accessible play component?				
Is the entry point (seat-transfer platform) of the accessible play component on suitable height for transfer?				
Further information:				

Consider, that:

- Many children with movement disability can use the steps in other way. They can sit on the step and move upward in sitting position, back to the “engine”. Because of this the step should not be too deep
- Except for swing, the manoeuvring space is not required to be located adjacent to the accessible play component
- The elevated structures with transfer access only are designed for movement on the structure without wheelchair, therefore manoeuvring space is not needed
- For transform gripable edge is necessary
- Different way for climbing up can be used, like nets, rope ladders, climbing walls, and fire poles). Steeper angle makes scrambling nets easier; fire poles should not be too wide for child grasp or placed too far out from main structure
- In addition that the child is not able to use a climbing structure it is always popular. Remember only a small proportion of disabled children use wheelchair

Walkway:

Check	Y	N	P	Comment
Are there a number of entry and exit points?				
Is the walkway wide enough for wheelchair user?				
Are there places for overtaking?				
Are there interest features along the walkway (steering wheel, slalom course, balancing, mazes)				
Further information:				

Swings:

Check	Y	N	P	Comment
Can children get and stay there independently?				
Is there appropriate back support?				
Is there appropriate leg support?				
Does seesaw have grips and rests for feet and hands?				
Is manoeuvring space adjacent the swing?				
Further information:				

Consider, that:

- For transferring manoeuvring place must be adjacent the swing. It is essential for wheelchair users.
- For those children who have difficulties with balance and co-ordination it is essential to be suitable seat, like rubber moulded seats.

Slides:

Check	Y	N	P	Comment
Is there a flat platform at the top?				
Are there handrails at the top to help child onto slide?				
Does the run-out level at the end?				
Is base the right height off the ground				
Are there wide treads alongside slide for alternative access?				
Is the slide wide enough for an adult or another child to accompany child?				
Is there alternative ways to get to the top of the slide?				
Further information:				

Consider, that:

- The slide can be well located in a mound or embankment

Aerial runway:

Check	Y	N	P	Comment
Can child get onto and off it independently?				
Are ramps or steps installed on approach to runway?				
Does tyre or harness offer adequate support?				
Is it suspended at an appropriate height from ground?				
Is runway sited away from other activity area?				

Roundabout:

Check	Y	N	P	Comment
Is the platform close to the ground for easy access?				
Is there space for handrails and seats?				

Sandpit:

Check	Y	N	P	Comment
Is the approach to sandpit wide and on firm ground?				
Is the height of the elevated sand table appropriate for a wheelchair user?				

Is the form of the sand table edges makes easier to go close to the sand table?				
Are there alternative ways for back supporting for children with balance problem?				

Consider, that:

- The sand table can be located on the ground level and on a stand as well
- The sand table should be used as many way as possible

Water play:

Check	Y	N	P	Comment
Do sides of the pond slope to aid easy entry?				
Is the depth of the water appropriate?				

The Principles of Universal Design also can be used to evaluate the given playground. Universal Design is described in the next chapter.

In addition, the dimensional requirements regarding to the playgrounds are involved in the Hungarian Standard (MSZ/T EN 1176-1:1997). Every detail of play elements must be met this Standard.

Chapter 3

Universal Design

There are not two children with the same abilities. They are so different; some of them have better skills at the play, more imagination and experiences than their mates. Others can be faster, steadier or more inventive. However, they play together in the same play area. They should gain the same experiences from the play according to their different abilities.

In spite of the different abilities there is a standard regarding to the playground design, which takes the average abilities into account. However there is not child with average abilities.

The standard describes which elements and in which way can be built in, recommends measures and materials and gives instruction about safety. Thus the designer considers lots of items but it does not offer guidance for design, how the playground can become usable by all children.

The result of this design method is a standard playground that suit the requirements but not accessible for all children. After building, this playground requires changing and addition immediately, which is very costly and in some case the rebuilding does not give accessible solution. Because of the above-mentioned the best way of design is to consider before planning how accessibility of playgrounds can be provided. For this consideration the Universal Design affords some help.

3.1 DEFINITION

Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design.

The intent of universal design is to simplify life for everyone by making products, communications, and the built environment more usable by as many people as possible at little or no extra cost. Universal design benefits people of all ages and abilities.

3.2 WHY IS IT IMPORTANT?

The Universal Design is a value, not a set of dimensional requirements, because they are involved in different Standards regarding to the given products or environment.

These seven principles may be applied to evaluate existing designs, guide the design process and educate both designers and consumers about the characteristics of more usable products and environments.

Universal Design is always accessible, but because it integrates accessibility from the beginning of the design process, it is less likely to be noticeable.

3.3 SEVEN PRINCIPLES OF UNIVERSAL DESIGN

1. PRINCIPLE ONE: Equitable Use

The design is useful and marketable to people with diverse abilities.

Guidelines:

- 1a.** Provide the same means of use for all users: identical whenever possible equivalent when not.
- 1b.** Avoid segregating or stigmatising any users.
- 1c.** Provisions for privacy, security, and safety should be equally available to all users.
- 1d.** Make the design appealing to all users.

Example: Slide located in a mound.

An excellent example of equitable use is a slide that is located in the mound, so everyone can get to the slide in the same way, through a slope that is formed in the mound. The slide has double wide so the child can slide down alone, with their mates or assistance.

