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# **PLAYGROUND MANUAL**

**COMPILED BY**  
**OFFICE FOR RECREATION AND SPORT**

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## **DISCLAIMER**

This Manual has been written as a guide only and has no legal force whatsoever.

This Manual does not displace statutory requirements detailed in existing or future legislation nor does it displace existing or future Australian Standards.

The accuracy of information in this Manual is not guaranteed and no responsibility is accepted by the Crown or its officers for any loss or damage caused by reliance upon this Manual, as a result of any error, omission, misdescription or misstatement therein, whether caused by negligence or otherwise.

*The first edition of the Playground Manual was published in 1998. This second edition contains all the information from the first edition, however it has been updated to reflect the recently updated Australian Standards relevant to playground design and installation.*

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# INTRODUCTION

## **Who would find this manual helpful?**

It is anticipated that Engineers, Parks and Gardens Managers, Recreation Officers, Community Service Officers, Risk Managers and interested members of Local Government, schools, kindergartens, child care centres, family day care providers, the general public and service groups will find material contained in this manual interesting, informative and relevant.

Those persons entrusted with the responsibility of developing and managing children's playspaces, must not only keep abreast of an increasingly technically sophisticated range of equipment but should also be sensitive to the broad range of community needs that our playgrounds and parks are required to satisfy. The legal and social responsibilities in owning and providing playspaces and equipment for our children are considerable.

This manual is provided to assist playground providers understand their legal responsibilities in connection with playground ownership and to encourage a planned, more easily managed approach that will result in play provision that is appropriate to the needs of the entire community.

Furthermore, it is recommended that playground providers apply the concepts outlined in the section on Natural Playspaces so that their parks have a balance of natural landscape features that complement any equipment which, in isolation, might provide an unbalanced play experience.

## **How to use this manual**

The manual has been divided into three sections:

Section one discusses how best to establish new playspaces.

Section two identifies management strategies designed to establish the current condition of a playspace and how best to bring it up to current requirements.

Section three provides a summary of legal responsibilities.

Appendix A has a general and specific checklist of items of equipment with information for correct installation and maintenance.

Appendix B provides guidelines for installing, monitoring and maintaining impact absorbing materials (softfall).

Appendix C includes a checklist to take out on site to assist in establishing the present condition of your play equipment and softfall.

Appendix D discusses sandpits in detail.

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# SECTION I

## PLANNING

### Objectives and play provision

It is extremely important to remember a child's need to interact with the environment.

Digging sand and dirt, arranging gumnuts and pine needles, stacking pebbles and rocks, building cubbies and forts, rolling and sliding down grassy mounds and climbing trees are some of the many delights of childhood.

Most adults have wonderful memories of discovering and playing in unstructured and/or natural areas.

Now, in many places, the structured playground provided may be the only available area the children are permitted to visit.

Therefore it becomes crucial to consider supplying undeveloped and/or imaginative areas which cater for their developmental needs.

Interaction with and manipulation of the natural environment, together with simple, inexpensive and introduced elements can provide some of the most rewarding play.

The following objectives are paramount in providing children's play space and facilities:

- To ensure a wide range of quality play opportunities that meet the needs of all children and young people through all stages of their development.
- To cater for children and young people with special needs.

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## **THE PLAYSPACE DEVELOPMENT MODEL**

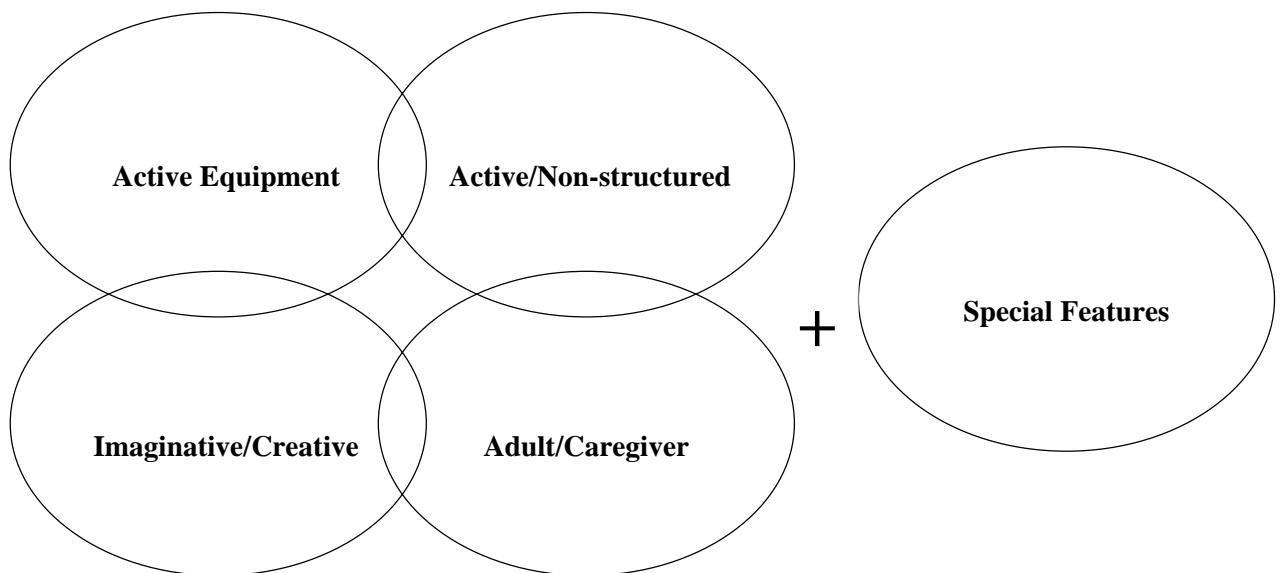
### **The Model**

The Playspace Development Model was developed in order to illustrate the elementary factors required to establish an area specifically for children's play. It is advisable that a long term approach to planning be established, otherwise resources may be spread too thinly on each project, this resulting in superficial play experiences and facilities that are under-utilised.

The four principal features of any playspace development are:

1. An active equipment-based play area.
2. An active non-structured play area.
3. An imaginative/creative play area
4. An adult/caregiver's area

There is an optional fifth component, namely, a special features area.



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## The Five Features

### 1. **Active/equipment-based play area**

Play equipment has historically been the dominant factor in playground provision. However, play equipment should complement the remainder of the play environment rather than be the only play feature in an area.

Play equipment aids children's development by providing them with purpose-designed structures on which they can balance, climb, jump, swing or run. The use of such equipment also assists in the development of social skills such as sharing and cooperation.

### 2. **Active/non-structured play area**

This is an open-spaced area that should not be confused with formal sport requirements. The essence of such a space is to encourage and allow activities to develop spontaneously among the children present at the time.

These areas often appeal to older children. This area is often used as a meeting place/socialising area or for informal ball games. Features, such as cricket nets or a basket ball ring set in isolation, should be located on the perimeter of these areas with consideration given to the impact on the surrounding environment.

### 3. **Imaginative/creative play area**

This is often the most neglected aspect of play provision and it requires sensitivity to develop the possibilities for such an area. Some areas, however, simply need to be left in their natural state. Establishment of this area is usually inexpensive and requires only enthusiasm, commitment, time and labour. The natural environment lends itself particularly well to this element of play provision. This area usually appeals to younger children and creates an attractive environment in which adults can congregate. Many of the features are not specifically covered by the Standards.