2. PRINCIPLE TWO: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

Guidelines:

- 2a.** Provide choice in methods of use.
- 2b.** Accommodate right- or left-handed access and use.
- 2c.** Facilitate the user's accuracy and precision.
- 2d.** Provide adaptability to the user's pace.

Example: Sand box in higher level.

The sandbox is located in that height to be reachable and usable from standing and sitting position as well. The child can choose the appropriate way of use. The sandbox has some nook that makes possible for wheelchair user to get closer.

3. PRINCIPLE THREE: Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Guidelines:

- 3a.** Eliminate unnecessary complexity.
- 3b.** Be consistent with user expectations and intuition.
- 3c.** Accommodate a wide range of literacy and language skills.
- 3d.** Arrange information consistent with its importance.
- 3e.** Provide effective prompting and feedback during and after task completion.

Example: Well-constructed labyrinth structure

In case of well-constructed labyrinth structure it is very easy to understand for children how they can use it. It should contain opaque or transparent walls rather than bars like in climbing structure.

4. PRINCIPLE FOUR: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Guidelines:

- 4a.** Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- 4b.** Provide adequate contrast between essential information and its surroundings.
- 4c.** Maximize "legibility" of essential information.
- 4d.** Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
- 4e.** Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Example: Information desk at the entry.

The information desk must be well positioning to provide perceptible information for the children and assistance. It should contain that the playground was built with the aim to be accessible for all children. The colours, contrast and style of desk must be maximally perceptible.

5. PRINCIPLE FIVE: Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Guidelines:

- 5a.** Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
- 5b.** Provide warnings of hazards and errors.
- 5c.** Provide fail safe features.
- 5d.** Discourage unconscious action in tasks that require vigilance.

Example: Surfacing

Using the most appropriate material for every surface. Soft materials should be installed in landing zones to avoid injury from fall down and hard materials should be used for accessible pathway in order to make the use of wheelchair possible.

6. PRINCIPLE SIX: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

Guidelines:

- 6a.** Allow user to maintain a neutral body position.
- 6b.** Use reasonable operating forces.
- 6c.** Minimize repetitive actions.
- 6d.** Minimize sustained physical effort.

Example: Climbing board with rope

A climbing board with rope used to climbing gives an easier way to get up. The rope can help the child who has difficulties with walk or lower strength to pull himself up. The climbing board has a maximum range of slope. By keeping this slope and using any help (rope, handrail) the high physical effort can be avoided.

7. PRINCIPLE SEVEN: Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Guidelines:

- 7a.** Provide a clear line of sight to important elements for any seated or standing user.
- 7b.** Make reach to all components comfortable for any seated or standing user.
- 7c.** Accommodate variations in hand and grip size.
- 7d.** Provide adequate space for the use of assist

Example: Accessible pathway

An accessible pathway must be wide enough. This size makes it possible for a wheelchair user to drive and overtake along way and also have enough places for use of assist.

Sometimes there can be some disagreements between the Principles of Universal Design and the playground design. In this case the responsibility is in the hand of designers to choose the suitable solution.

Chapter 4

Accessible Design

4.1 ACCESSIBLE DESIGN IN PRACTICE

What does it mean that a playground is accessible?

An accessible playground provide:

- Physical accessibility (getting to the equipment, enough place to manoeuvre)
- Accessible play equipment (every child able to use them)
- Accessibility both adults and children
- Participation in the play activity
- Social interaction with others
- Equal opportunity to play in the same way than others
- Same and maximum range of experiences for all
- Safety and risk

How many playgrounds and play equipment should be accessible?

An accessible playground provides similar opportunities for children with varying abilities. It does not mean that each and every feature of play event has to be usable by every individual. It means similar experiences must be available.

With other words as many play equipment as possible should be accessible. The best solution, of course, is that if every element is accessible. But in some cases this is almost impossible. If there are some equipment or area that is not available by children with one kind of disability other elements that offer the same experiences and feeling should be provided.

What are the benefits of an accessible playground?

- Children with different abilities are able to play in the same play area
- Children with disability are able to join the activities of non-disabled children
- Both children with and without disability can learn to value and accept diversity
- It enables for children with disability to develop their skills through process of the play
- It prevents the separation of disabled children
- It helps to avoid isolation of the families with disabled children
- The views of disabled children can promote the changing mind of society regarding to the value of differences

What should be the main principles during design?

- Make difference between equipment for treatment and “just” for fun
- If it is fun for the children, it is successful activity
- The focus is on children’s individual needs and abilities

-
- The use of the playground does not require too much effort from both child and assistance
 - Children are encouraged to take risks in a supportive environment
 - All activities are available to all children or the maximum range of experiences are provided – circulation in the play area
 - Provide safety especially in the landing/fall zones
 - Appropriate surfaces
 - Design must be POSSIBILITY-MINDED, rather than LIMITATION-MINDED (Possibility-minded means that the children can find appropriate activity for their skills and ability in the same play equipment. Limitation-minded means that there is only one way to use the piece of play equipment, like swing and slide.)
 - Self-directed play with the less assist can be the best help in the process of physical development
 - We must know effects of the changing in structure of play environment as well.

Before design, make a contact with parents who has children with any kind of disability, occupational therapist and professionals and ask them about

- Needs of the child
- Difficulties that was experienced earlier in the playground
- Suggestion

During design create a list of tasks that will be fulfil by the children, like

- Climbing
- Running
- Walking
- Crawling
- Sliding
- Sitting
- Standing

During design consider that the design is usable if the children

- Cannot see the floor surface
- Cannot lift either foot
- Cannot rise from a seated position
- Have balance problems
- Wear two different shoes (different heel heights and sole function)
- Use a cane
- Use crutches
- Use a wheelchair

4.2 SURFACE

The 70% of the playground injuries happen because the children fall down on an inappropriate surface. Although there is no playground safety surface that can prevent the body injuries when the children fall down, however, it is possible to reduce the severity of any resulting injury. Accordingly the surfacing and used material is one of the most important accessibility features. If they are located in insufficient way it can cause many barriers for the children with movement disability. Thus choosing playground surfaces is one of the most challenging tasks when designing playground due to the need to balance requirements for safety with requirements for accessibility.

So before design or improve a playground's surface the materials must be considered very clearly.

Which kind of material can be used?

It cannot be said that one material is good and another is bad. In an accessible playground all materials can be used but it depends where, why and in which way.

Every type of materials has a characteristic and quality that assigns the consequent application of them and the quantity of the used materials is not negligible at all.

According to these factors, the materials can be classified into different groups such as soft, variable and hard. In addition to this all materials must be resistant, durable, safety in the given situation.

The designers can choose between them but they must consider some quite important requirements regarding to the setting of materials:

- Soft materials: to the landing area and where the child can fall down to avoid the injury. They must cushion falls in this way the injury can be avoided. The poured surfaces often content the requirements.

Usable materials:

- Earth
- Lawn-grass
- Bark chips
- Hardwood fibre
- Rubber tiles
- Sand
- River rock
- Gravel
- Crushed rock

Features of a soft surface:

Because of the softness the walk and use of walking aids or wheelchair is difficult on a soft surfaces. The installation takes short time but the materials require much maintenance and periodically supporting. It could be well drained and manipulative.

- Variable materials: to sign the area of certain play activity and provide creative play

Usable materials:

- Unistone (sand base)
- Turf stone
- Brick
- Patio-stone
- Wood (-deck, -rounds)
- Exposed aggregate
- Rubber
- Flag

Features of a variable surface:

These materials can provide more experiences for the child while they are playing. It is good for border a given place.

The placement happens in smaller pieces so the joint of the adjacent pieces can cause barriers during walk. It requires moderate maintenance (e.g. removal of snow and ice)

- Hard materials: to enable the use of wheelchair or wheeled vehicle.

Hard materials:

- Asphalt
- Concrete
- Brick in concrete
- Terrazzo
- Flag

Features of a hard surface:

These materials resist the weather conditions; the snow and ice can be removed without causing damaged in the surface. It requires low maintenance but the installation cost can be higher.

4.3 EXAMPLES OF PLAY ELEMENTS AND ACCESSORIES

Children need different play opportunities to complete their social, intellectual and physical needs. Design of accessible play opportunity requires some consideration. In case of every play elements the accessibility can be provided in many ways. There are several solutions that can lead to the same result. The choice of the right solution depends on many circumstances such as local conditions and materials, environments, users or designers but in every time the ability of children and the aim of playground design must be taken into account. Providing of accessible features is the designer's responsibility in every time. The designer must be aware what he/she wants to reach with a new element.

In this part some accessible solution of play elements are introduced. It can help to collect ideas during design and shows what the designer should avoid. The short description about elements tries to make an overall picture, how accessibility can be provided.

Slides:

Sliding is a movement along a smoothly surface. The child slides down and climbs back to the top of the slide. This activity can be a kind of challenge for children with movement disability. The return process from the landing area to the top must be considered and it should be the part of play activity.

It seems a good solution if the slide is located into a small mound or in a slope ground. Access from the landing area to the starting point can be provided in more than one way in order to make the use possible for children with different disabilities. Accessible solution can be ramps, stairs or climbing surfaces. At the same time more ramps can be built in the ground with different range of slope. Thus the children can use the most appropriate ramp according to their abilities. If stairs are offered, they also must have different range of slopes. On one stair the children can walk up and on the other they can crawl. The climbing wall also can solve the problem of getting up; usually children with strong arms are able to use it. The slide should be wider (duple width or more) so the children with disabilities can slide down with their mates or assistance. So as to make the transfer easier from and to a wheelchair run out level/transfer platform must be offered and this should be in the same height than the wheelchair' seat is.



Good Features:

- Different possibilities to get back the top (ramp, slide, climbing board)
- Duple width
- Wide enough platforms at the top and the base.
- High sidewalls of the slide against falling out

Figure 8. Slide 1.

Good features:

- The height of the slide at the top is appropriate for transfer from wheelchair
- The slide is integrated in mound

Wrong features:

- Slide is made from metal
- The upper level of the ground is not flat



Figure 9. Slide 2.



Good features:

- Duple wide
- Good location

Wrong features:

- The sidewalls are low
- The material of the landing area is not accessible (sand)
- The way getting back is too sheer for a wheelchair or other walking aid user

Figure 10. Slide 3.