### 4. **Adult/care-givers area**

Adults/care-givers accompanying children to play areas require a comfortable area where they can oversee activities should they choose not to participate.

The inclusion of such areas in playgrounds may result in longer periods of use by families or adult/care-givers with young children.

Increased adult presence in playgrounds can also reduce problems such as vandalism and is also an important factor in reducing the occurrence of accidents.

### 5. **Special feature area**

This is an optional component which may be included in the Playspace.

Although these areas are not essential such features as a roller-blade or skateboard ramp and/or a BMX track can discourage children from practising their skills in less acceptable locations. Other special items which may be included are: some sporting facilities, an open air theatre, a rotunda, a maze or a water feature.

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## **Five Steps to Playspace Planning**

The Playspace Development Model is used to plan the development of new, or the redevelopment of existing, playspaces. The following is a list of the planning steps that should be undertaken to achieve a balanced design.

### **Step 1 Inventory**

Prepare a plan identifying:

- boundaries, area, fencing
- natural features, landscaping, existing trees and shrubs
- surface levels and gradients; soil, subsoil, watertable
- existing equipment, softfall areas
- existing facilities, toilets, water fountains, lights
- access/pathways, dimensions, gates, etc.
- any other existing feature that relates to the site development, its-current use or relationship to its surrounds, ie, surrounding land - use, roadways, signage, etc.
- existing services including electricity, water, sewerage, - telephone, emergency, garbage.

### **Step 2 Bubble Diagrams**

Using the four or five features of the Playspace Development Model, arrange bubbles, allocating the various areas designated for different activities. (Equipment, Active/Non-structured, Imaginative/Creative and Adult/Caregiver and Special Features if deemed appropriate). Take time, consider and modify. This step represents the essence of how the reserve will be developed and is by far the most important step in the planning process.

Community consultation should occur first at this stage and as much publicity as possible given to the project. You should be prepared to re-work the concept and compromise where necessary. Remember it is far easier to alter the bubble diagrams than the working drawing or the finished development.

### **Step 3 Wish List**

Make a list of items you, the local community or other users would like to see in each bubble, i.e., particular play items, specific trees, landscape features, etc. Do not feel constrained by practical considerations. This stage is fantasy!

### **Step 4 Time Line**

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Highlight the items that are achievable immediately and which would most benefit the children and then prioritise those that need to be deferred into an achievable time line.

You will now have a staged concept plan.

The planning for many projects may stop at this point. If suitable staff can direct operations on site with a creative flair then a working drawing need not be prepared. However, a second stage of community consultation can be enhanced by such a drawing.

**Step 5 Drawing**

This stage is optional though good practice. A working drawing may be required for planning approval and/or as a construction guide; it can also be used to publicise the project and is particularly effective if seeking to “sell” an idea to councillors or the public.

NB. Leave a copy of the Plan and Timeline in an appropriate place for future reference.

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## **SELECTING EQUIPMENT**

The provision of children's play equipment requires special care as there is a very real safety issue relating to structures that are used by children on the assumption that they have been purpose-designed to provide risk, challenge and fun. Frequently the users are not qualified to assess equipment safety or condition. It is up to the provider to identify foreseeable hazards and to see to it that these hazards are removed.

### **Equipment Selection**

With regard to the selection, arrangement and siting of play equipment the following may be used as guidelines.

All play equipment should comply with the Australian Standards. The Standards have specific recommendations regarding fall heights, access, geometric arrangement, entrapment, ground surfacing and most other design aspects of play equipment. The aim of the Standards is to ensure the development of a hazard-free environment where children can feel confident in extending themselves.

The Australian Playground Standard is an advisory set of guidelines; it is not regulatory. This means that equipment can be installed that does not comply with its requirements; however a specialist knowledge of children's play behaviour and human ergonomics is necessary when considering designs that depart from the Standard in order to avoid potential hazards and an exposure to public liability litigation.

It is possible to design and build equipment but the complexity of the Standards relating to modern activity structures precludes all but the most experienced from successfully building them.

It is recommended that competent and experienced playground consultants, manufacturers or suppliers be engaged to assist in the design and construction of new playgrounds and in the upgrading and modification of existing playgrounds.

There are other recommendations/requirements that may be applicable in certain circumstances such as licensing rules for child care-centres, on site ground surface testing, swimming pool fence regulations, etc.

Avoid conflict of activities. Moving apparatus such as swings of all types, see-saws, flying foxes and track rides, etc., should not be located near static structures or traffic flow lines. Guard railing around some moving items may be a consideration but can create additional hazards. Anticipate flow and avoid possible conflicts.

Active play features should be separated from quiet, creative areas. Locate activity structures away from sand pits, cubbies, explorative gardens, etc. For example, do not place cubbies on platforms that are used as thoroughfares to agility features and do not direct slides into sand pits that are used for creative play.

Similarly, role-playing features such as shop fronts or similar enclosed areas are not compatible with gymnastic items such as fire poles, banister slides or scaling walls.

Excessive fall heights may not necessarily increase challenge but they can substantially increase risk.

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Separate the young and the very young play areas by the design, scale and function of the apparatus and areas. Children should have imaginative areas as well as physical equipment. Older children enjoy using physical apparatus but it should be more challenging than that provided for the very young. Young teenagers tend to want to socialise in park/play environments; hence such facilities should be provided with informal sport facilities.

Try not to be repetitive in the selection of play features. If possible cater for upper and lower body activities.

Do not have too many features leading from a single platform because the effectiveness of guardrailing can be compromised or even absent. Include handgrips to assist access/egress.

Vertical guardrailing is preferable to horizontal railing for lower heights and essential for greater heights as the horizontal railing is more easily climbed.

It is important to provide a wide range of activities and settings. A single multi-activity structure can become boring and is often less interesting than a series of well sited structures or single purpose elements located in a variety of settings.

A slide that looks like a rocket may have an initial attraction but children soon tire of the single theme if they are subjected to it day after day. Non-thematic or abstract equipment is more adaptable. Discrete “thematic” elements, however, can have an imaginative effect.

The impact of theme equipment diminishes rapidly so it should be reserved for large regional playgrounds.

Platforms provide height and access to play activities but have little intrinsic play value (the notable exception being socio-dramatic platforms). Efficiencies, cost savings and variety can be achieved by mounting play items on mounds and natural slopes.

Where platforms are required they should allow sufficient space for access and egress from play items without causing congestion which can lead to falls. It is important not to use every available space on the platform to attach play items as this often leads to conflict and collisions.

Where platforms are required for wheel chairs or people with visual impairment, the space for access and egress for non-disabled children should be small enough to prevent a wheelchair falling through the gap.

“A serious issue in play environment design is that challenge for the child is being eroded by adult concerns (sometimes unfounded) about liability and risk of suit. Children will use equipment in all possible ways, regardless of original design intent. Since the idea of play is to explore the potential of any play setting, children will test it beyond the limits of their ability – that is how they discover their limits.” (Play for All Guidelines, PLAE Inc. Berkeley California).

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## **SITING GUIDELINES**

Before allocating open space for children's play, the following questions should be considered.

Have current and future population trends been taken into account to establish the age range and size of potential user groups?

Has the process involved children and members of the local communities in the siting of new playgrounds where possible, given that they will know the movement and activity patterns of children in the area?