Good features:

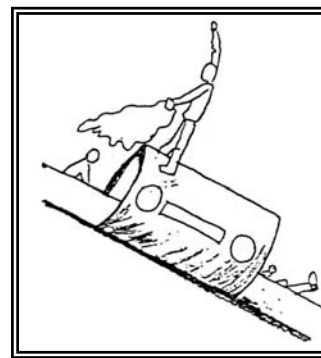
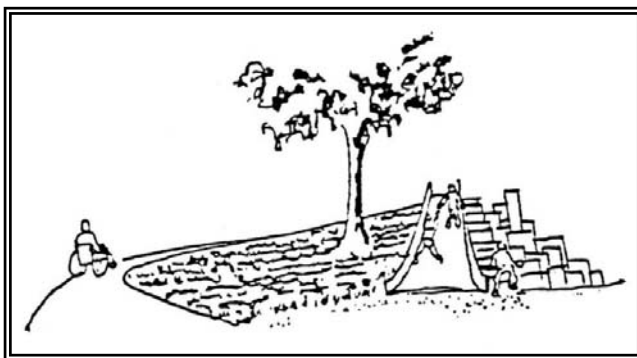
- More ramps with different slope
- The slide is located into the surrounding environment

Wrong features:

- The boundary of landing area is not accessible (sand, log boundary without opening)



Figure 11. Slide 4

Features:

- Short and wide slide for more children
- “Barrel” trough that children slide helps to develop sensation of space
- Shade is provided in natural form

Figure 12. Accessible solution

Swing:

Swinging is a rapid movement back and forth in an arc. The child must be able to transfer from the mobility aid in the swing, put it in motion, break it and get back to the mobility aid. Sometimes it can be required that more children be able to swing in one seat.

Swing with mobility aids is also solvable but requires some consideration.

Swings for children with any kind of disabilities should provide at first stability and suitable, safe seat. It means that the child get appropriate leg and back support. Transferring from and to the mobility aids requires stability and locked position from the swing seat. Appropriate place to leave the mobility aids near the swing should be provided. There can be more different kind of swing in one swing-rack such as ordinary desk, rubber moulded seat and special kind of seat as well. All of them should provide support but in different level. Suitable solution for wheelchair user can be a wheelchair-swing but it must fulfil several safety regulations. Because of the additional weight of the wheelchair the child can have difficulties to propel

and break the swing. It is necessary to solve that the wheelchair be fixed during swinging. Accessible pathway and manoeuvring place must be provided to the swing.



Good features:

- Different kind of seats on one swing-rack
- Slides are located in different height

Wrong features:

- Material of surfacing is not accessible (sand)
- There are not enough places for transfer and leaving of walking aids.

Figure 13. Swing-rack



Good features:

- Different type of seats provide more or less back and leg support for the child

Wrong features:

- Transfer from wheelchair to the swing is not suitable and take big effort from the child and parents as well

Figure 14. Swing seats



Good features:

- Accessible surface around the swing

Wrong features:

- The wheelchair is not stable during swing
- There is not suitable grip for child
- The swing is not stable when the child get up with a wheelchair

Figure 15. Wheelchair swing

Good features:

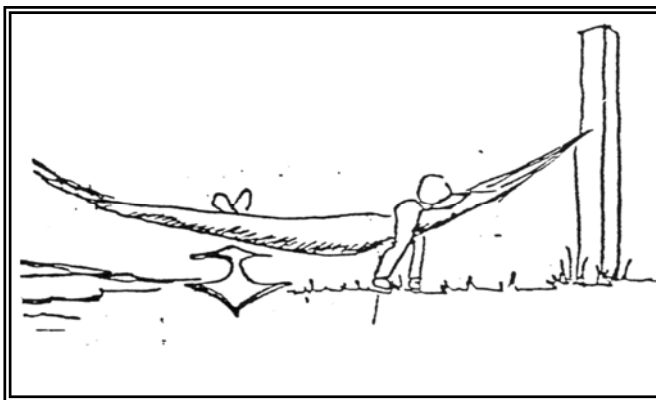
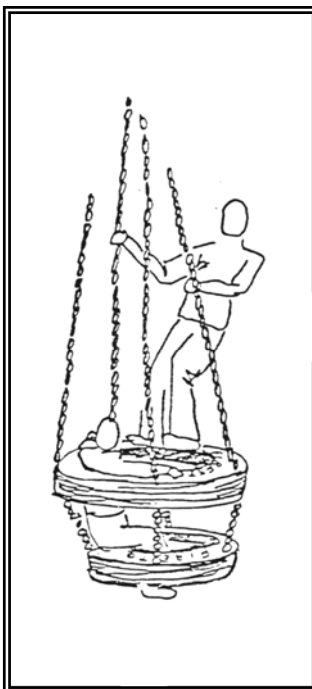
- More children can use at the same time

Wrong features:

- The surface is not accessible by wheeled vehicles
- Back and leg support are missing



Figure 16. Group swing

Good features:

- Both swings provide back and leg support
- More children can use it

Wrong features:

- It is hard to transfer the child from the wheelchair to the swing

Figure 17. Accessible swing solutions

Sandpit:

To play with sand is a creative play activity. The child's imagination leads it. The sand play serves sensory experiences and promotes two-handed play for those who have poor control. It can be combined with water that helps to create different shapes from the sand.

The sandpit is usually installed in the ground level that causes lots of problem for children, who use any kind of moving aids (wheelchair, standing aids, crutches, and so on). It can be said that an elevated sandpit is much better solution. Sandpits should be located in different heights that are available from sitting and standing position as well. The edges of the elevated sandpit should have "U" formed indentations or a kind of brim in order that the

wheelchair user can go closer to the sandpit. The width of the elevated sandpit should allow the children to play across from each other. Sandpit located in ground level must have a kind of edges that enable the child with movement disability to get in and out. It can be a general problem that the elevated sand table is usually located in the ordinary sandpit so the child with wheeled vehicles is not able to get there because of the sand surfacing. For children who has balance problem and difficulties while they are sitting need suitable back support. There are some other conditions such as wind and sun that influence the location of the sandpit. Shadow and wind-protected area should be provided.



Good features:

- Elevated sand tables are at different height
- Accessible pathway to the sand table

Wrong features:

- Sand is not available directly from behind the table
- The different level of play activity separates the child from each other

Figure 18. Elevated sand table

Features:

- The edge of sand box provides back support while sitting
- Back support should be located in that way the prevailing wind is from rear

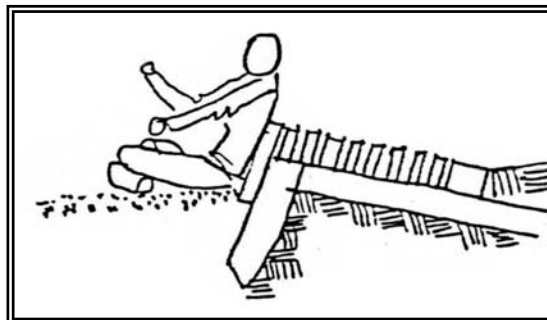
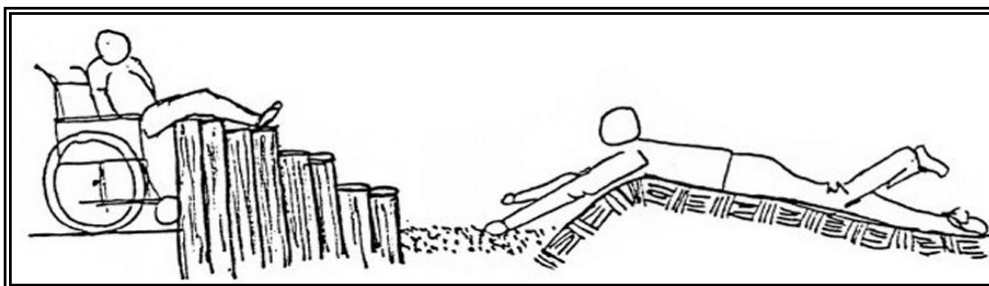


Figure 19. Back support



Features:

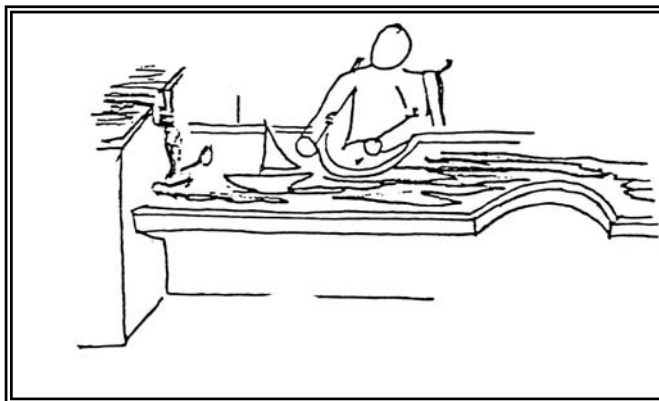
- Sand box edges provide an opportunity to “bump down” from mobility aid
- Children can use the sand box in different way
- Play on stomach give appropriate body support but encourage the child to use his arms and control his head movement

Figure 20. Accessible sand box solution

Water play:

Water serves a very interesting play activity for all children because it is so versatility. It helps to get more experiences about the nature and the child can learn the different properties of the water (cold, wet, reflected, and so on).

Water trays, like sandpits should be elevated in an appropriate height, that the children reach it from sitting position as well or it can be situated in a mounds and a slope ground. Introducing water play opportunities can be performed in different form, such as ponds, streams, sprinklers, controlled sources, trough, and so on. The water can be provided in stable and moving way as well. It is doubtless that the moving water is more interesting. The child can balance over the water; go through it with mobility aids, and can use it for send ships and other things.

Features:

- Table notches are shaped up for wheelchair users
- Water table is at different heights
- Water trough can carry water to sand box or garden plots

Figure 21. Elevated water table

Features:

- Shallow pools are located to drive the wheelchair through

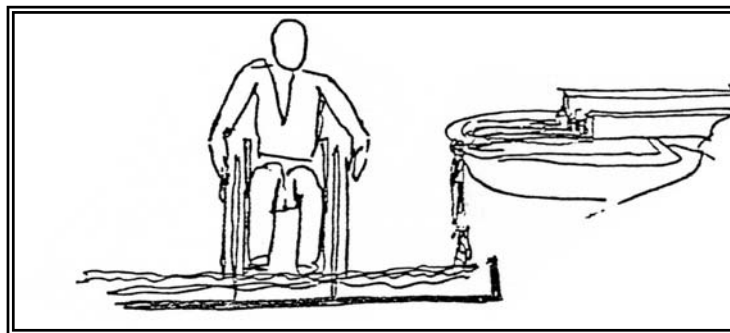


Figure 22. Water challenge

Climbing structures:

Climbing structures provide possibilities to go up and down in a safety built environment by use of hands and feet. It develops the gross motor skills of the child and reduces the co-ordination problems. Consider that the child can have difficulties with grasping function of hands.