Are the play facilities located close to a child's home in order to achieve optimum usage, e.g., at intervals of no more than a half a kilometre in built up areas so that users can walk without crossing major roads? Can segregation of children and traffic be achieved? It is safer in the planning stage to adapt the traffic environment to children rather than expect children to adapt to the traffic environment. Therefore, existing road networks should be designed to take into account that there is a conflict between cars and children when allocating recreation open space. Appropriate traffic calming measures should be taken in new and existing communities.

Has access for children with disabilities been considered not only to the play environment but also to features within the play environment?

Have footpaths and cycle tracks been included to provide both access and safety?

Is there diversity of play areas according to the ages of the children? These should feature natural areas with trees and undulating ground as well as complementary play equipment. Other features, such as a small stream can enhance the play environment although the safety factors must be considered.

Is the site drained well?

What is the history of the site, e.g., its previous uses?

Is there any natural shade or shelter in the vicinity of the proposed playground area?

Is the site accessible by emergency services?

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## **NATURAL PLAYSPACES**

Variety and diversity are essential requirements when planning for children's play.

It is widely recognised that children find much of the play equipment available today challenging for only short periods of time. Some studies suggest children tire of it after 10-15 minutes. It is further suggested that much of the child's imaginative play takes place with elements other than equipment.

It is no secret that children find natural elements, such as creeks, trees, shrubs and rocks, a far more stimulating environment than many of our manicured, irrigated and very formal municipal parks.

This does not mean that there is no place for play equipment. Children will always be attracted to it and it fulfils many needs but it must not be supposed that it will provide for our children's total play requirements.

### **Children's Needs Versus Providers Needs**

If we are honest, we will realise that, as providers, we often put our needs above the play needs of our children. For example, how often do we allow the threat of litigation to override a child's legitimate need for challenge and risk in his or her environment? Furthermore, how can children learn competence if they have not learnt to manage these elements? Playgrounds are often developed as a statement to the community rather than being based on children's needs. Perceived management problems relating to vandalism and anti-social behaviour often prevent the inclusion of many desirable features in our local parks.

We must put the real needs of our children and the community first when planning our playspaces, parks and gardens.

### **Planting**

Imaginative games, secret places, special places – these are the things that we remember about our childhood play. It is not a particular swing or see-saw but a particular place or environment with special appeal that conjures up warm feelings about our childhood. More often than not, it was the trees and plants that gave the playspace the appeal that we sought.

It is virtually impossible to over plant a child's play environment.

A great variety of trees, shrubs and ground cover are essential when planning for play. Appropriately and imaginatively placed dense foliage provides the infrastructure for imaginative and creative play. Advice is freely available from nurseries and the Botanic Gardens.

The simple, cheap, low maintenance and almost "litigation-free" decision to plant a large number and variety of trees and shrubs will leave a legacy for many generations to come.

### **Rocks, Logs, etc.**

The interest of a playground is multiplied enormously by increasing the variety of textures and elements present. Sensibly arranged rocks (large and fairly flat, or

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rounded and smooth and tree logs (large, fixed against movement and free from sharp projections) are excellent ways of including abstract items that can be used for a wide range of activities.

## **Water**

Creeks, ponds, dams, etc. are naturally attractive to children. Children delight in relating to water and wherever possible it should be incorporated into their playspace.

It is essential that any installation exhibits good drainage.

There are obviously several safety issues that must be addressed but, generally, if water is free-flowing and shallow the only problems that arise are muddy, wet clothes; this is balanced by smiling faces!

## **Development**

The natural environment has much to offer children and it should be recognised as the provider of quality play.

Playspace providers need to be aware of the desirability of leaving some land that has particular appeal relatively undeveloped and in its natural state. Unfortunately, there is pressure to “upgrade” every undeveloped public plot of land so that it conforms to the standard model of a mown, reticulated and formally planted local park. This is not always necessary and, from a child’s point of view, not always desirable.

The natural environment is becoming increasingly inaccessible to our urban children; densely planted pocket parks can provide a taste of what has already been lost.

## **Conclusion**

When developing or redeveloping parks that are intended to serve as “playgrounds”, play providers should place a heavy emphasis on the creation of as “natural” an environment as possible.

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## **PLAYGROUND FACILITY DESIGN GUIDELINES**

There is a tendency to think of children's playgrounds as just swings, slides and round-a-bouts but there are other necessary facilities to provide in a successful play area.

Future inspection and maintenance of the facilities must be an essential consideration when designing playgrounds. Elaborate and complicated equipment and poor access for maintenance purposes could prove costly in the long run. The following facilities for playgrounds are listed under a number of subheadings.

### **Site Works**

#### **– Hard surfaces**

These surfaces should be used only for the provision of access, e.g. Pathways, areas for some ball games, for wheeled toy areas and decorative purposes. Hard surfaces should not be used beneath equipment.

#### **– Softfall surfaces**

There are a range of natural surfaces such as varying grades of wood chips and many artificial surfaces to choose from. Softfall should be used under any piece of equipment that might cause an injury if a child should fall. Appendix B provides guidelines for installing, monitoring and maintaining impact absorbing materials (softfall).

### **Landscaping & Sun Protection**

Also refer to 'Natural Playspaces.'

Provision should be made in playgrounds for sun protection for both users of the play equipment and caregivers.

Shade and sun protection may be achieved in a variety of ways:

Locating playgrounds within the shade canopy of trees.

Constructing purpose built shade structures over the equipment or erecting shelters adjacent to equipment as a refuge for users or caregivers.

Locating playgrounds within the shade of buildings/walls/shrub borders/or any other permanent fixtures without compromising casual supervision of the playground by neighbours and passers-by.

Consideration should be given to the movement of the sun and its effect on the creation of shade. The hottest part of the day is generally between 3 pm and 4 pm, consequently equipment should be located or shelters constructed to maximise shade at that time of day.

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Structures may require the approval of the local council or relevant state department prior to being constructed.

### **Ancillary Items**

#### **– Seating**

A variety of seating should be provided for both children and adults. If possible surround some seating by low planting so that children have privacy but can be observed. Climatic conditions should be considered.

Some seats should be located in play areas used by toddlers/early childhood, e.g. near sandpits to encourage a longer stay by adults.

#### **– Fencing**

Attractive child proof fencing with self-closing gates should be considered for use around the perimeter of areas designed specifically for young children or in areas located close to heavy traffic.

#### **– Bicycle Racks**

Some children and adults visit playgrounds by bicycle and provision may be made for racks adjacent to the playspace.

#### **– Toilets, Shelters and Drinking Water**

On larger playgrounds, consideration should be given to providing toilets with access for children and adults with disabilities and shelter from the sun and the rain. Shelters could be in the form of a large roof without sides. Appropriate planting should also be considered. Provision should be made for drinking water.

#### **– Litter Bins**

A wide range of litter bins are available. These should be aesthetically designed to fit into the environment and large enough to meet the needs of the users. They must be emptied regularly.

#### **– Signage**

Unsupervised playgrounds should be appropriately signposted to indicate the nearest facility for contacting emergency services (eg. Public telephone) and provide contact details of the provider/manager of the playground for the reporting of playground defects; vandalism or hazards.

### **Children With Special Needs**

Often children with special needs are neglected when designing playgrounds. The principle of access for all children should be adopted. Provision should be made in accordance with the Australian Standard AS 1428 Parts 1-4.

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The following guidelines should be considered to provide for children with disabilities:

- Vehicle access and drop off points should be provided with ramps as recommended by Standards Australia.
- Gates should have an opening width of at least 900mm and there should be sufficient space around the gate to manoeuvre a wheelchair.
- If toilets are provided, they should be accessible for children and adults with mobility difficulties.
- There should be access for people with mobility difficulties around the area and between the equipment, and the surfaces should be non-slip, firm and stable.
- Care should be taken not to socially isolate them from their non-disabled peers.
- Equipment selection and its layout should take into consideration children with specific disabilities.
- Refer to Australian Standard 1428 Parts 1-4 “Design for Access and Mobility”.
- Refer to Disability Discrimination Act 1992.

## **Safety**

There are a number of safety issues that must be considered at the planning and design stage.

The Standards have not been written as a document to restrict planners and designers but as a guide to the concepts involved in the provision of safe playground equipment. The spirit of the Standard is that children’s play spaces should not contain unacceptable or imperceptible hazards for the children using the equipment. The Standards are guidelines only.

There is a growing community concern about child abuse or molestation and attention is drawn to the following priorities for meeting parental and community fears.

### **A playground should:**

- Provide seats/shelter for parents or supervisors to encourage them to stay in the area.
- Be situated so that it can be seen from adjacent houses and streets.
- Be located in a manner which enables it to be publicly supervised by passers-by, park officials and neighbourhood watch schemes.
- In some situations, have restricted or controlled use.
- In certain areas the playground should be closed at night.

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However, try to retain the essence of why these areas exist and remember that planning and design guidelines should meet children's needs, and not the preconceived ideas of well-meaning adults.

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# PURCHASING MANUFACTURED PLAY EQUIPMENT

## Written Specification

There are many playground equipment manufacturers and suppliers offering a variety of play equipment types. For the uninitiated, this can make play equipment purchase a daunting task.

In seeking quotations for play equipment, a purchaser should develop a written specification and invite manufacturers and suppliers to quote for the supply of equipment based on the specification. The specification need not be limiting but rather, sets a broad framework within which the supplier designs and quotes.

For example, the following could be included in a specification:

### 1. General Statement

Invites quotations for some or all of the following: supply and installation of equipment, supply and installation of an impact absorbing surface, site clearance and preparation, grading, setting out (any other special requirements).

Nominates the total project budget for the works.

### 2. Design Criteria

States that the play equipment be designed to comply with:

- AS 4685:2004 (this Standard superseded AS 1924 – 1981) Playground Equipment for Parks, Playgrounds and Domestic use
  - Part 1 – General requirements
  - Part 2 – Design and Construction Safety aspects
- Relevant sections of AS/NZS 4486.1: 1997 (below) that superseded AS 2155 – 1982 – Playgrounds – Guide to siting and installation of Playground Equipment
- AS/NZS 4422 – 1996 – Playground Surfacing Specifications, requirements and test methods.
- AS/NZS 4486.1: 1997 – Playgrounds and Playground Equipment
  - Part 1: Development, Installation, Inspection, maintenance and operation.

Provides details of the site (if known) and a location plan.

States the age range of the children most likely to use the equipment eg. Pre-school, junior primary, 0-5 year olds, 9–12 year olds etc.

Nominates specific items which should be included (if applicable) e.g. swings, rockers, slides, monkey bars etc.

Nominates preferred requirements for an impact absorbing surface e.g. loose surface with rubber matting at base of swings, edging to contain surface; to be provided on finished ground level etc.

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### **3. Installation Criteria**

This section:

- Specifies if the site is to be prepared by the purchaser or the supplier.
- If applicable, states that all earthworks required to effect installation is the responsibility of the supplier.
- Requires that quotes are to include supply and delivery to site, if applicable.

### **4. Warranty**

Seeks written confirmation of warranty, guarantee, after sales maintenance for structure, components and workmanship.

### **5. Public Liability Insurance**

Suppliers / manufacturers should be required to have current public liability insurance cover of \$10 million.

Items which a purchaser should expect from a manufacturer and which should be requested through the written specification include:

Product Information including:

- Confirmation that the equipment will fit on the site nominated and that the fall zones and impact absorbing surface requirements are met.
- User details such as suitability for age range, supervision requirements.
- Suitability for indoor and outdoor use.
- Where items are provided for installation by the purchaser, the supplier should advise of the relevant fall zone and impact absorbing surface requirements.
- Resistance to vandalism.

Installation Instructions including:

- A list of all parts and componentry.
- Installation instructions for correct assembly, siting and erection of equipment. The supplier/manufacturer should list the level of competence required for installation.
- General information such as: safety distances/clearances between items and fall zone dimensions; equipment and parts identification; labelling and diagrams; tools/machinery/equipment requirements; location/orientation/site/terrain details; foundation/footings/anchorage specifications.

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- Post-installation inspection checklist.
  - Running-in requirements.

Inspection and Maintenance Information including:

- A list of factors which are likely to influence the frequency of maintenance and the frequency level for each factor e.g. high use factor may require weekly or fortnightly inspections.
- The frequency with which all play items should be inspected and maintained.
- Competence levels necessary for inspection and/or maintenance of equipment.
- Maintenance instructions relating to servicing points and methods of servicing, replacement parts specifications, identification of spare parts, maintenance of impact absorbing surfaces.

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## **SUGGESTED FURTHER READING**

Australian Standard 1428, parts 1-4 “Design for Access and Mobility”. (1992)

A User Guide to the Disability Discrimination Act 1992

Australian Standard 4685 (this Standard superseded AS 1924 – 1981), “Playground Equipment for Parks, Playgrounds & Domestic Use”

Part 1, “General requirements”

Part 2, “Design & Construction Safety Aspects”

Australian/New Zealand Standard 4422:1996 “Playground surfacing – Specifications, requirements and test method”

Australian/New Zealand Standard AS/NZS 4486.1:1997 “Playgrounds and Playground Equipment Part 1: Development, Installation, Inspection, Maintenance and Operation”

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## SECTION II

### MANAGING A PLAYGROUND

#### Six steps for assessing existing equipment

To comply adequately with the law of negligence as outlined in the Wrongs Act, certain steps are necessary for a playspace provider to undertake as part of their management strategy. The following section outlines the procedures that should be adopted in order to assess the current condition of its playground equipment and then maintain it in a satisfactory condition.

- Step 1** A list of the playspaces needs to be compiled identifying location, surrounding land-use, access and facilities provided.
- Step 2** An inventory or equipment register of individual items of play equipment at each playground/reserve needs to be made, with photographic records if desired.
- Step 3** Each item of play equipment needs to be audited to ensure it complies with the Guidelines for Play Equipment to be found in the Appendix A of this manual. The auditing process may be time consuming but it is a critical part of the playground management process. Ensure those carrying out this procedure have appropriate knowledge and equipment and record the detail of the audit for all items of equipment. All records should be retained in case they are required for future reference.

- Step 4** The findings of the play equipment audit should then be categorised as follows:

(a) Acceptable. If an item is found to be acceptable, record the information and identify it for future regular maintenance inspections.

(b) Unacceptable. If an item is found to be unacceptable it must be identified as such and a decision made on what action to take.

It should first be considered what options exist for modification. Advice should be sought from either a playground consultant or a play equipment manufacturer where significant modifications are required and particularly where the modification may cause a non compliance on another part of the equipment.

Secondly, should modification prove too difficult or cost-prohibitive the item of equipment should be removed.

Thirdly, the action to be taken on that item should be prioritised on the basis of Urgent, High, Medium, and Low. As a general rule the item listed closer to the front of Appendix A needs more urgent appropriate actions.