Because of the different skills of children, the climbing structure should offer different levels of actions and difficulties.

The climbing structures can be used with and without any mobility aids. It means that ramps and other accessible paths should be provided. Ramps should be situated in a way that as many activities as possible become reachable. Thus the ramp should lead to the middle-level of the structure. It can contain interesting play activities and protective edges against the falling down. Children with movement disabilities usually prefer crawling that is performed when they are out of their mobility aids. Accordingly the climbing structure should offer opened and closed places where and through that the child can crawl. Crawl through a closed place increases the children knowledge about how much space their bodies take and they develop the skill of space-perception. For crawl the surfaces must be smooth and free from protruding elements.

Somewhere in the lower level hard transfer platforms should be located that allow the children to get out from the wheelchair to the structure.



Good features:

- Accessible path is provided over the sand
- Transfer plate is provided

Wrong features:

- Tube is at low height so transfer from mobility aid is not possible

Figure 23. Climbing Structure

Features:

- Ramp with protective edge for wheelchair user
- Key mid levels for wheeled access
- Platform for transfer from mobility aids

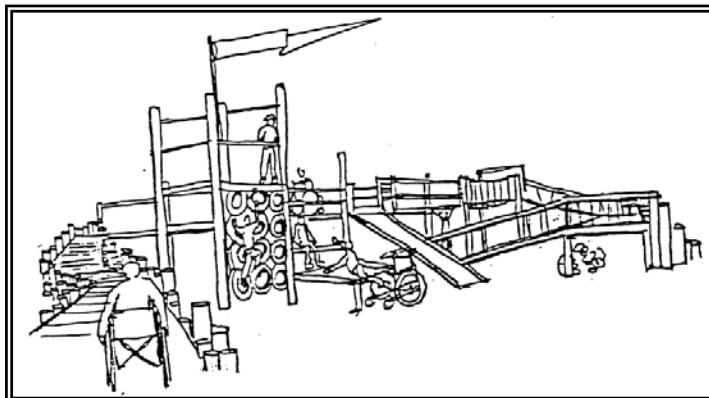
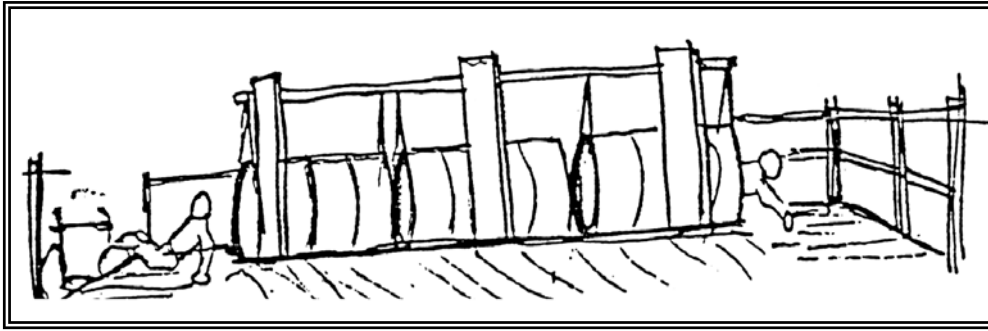


Figure 24. Accessible climbing structure

Features:

- It can be used when the child is out of the mobility aid
- Accessible transfer platform is provided for wheelchair user
- There is enough place for parents to help their child

Figure 25. Crawling structure

Balancing Structures:

Balancing means maintaining of equilibrium. The child with balancing between two objects develops skills to keep his own balance. It gives sensory experiences and can be used with and without mobility aids and the child becomes more aware of his/her own body.

Children can balance with and without their mobility aids.

The balancing structures can be situated between two objects for balancing whilst moving or it can move on one-fixed points back and forth or sideways.

The first one helps the child to develop walking co-ordination and balance reaction and the other develop their balance skills.

The balance structure can be balance beam in different height, floating and Rocker Bridge, rocker or spring platform or rope structure in the air. All elements need to have handrails that provide safety for those who have poor balance in the beginning. Accessible pathway should be installed to the balancing structures.

Good features:

- Helps child develop walking co-ordination and balance

Wrong features:

- Less stable handrails
- Steps of the leather are too narrow

Figure 26. Floating bridge

Good features:

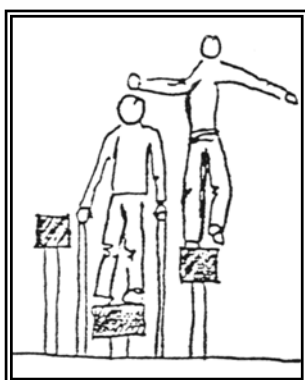
- Natural form of the balance board

Wrong features:

- Trunk is not cleaned up from twigs - safety!
- Hard to get up the trunk



Figure 27. Balance board 1.

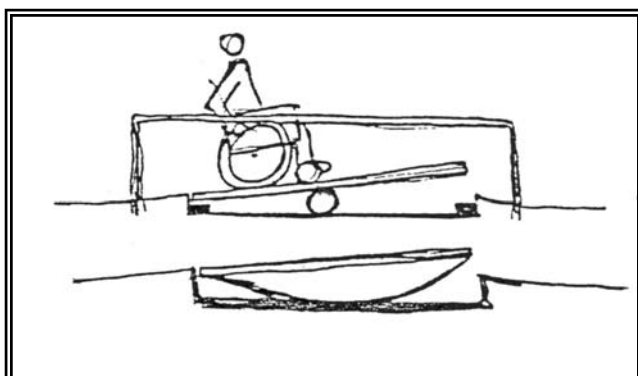


Features:

- Help to develop balance skills
- Different levels should be provided
- Balance board can be in different width with or without handrails



Figure 28. Balance board 2.



Features:

- Balance in a suddenly changed situation
- Handrails should be provided
- The accessible pathway can be completed with rocker bridge
- The tilt height should be considered to avoid the injury

Figure 29. Rocker bridge

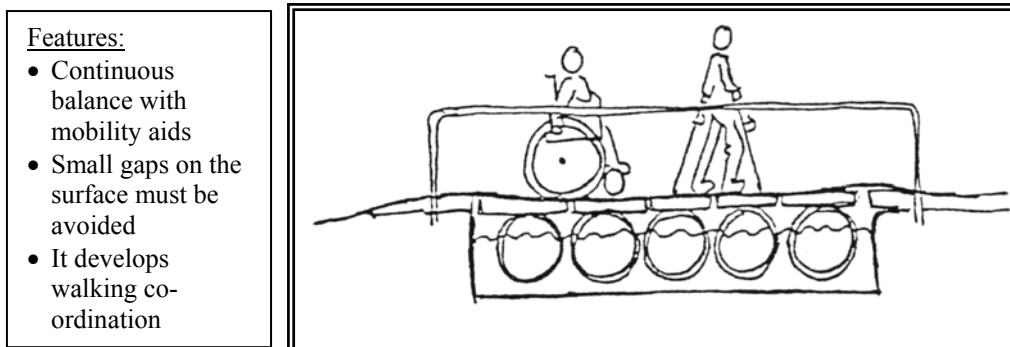


Figure 30. Wheelchair bridge

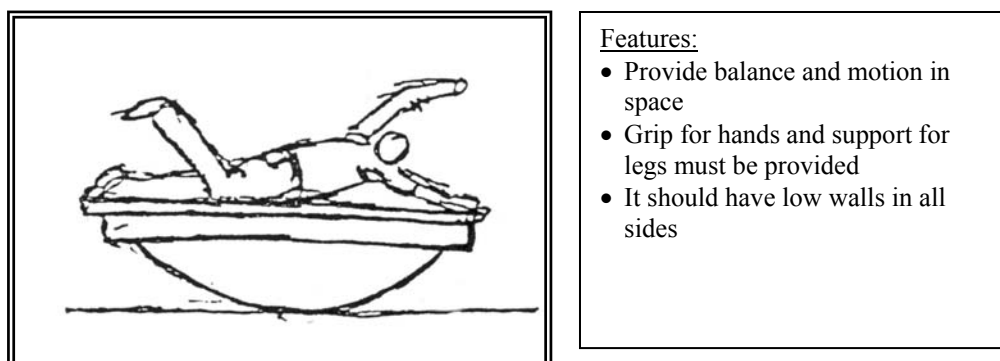


Figure 31. Balance board 3.

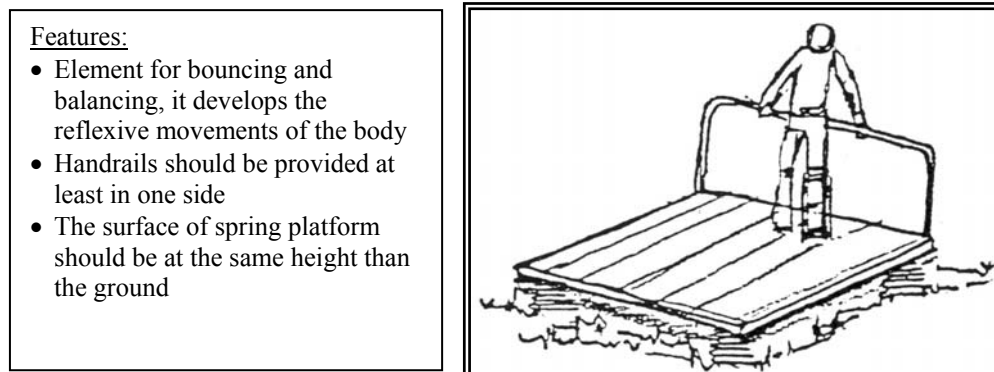


Figure 32. Spring platform

Sew-saw:

The sew-saw provides a rapidly and dynamic movement up and down. The child perceives the feeling of falling down and landing and become aware of his own and others weight. It develops balance skills and strengthens the muscles of legs.

Sew-saw should provide opportunity that more children can use it at the same time. It encourages the social play and co-operation.

Children who have balance problem or poor co-ordination should need to have appropriate back and leg support. The sew-saw should offer suitable grip for hands. All of these features are solvable by a properly choice seat construction. Landing of the seat should be solved so the child who has weak muscle in the legs does not hurt himself because of the bump. This can be solved for example by tyre fixed under the seat.

Roundabout:

Roundabout offers rotary movements for the child. It increases the child's balance skills.