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Finally, if an item does not appear in the Appendix it is recommended that advice be sought in writing from a Playground consultant, manufacturer or supplier.

Depending on the extent and volume of items requiring attention, an action plan with a priority listing should be formed and agreed to by the playground provider. These will be affected by the following factors in order of diminishing priority:-

- (a) The condition of the equipment. If the equipment does not meet the Standards it must be modified or removed, as detailed in Appendix A, as soon as possible.
- (b) The extent of the potential exposure to injury. For example, the potential for injury in most cases would be more severe if a 2.0 metre high deck had no Impact Absorbing Undersurface (to be referred to as softfall) than if it had a missing grabrail.
- (c) The location of the equipment. An item located in a highly used area should, in most cases, be repaired before an item more remotely located, presuming the above two points have been fully considered.

The original suppliers or providers of equipment can be a good point of contact but should be given a clear terms of reference for their role in assessing the equipment i.e. to focus on removing the identified hazard and not creating a new one.

**Step 5** The issue of ground surfacing cannot be overstated. Any item of equipment that exceeds 500 mm above the underlying ground surface must have appropriate softfall installed underneath it.

For those playspace providers in remote regions where the cost of freight can make softfall an extremely expensive proposition other options may exist. The play spaces could be designed to avoid the need for softfall using mounding and natural play opportunities.

Remember that softfall is intended to minimise injury in the event of a user falling from an excessive height. Therefore it is vital that the softfall is maintained in those areas where an injury from a fall seems most likely.

**Step 6** Inspection of equipment cycle and use of maintenance check sheets should be adopted to comply with Section (g) of 17c(1) of the Wrongs Act.

The process to this stage has taken time and resources and will continue to do so. It is therefore important that an evaluation of the financial commitment be made in order that costs be allocated within an annual budget. It is not acceptable in legal or moral terms to install a playground and then do nothing towards its management or maintenance.

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## **Equipment Maintenance**

Once new equipment has been installed or in the case of existing equipment it has been established that the play equipment meets current Australian Standards and design guidelines outlined in Appendix A and is suitable for continued use, the provider must then implement a regular playground maintenance system. Competent staff must be allocated to undertake the ongoing physical inspections and effect any maintenance which is required.

A sign should be installed in unsupervised playgrounds indicating the nearest public telephone location for contacting emergency services and also nominating a contact number for the playground operator inviting the public to notify the operator of any defects on the equipment.

## **Maintenance Procedures**

The playground provider/operator is responsible for coordinating regular inspections of playground equipment and surfaces to assist in their safe performance.

The following playground maintenance procedures are recommended in AS/NZS 4486.1:1997-: Playgrounds and Playground Equipment Part 1: “Development, installation, inspection, maintenance and operation”.

### **1. Equipment Register**

The play equipment owner is required to maintain an up-to-date register of all playground equipment including:

- location of playground
- location of equipment on site
- equipment and under-surfacing details
- installation dates
- installer details
- manufacturer details – including warranty
- certificates of inspection
- operating instructions

### **2. Inspections**

The play equipment owner is required to implement an ongoing inspection program based on manufacturers’ instructions and local risk factors. The program shall include frequency, elements to be inspected. Where hazards are identified, corrective action is to be initiated.

### **3. Corrective Action**

The owner/provider must develop and maintain procedures for corrective action where hazards are identified or notified. Corrective actions are measures taken to correct defects or reinstate the safe operation of a playground. Defects which create a

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hazard should be repaired without delay or items secured against use. Corrective action should not cause additional hazards.

#### **4. Maintenance Procedures**

The play equipment owner must implement an ongoing maintenance program based on manufacturers' instructions and local risk factors.

#### **5. Incidents**

Owners should develop and maintain procedures to be followed in the event of injury, near misses and damage caused on or by equipment. All details relating to any incident should be recorded and retained permanently.

A sample equipment Maintenance and Repair Report is provided in Appendix C. Should repairs be necessary, make a duplicate form with details of the repairs which are needed. The person effecting the repairs should then sign and date the form. The form should then be kept as a permanent record.

### **Suggested Maintenance Time Table**

Playgrounds and equipment should be inspected and maintained regularly

<b>Weekly</b>	<b>Monthly</b>	<b>Three Monthly</b>
Ground Surfacing	Static Equipment	Replenish loose fill ground surfaces
All Moving Parts	Metal Frames	Footings
Swings	Timber Structures	Insects
Ropes, Chains, Tyres	Slides	
Sandpits	Linking Items	

This is a suggested timetable only. Each playspace provider should develop an individual timetable according to the available resources and likely usage patterns.

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## **COMMON PLAYSPACE PROBLEMS**

### **Ground Surface**

Without doubt, the most common fault in our playgrounds is that of an inappropriate ground surface underneath equipment from which children may fall.

The major cause of playground injuries is impact as a result of children falling onto hard ground surfaces. By installing impact-absorbing surfaces under play equipment, the incidence of fall related injuries should be reduced.

Commonsense dictates that a significant improvement in playground safety will result from the provision of softfall underneath equipment from which children may fall.

There are two key requirements that must be satisfied when selecting a material for play equipment ground surfacing. They are:

The material must be of a composition that is acceptable for bodily (sometimes facial) contact.

Clearly, materials that present additional hazards, such as ingestion, eye piercing etc., must be rejected.

The material must be sufficiently impact absorbing for the height of the equipment.

The degree of impact absorption required is a function of fall height and some materials only perform satisfactorily at low heights. Some materials require greater thicknesses to achieve an acceptable degree of impact absorption.

Ground surfacing should extend at least 2.5 metres from equipment where falls are possible.

Loose materials can be installed above ground (good for drainage) with a suitable border (perma-pine logs, sleepers, etc) or in an excavated depression (no need for borders but can create drainage problems).

It should be realised that access by people with a mobility disability is often impaired by the installation of softfall. Consideration should be given to installation of alternative material for paths in and around the equipment.

Further information relating to the selection, provision and maintenance of playground surfaces is provided in Appendix B.

### **Dangerous Equipment**

Contrary to popular belief very few items of play equipment need to be totally removed. Those which do need to be removed have been targeted because they have inherent design problems that are extremely difficult to modify. These problems result in users having difficulty in keeping control and in some cases have been responsible for serious injuries and deaths.

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## Removal of Dangerous Equipment

Immediate action should be taken to prohibit and prevent use of the following items of equipment. Removal or immobilisation should occur as soon as possible.

- **Maypole**  
The risks on this item include colliding with the centre pole whilst in motion, falling whilst in motion and colliding with other users or with spinning chains. Furthermore, severe accidents have been recorded when the maypole has collapsed whilst in use due to corrosion of the centre pole below the ground surface. As this last fault is most often undetectable, no course remains other than to remove this item.
- **Cradle or Boat Swings**  
Many of these are so poorly designed that the “carriage” moves close enough to the frame to create an entrapment point for limbs and head.
- **Plank Swings**  
The problems associated with the plank swing are similar to those of the cradle or boat swing. Additionally, the momentum produced by these swings can easily become uncontrollable generating a battering ram effect.
- **Witches Hat Merry-go Rounds**  
The possibility of crushing children against the centre pole and lack of individual control creates a serious hazard. Furthermore, the problem of underground corrosion also applies in this case.
- **Old Machinery**  
In many instances old vehicles (tractors, cars, carts) are donated as play items for the community. This is not to be totally discouraged as they provide role-play opportunities and can provide a thematic feeling to a reserve.