Roundabout can be used with or without wheelchair. The children must be able to proper themselves.

The roundabout should contain properly planned seats, back and leg support when the roundabout is moving. The child who has poor head control should need head support as well.

If wheelchair users use the roundabout the height of the base platform must be considered. It should be lower in order to the child be able to step on and off and the wheelchair user also be able to get on and off.

Pathway:

Accessible pathway must provide continuous surface from one accessible element to another and it should have suitable width for wheelchair users.

Pathway must have hard surface with possibilities to turn back and manoeuvring. It is an important feature that the pathway does not cross the landing area of play elements and the use zone around the elements because these are the main places where children can play. The pathway should contain challenges, interesting play activities and it should be safety all the times. The circulation system of accessible pathway should encourage a "natural" flow between facilities. Many times this is the only link between facilities for disabled child. Rest are should be involved in the circulation system.

- Good features:
- Hard material
 - Accessibility from one elements to another
- Wrong features:
- There is not interesting features or any obstacles along the way



Figure 33. Accessible pathway 1.



- Features:
- It develops the space-sensation of the child
 - It serves an interesting station for children with mobility aids

Figure 34. Movable accessible pathway

- Features:
- Provides interesting activity along pathway
 - It must be wide enough for a wheelchair user
 - Sidewalls provide safety against falling down



Figure 35. Wheelchair challenge



- Features:
- Small ramp between two accessible surfaces
 - Consider the slope of the ramp
 - Protruded edges should be avoided
 - Surface of the ramp is slip-resistant

Figure 36. Accessible path 2.

4.4 SAFETY

Safety is one of the most important requirements regarding to all playgrounds and play elements. It serves the base of all play activity. So at first accessible playgrounds should fulfil the safety regulations. The designers should consider them during design.

Safety is the most important criterion from the parent's point of view as well. It is natural that the parents fear their child from injuries that happen in the playground. A safe playground allows the parents to be free from the continuous attention to their child's activities. In this way the parents can spend more enjoyable and pleasant time with their child. It is really important because the parents spend as much time in the playground as their child.

The other thing is necessary to know the children sometimes need to play with their mates without their parent's attention. Thus the parents should put some slight distance from their children when they are playing. It is only possible if the playground is safe.

In addition there are some other things that should be thought over:

- Children with physical disability are less likely to play alone, without any care in the playground. Presenting of supervision is essential to avoid injury in the playground. So during design it should be kept in mind that parents or assistance can be presented.
- Different playgrounds should be provided for children with different ages. Play equipment that is suitable for a 3 years old child does not serve appropriate play activity for a 10 years old child. So play elements for children with different ages should be sited in different area and this are should be signed clearly.
- Pieces of moving equipment, like swings can cause injuries. For that reason it should be placed so that the children - when they are moving from one element to another - do not cross the path of swing or slide.
- The elevated platforms can require some protections against falling down but not all of them. It depends on the height of the given platform and the ages of the children who use it.
- Surface under the landing area must be safety and protect children against injury when they are falling down. It should be a properly cushioned surface and soft material can be installed. (There is more information about the usable materials in the landing area above)
- Hard surface should be installed to the accessible pathway.
- Be aware that the playground should contain shadow and wind-protected area.

How safety can be provided:

- Keep the safety regulations regarding to the playground
- Periodically checks of all elements
- Preventing of vandalism
- All equipment should be stable
- Surfaces be appropriately depth and free from sharp objects

Safety vs. risk

Providing safety of playgrounds is really important parts of the design process and it must be fulfilled at all time. However, the children with different disability need to face challenges and risk because they are essential in their life.

The play always should contain challenge because this provides continuous learning process that gives experiences and develops the children's skills.

The learning process is the combination of

- Assimilation (repeating the performance of something we already known in order to perfect it)
- Accommodation (mastering new things requiring new combinations of skills and ability)

The playground that offers only familiar and easily surmountable challenges that the child overcome several times – blamed on the safety - will never develop new skills. Similarly if the playground offers too large challenges the child can become unsuccessful and it will not encourage him to try again. So the learning process will discontinue.

The playground therefore should offer a serious number of challenges.

However, it is necessary to know that there is not absolutely safety environment. Children always can fall down and there are not materials that can prevent the injury at all times.

The playground and play elements must offer challenges and different levels of difficulties otherwise the play area can fail. So that designers must think over soundly how they provide safety, challenges and risk together!

CONCLUSION

In our days when disabled people have the same right to live as independent life as others live and the state makes huge effort to provide equal opportunities for them in every day life, it can be said that every intention for accessibility in every topic have reality.

Children with disabilities in the most cases will become adults with the same problems. It is not enough to provide equal opportunity only for adults; the best way of a successful rehabilitation is to start it in childhood. For this successful work it is essential to have suitable circumstances that encourage the child to reach their goals from step to step. Children spend the most of their time with play that is performed in the playground. Thus the play area must provide the best opportunities for them. That is why accessible playground design must be considered.

This report shows the critical point of play facilities and gives suggestions for accessible design. It does not contain measures or such information that is already involved in other Standards. Thus it requires from the designers to be aware all information that is necessary for playground design. The report always complements the usually used standards and requirements, and helps to consider the accessibility questions at the same time.

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Photos of existing playgrounds from Sweden and Hungary - 2000