This does not mean that any old piece of equipment can be installed in a designated play area and left to ruse and/or deteriorate. The machinery must have all hazardous protrusions removed and should be substantially rust free. Access should be made easy, or prevented where inappropriate. The item must be immobilised.

## Miscellaneous

- **Split Links**  
There have been playground injuries involving split links that are used to join chain. The problem occurs when the links is installed with the “horns” facing upwards and are left open. There is great potential for children to catch themselves on the link.

The use of split links should be avoided in playgrounds and replaced if they are already in use.

Alternatives to split links are modified D shackles, karabiners, bolts and the various proprietary chain joiners.

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- **Swing Seats**

Swing seats should be light-weight and impact absorbing. Recommended are rubber strap seats which fit all sizes and are inexpensive. There are many soft seats available so there is no need for the presence of heavy (wooden/metal framed/rigid plastic) swing seats.

- **Erosion at the end of Slides and beneath Swings**

The erosion problem is solvable by the installation in erosion areas of materials such as rubber tiles, conveyor belt rubber and other like products available commercially. The same degree of impact absorption is not required at the end of slides and immediately under swing seats due to the low fall height. Ensure that the material is installed in such a way that the manner of fixing to the ground does not provide further hazard.

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## SECTION III

### THE LAW – OCCUPIERS’ LIABILITY

Over the years some misunderstandings have risen with respect to “Liability Exposure” relating to playgrounds and play equipment.

Let there be no confusion. It does not matter who purchased, supplied, or installed the play equipment; it is the owner who has a duty of care. Even though service clubs or other organisations may undertake to provide inspections or maintenance of various playgrounds or play equipment the ultimate responsibility still lies with the landowner.

This responsibility arises in particular from a South Australian Act of parliament known as the “Wrongs Act (1936)”. A 1987 amendment to this Act (Part 1B) clarified various responsibilities in terms of “Occupier’s Liability”. The Act defines an “occupier” as the person in control of premises, and defined “premises” as *inter alia* land.

Section 17C(1) of part 1B states: “The liability of the occupier of premises for injury, damage or loss attributable to the dangerous state or condition of the premises shall be determined in accordance with the principles of the law of negligence”.

The Act also states that in determining the standard of care to be exercised by the occupier of premises – in this case, playgrounds – a Court shall take into account the:

- (a) nature and extent of the playground;
- (b) nature and extent of the danger arising from the state or condition of the playground;
- (c) circumstances in which the person alleged to have suffered injury, damage or loss, or the property of that person became exposed to that danger;
- (d) age of the person alleged to have suffered injury, damage or loss and the ability of that person to appreciate the danger;
- (e) extent if at all to which the playground provider/owner was aware or ought to have been aware of the danger;
- (f) measures taken to eliminate, reduce or warn against the danger;
- (g) extent to which it would have been reasonable and practicable for the owner to take measures to eliminate, reduce or warn against the danger.

As a consequence, applying these points from the Wrongs Act to the playground situation may result in the following scenario:

If an injury occurs at a playground and that injury is caused by a piece of play equipment which the owner should have identified as having the possibility to cause such injury and therefore should have taken steps to either eliminate or reduce the

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danger, and this has not occurred, the courts could establish negligence against the owner. The amount of compensation will depend on court awards, the extent of the injuries and previous court awards.

It is important to realise that even if the owner complies with relevant standards, the owner can still be found liable. Standards provide a starting point and should be used as a minimum standard in playgrounds, parks and reserves. However, should the owner design equipment that exceeds the Standards, special consideration would need to be given to any additional hazards brought about through any non-conformity.

It should be noted that at present claims by injured persons can be brought up to three years from the date of an incident and in the case of an injured infant up to three years from their eighteenth birthday. If a claim is made against the owner, written records of inspection and maintenance procedures and types of equipment could become vital. Therefore accurate written records of such matters and procedures should be completed and retained permanently.

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## APPENDIX A

### General Equipment Checklist

Note that this checklist clearly cannot cover every possible situation, nor can the questions be applied universally. They should be interpreted and used sensibly with a realistic concern for community safety.

All equipment should be checked for:

#### Ground Surfacing

- Is the equipment erected over an appropriate ground surface?

Note that if this question is answered “no” then the equipment is unsafe!

- Softfall is required where fall height exceeds 500 mm.
- A depth of 250 mm – 300 mm is required for bark chips, wood chips, wood chip mulch, wood peelings, grape marc, seaweed and sawdust.
- A depth of 150 mm – 200 mm is required for shredded rubber and foam rubber.
- A depth of no less than 250 mm is required for sand and pea gravel.
- A maximum fall height of 1.5 metres shall be provided for grass and rubber tiles.

#### Fall Height

- The maximum accessible external fall height for play equipment for:
  - Supervised early childhood must not exceed 1.5 metres.
  - Other equipment is 2.5 metres.
  - Upper body equipment (monkey bars, horizontal ladders, trace rides etc.) is 2.2 metres.
- The maximum internal fall height for play equipment is 800 mm.

#### Fall Zones

- This is the area around or under the equipment which constitutes the normal fall area.
- The concrete foundations/footings should be no less than 400 mm below the playing service.
- Clearance zones between equipment and borders:
  - Where the free height of a fall is 500 mm the clearance should be 1500 mm.
  - Where the free height of a fall is 1500 mm the clearance should be 2000 mm.

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- Where the free height of a fall is 2500 mm the clearance should be 2500 mm.

### **Entrapment**

- To avoid the possibility of strangulation by head entrapment, the Standard bases its recommendations on the following dimensions:

Neck diameter	45 mm (compressed)
Head diameter	100 mm minimum
Head diameter	230 mm maximum
Chest size	220 mm by 80 mm (compressed)

- To test for entrapment in play equipment, identify all rigid circular openings that are larger than 100mm diameter and smaller than 230mm diameter and in excess of 600 mm above the ground. Also check for open-ended gaps (e.g. U-shaped, 45 mm wide) that could permit neck entry and capture the head.
- Check for openings that could permit chest entry but would capture the head.
- Openings that conform to the above are an entrapment and must be eliminated.
- Acceptable dimensions within equipment to prevent entrapment of the body, body components or clothing in:

Tunnels (other than tunnel slides) or suspended parts of equipment open one end:

- With an upward incline of more than 5 degrees when entering should have internal dimensions (measured at the narrowest point) of no less than 750 mm and a maximum length of 2000 mm.

Tunnels (other than tunnel slides) or suspended parts of equipment open both ends:

- With an upward incline of more than 15 degrees when entering should have internal dimensions (measured at the narrowest point) of no less than 400 mm and a maximum length of 1000 mm.
- With an upward incline of more than 15 degrees when entering should have internal dimensions (measured at the narrowest point) of no less than 500 mm and a maximum length of 2000 mm.
- With an upward incline of more than 15 degrees when entering should have internal dimensions (measured at the narrowest point) of no less than 750 mm and has no length restrictions.
- Where the incline is greater than 15 degrees and the internal dimensions are greater than 750 mm, no length restrictions apply but provisions for climbing are required, for example steps or handles.

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For partially bound openings that are larger than 45 mm and in excess of 600 mm above ground level refer to the test probe measurements in AS 4685.1

For foot or leg openings, other than suspension bridges and surfaces inclined up to 45 degrees there shall be no gaps smaller than 30 mm.

### **Enclosed Equipment**

Tunnels and Playhouses with internal distances of less than 2 metres from the entry point:

- Shall have at least 2 access openings that are independent of each other and situated on different sides of the equipment.
- Openings shall not be capable of being locked and shall be accessible without additional aides.
- Access opening shall be smaller than 500 mm.

### **Fixings**

- Are all bolts, screws or any other fixings arranged so there are no protrusions or catch points?
- Steel joints, edges etc must be smooth.
- Pipe ends must be closed.
- Are all fixings suitable for their purpose and adjusted correctly?

### **Guardrails and Barriers**

- Are guardrails of the appropriate type, installed correctly and of adequate height?

### **Supervised Early Childhood**

- For platforms no higher than 500 mm above the playing surface no guardrails/barriers are required.
- For platforms higher than 500 mm but lower than 1200 mm above the playing surface a guardrail or barrier shall be provided. Guardrails shall be no lower than 650 mm but no higher than 750mm above the platform surface. Barriers shall be no lower than 700mm above the platform surface.
- Platforms lower than 1200 mm but higher than 1500 mm above the playing surface shall have a barrier of no less than 900 mm above the platform surface.

### **Other Equipment**

- For platforms in excess of 500 mm but no higher than 1200 mm above the playing surface a barrier 700 mm above the platform surface is required.
- For platforms in excess of 1200 mm but no higher that 2500 mm above the playing surface a barrier of 900 mm above the platform surface is required.

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- Grip requirements with a cross section of no less than 16 mm but not more than 45 mm in any direction shall be provided with a grasp requirement width of 60 mm.
  - Entry and transfer points for guardrails and barriers may be discontinued at locations used for exit/entry e.g. access, ladders and slides. The width of opening in guardrail and infill shall be no more than 800mm or not exceed the width of the adjoining assembly.
  - The vertical guardrail fence or infill required on walking or standing areas shall be 1200 mm above ground.
  - The vertical height of guardrails shall be at least 800 mm above the standing surface.
  - The spacing between the vertical members shall not exceed 125mm.
  - The bottom of the guardrail, if not attached to a platform shall be no more than 60 mm above the standing surface.

### **Handgrips/Handholds**

- Are handgrips that do not contravene the entrapment rules provided at all access/egress points where transition is uncertain?
- Grip requirements shall have a cross section of no smaller than 16 mm but no bigger than 45 mm in any direction.
- Grasp requirements shall have a width of no greater than 60 mm.

### **Chains and Ropes**

- Are chains 6 mm or 8 mm proof tested short link type with no finger entrapment?
- Split link joiners should be avoided as chain joiners.
- Openings should be less than 8.6 mm in any direction except where connections are made where the opening shall be smaller than 12 mm or greater than 8.6 mm.

### **Ropes**

Swinging Ropes fixed at one end:

- Greater than 2 metres in length should have a distance between the rope and the fixed equipment of less than 600 mm or the distance between the swinging equipment should be less than 900 mm.
- No less than 2 metres but no longer than 4 metres should have a distance between the rope and other equipment of less than 900 mm.
- Diameter of the rope shall be no smaller than 25 mm but not greater than 45 mm.

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Climbing Ropes fixed at both ends:

- Shall be anchored at both ends.
- Shall have amplitude of swing greater than 20% of the distance between the point of suspension and the surface level.
- Should have a rope diameter of no smaller than 18 mm but not greater than 45 mm.

**Structural Adequacy**

- Is the equipment frame stable, free from movement and able to withstand the loads imposed on it?

**Access**

- Is appropriate access provided to platforms and in good repair?
- Can people with disabilities access the equipment?
- Have you referred to AS Standard 1428 in particular Part 3 for Children with Physical Disabilities and part 4 for Children with Sight Impairment?

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## **Design Guidelines for Specific Play Equipment Items**

The design guidelines for specific play equipment items provided in this section is not intended to displace current or future Australian Standards. The guidelines reflect the principles and standards specified in AS/NZS 4422 - 1996, AS/NZS 4486:1 – 1997, AS/NZS 4492 – 1996, AS/NZS 4486.1:1997 and specific items of play equipment.

Assistance should be sought from a playground consultant, manufacturer or supplier where the playground provider is unable to interpret these guidelines.

### **General**

#### **(1) Equipment Height**

- (a) The maximum accessible height of the standing surface of any play equipment should be 2.5 metres above the surrounding ground level.

#### **(2) Entrapment**

- (a) All equipment should be tested to ensure it complies with the prescribed standard tests for head and neck entrapment.
- (b) All accessible spaces on the play structure should be free of possible head and neck entrapment hazards:
  - fully enclosed spaces must be less than 125 mm or greater than 230 mm to avoid head entrapment in excess of 600 mm above ground level
  - when open in their upper-most section, spaces must be less than 45mm or greater than 230 mm to avoid neck or head entrapment in excess of 600 mm above ground level.
- (c) Accessible spaces or holes which may result in finger, foot, limb or torso entrapment should be avoided in any accessible portion of the equipment.

#### **(3) Impact Absorbing Surface (Softfall)**

- (a) Softfall should be provided under play equipment with fall heights in excess of 500 mm above ground level (Refer Appendix B).
- (b) The softfall should extend for a distance of 2.5 metres from the outside edge of any play item with the exception of all types of swings. Swings require softfall to extend in the direction of the swing motion for a distance of 2.5 metres plus extended length of the swing chain.

#### **(4) Separation of Dynamic Play Items from Static Play Items**

- (a) Swings should be provided as free-standing units.
- (b) Overhead track rides and flying foxes should be free-standing. However, existing units may be attached at one end of a play structure if appropriate deck space is provided.

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- (c) Play items such as noughts and crosses, spinning ball panels and shop counters should be provided as free-standing units as distinct from activity stations.

**(5) Materials**

- (a) Materials should not be abrasive or contain finger entrapment points, shear or crush points.
- (b) Concrete foundations should be a minimum of 100 mm below the actual ground level.
- (c) All timber should be straight and smooth and be free of gaps which allow for finger entrapment or the like.
- (d) All metal supporting members should be embedded in concrete as the process of corrosion is accelerated when metal is in contact with soil.
- (e) All steel joints and edges should be ground smooth.
- (f) All pipe ends should be closed to avoid finger entrapment.
- (g) All steel should be galvanised or similarly protected against rust.
- (h) All chain should be proof-tested 6 mm short link.
- (i) Bolts and locknuts, d-shackles, karabiners, or other joiners should be used to join chain in preference to split links.
- (j) Plastic coatings on chain, if present, should be regularly surveyed to ensure that damaged coverings are replaced or removed.
- (k) All bolt heads are to be countersunk or, alternatively, cup-head bolts are to be used.
- (l) Protruding bolt threads are to be sawn off or filed flush with their nut. Where feasible, nuts should be countersunk.
- (m) The equipment should be free of sharp or rough edges which may present a hazard to the user.

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## Specific Play Items

### (1) Platform Decks

- (a) Specification (Height):
- The maximum standing height on a platform (i.e. the deck surface), should be 2.5 metres above the surrounding ground level.
  - For equipment specifically designed for use by the junior age groups, the maximum standing height on a platform (i.e. the deck surface) should be 1.5 metres above the surrounding ground level.
  - For equipment designed for use by children who use a wheelchair, openings on platforms for egress by ambulant children should be no wider than 700 mm.
  - No canopy/roof shall be installed above a deck where the deck height is less than 1200 mm.
  - The clearance between the deck and lowest part of the canopy/roof opening shall be no less than 1800 mm.
  - Equipment must be designed to prevent access to canopy/roof from other equipment, handrails, grabrails etc.
- (b) Specification (Area):
- The deck surface area should be a minimum of 0.25 square metres for every play item attached.
  - An additional 0.25 square metres deck area should be allowed for every play item which is greater than one metre wide.
  - The deck surface area for wheelchairs should be 2 square metres.
  - The guardrail should be continuous over at least 25% of the perimeter of the platform to provide refuge on platform decks.
- (c) The guidelines relating to guardrails (Section 2(2)), handrails, (Section 2(3)) and grabrails (Section 2 (4)) shall apply to platform decks.
- (d) The deck surface should be flat and horizontal, level within plus or minus 3 degrees across its width with a slip resistant surface and it should not provide any form of entrapment for toes or fingers.
- (e) Where an activity station combines a number of platform decks in its structure, an upper platform must have its outer face in line with the corresponding outer face of a lower deck and preferably the two outer faces should overlap.

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- (f) Where the distance between upper and lower adjoining decks is greater than 300 mm, a form of access should be provided between the two decks (refer Section 2(5) – Access).
  - (g) The distance between upper and lower adjoining decks should not exceed 800 mm for Senior Equipment and 600 mm for Junior Equipment.
  - (h) Horizontal beams attached to and extending from platforms must be designed and positioned to avoid use of the beam as a balance walk or bridge.

**(2) Guardrails**

- (a) Where the platform deck height exceeds 1.0 metre above the ground level, vertical guardrailing should be provided – except at deck openings.
- (b) Guardrail materials and designs must prevent users gaining a foothold which may assist them to climb the guardrail.
- (c) Specification:
  - The vertical height of the guardrailing should be a minimum of 800 mm above the standing surface.
  - Vertical guardrail, fence or infill on decks shall be a minimum of 1200 mm.
  - The bottom of the guardrailing shall be integral with the standing surface to which it is attached or at a maximum height of 60 mm above the standing surface to avoid hand/foot entrapment.
  - The space between vertical members of the guard fence is to be less than 125 mm or of solid construction.
  - The bottom of the guardrail (if not attached) is to be no less than 60 mm above the standing surface.

**(3) Handrails**

- (a) Handrails shall be continuous and should be provided along or around elevated walking or standing areas including:
  - all decks in excess of 500 mm above the surrounding ground level;
  - all bridges with a flexible standing surface;
  - all bridges and balance items which have a standing surface 500 mm or greater above ground level;
  - all stairways and access ways as specified in Section 2 (5) – Access;
  - for supervised early childhood continuous handrails on all access ramps, stairways, step ladders and bridges shall be provided;

- 
- other equipment requires a minimum of 2 handrails on each side.
- (b) Handrails need not be provided across access and egress points or platform decks unless the deck opening at these points exceeds 750 mm.
- (c) The handrail should preferably be parallel to the level of the standing surface.
- (d) A vertical guardrail fence should be provided where the height of the platform deck standing/walking surface above the surrounding ground level is in excess of 1.2 metres (Refer Section 2(2) – Guardrails).
- (e) Specification:
- Grip requirements shall be a cross section of no less than 16 mm but no greater than 46 mm in any direction.
  - Grasp requirements shall have a width of no greater than 60 mm.
  - The outside diameter of the handrail should be a minimum of 20 mm (nominal) and a maximum of 40 mm (nominal) or equivalent section suitable for gripping.
  - The upper handrail should be 800 mm above outer edge of equipment to 1000 mm above the standing surface for supervised early childhood and 1200 mm above the standing surface for other equipment.
  - The height of the handrail above the step nosing for supervised early childhood should be no lower than 450 mm but no higher than 700 mm.
  - For other equipment the height of the handrail above the step nosing should be no less than 400 mm for the lower rail but no higher than 550 mm and for the top rail no less than 800 mm but no higher than 1000 mm.
  - A mid-rail should be provided between 400 mm and 500 mm above the standing surface and may be rigid or flexible.
  - The upper handrail should allow unrestricted movement of the hand along its surface and provide a minimum hand clearance of 60 mm.
  - The height of the handrail above the platform for supervised early childhood should be no higher than 800 mm and for other equipment no higher than 1200 mm.
  - Handrail clearance for supervised early childhood should be no less than 40 mm and for other equipment no less than 60 mm.
- (4) Grabrails**
- (a) Grabrails should be provided at deck entry and exit points unless handrails are provided on the sides of the equipment adjoining the platform deck.
- (b) Grabrails must not serve as a ladder.
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- (c) Grabrails should be located to assist the user in gaining access to the platform deck (i.e. user's centre of gravity should be over the deck).
  - (d) Specifications:
    - the outside diameter of a grabrail should be a minimum of 20 mm (nominal) and a maximum of 40 mm (nominal) or equivalent section suitable for holding.
    - the clearance between the grabrail and other structural members should be less than 125 mm or greater than 230 mm to avoid head entrapment.

## **(5) Access**

- (a) Refer to Australian Standard 1428 part 104, 1992, "Design for Access and Mobility".
- (b) All angles specified in this section relate to the horizontal plane.
- (c) Handrails are to be provided on all form of access with the exception of rung ladders (Refer Section 2 (3) - Handrails).
- (d) The horizontal distance between handrails on stepladders, stairways and ramps should generally not be greater than 750 mm to 850 mm.

### **Rung Ladders**

Specification:

- The angle of repose of rung ladders may range from 65 up to 90 degrees above horizontal with a preferred range of 70 to 75 degrees.
- The outside diameter of stringers and rungs of the rung ladder should be a minimum of 16 mm (nominal) and a maximum of 45 mm (nominal) or an equivalent section suitable for gripping by hand.
- The distance between the rungs should be a minimum of 300 mm but conforming to head entrapment specifications.
- The horizontal angle of the rung should be plus or minus 3 degrees.
- The rear of ladder should have an unobstructed space with a minimum of 90 mm from centre of rung measured at 90 degrees to the ladder.
- The overall width of the ladder should be no less than 300 mm and no greater than 600 mm.
- Handholds (e.g. grabrail or extended handrail) should be provided to assist access to and from the deck.

### **Step Ladders**

Specification:

- 
- The angle of repose of step ladders should be a minimum of 60 and a maximum of 65 degrees above horizontal.
  - Treads should be evenly spaced with the vertical distance between tread surfaces not less than 175 mm no more than 275 mm.
  - NB. If tread spacings of less than 230 mm are required, the treads should be enclosed to prevent head entrapment.
  - The overall step width should be not less than 450 mm no more than 600 mm.
  - The minimum tread depth should not be less than 75 mm if open and 150 mm if closed.
  - There should be an unobstructed space at the rear of the step with a minimum of 90 mm from centre of step measured at 90 degrees to the ladder.
  - The horizontal angle of the steps should be plus or minus 3 degrees.

### **Handrails**

- Supervised early childhood require continuous handrails on all stairways.
- Other equipment requires a minimum of 2 handrails on each side.
- Height of handrail above step nosing:
  - The height of the handrail above step nosing should be a minimum of 450 mm and a maximum height of 700 mm for supervised early childhood.
  - Other equipment should have a lower rail with a minimum height of 400 mm but no greater than 550 mm and a top rail with a minimum height of 800 mm but no greater than 1000 mm.

### **Stairs**

- Stairs shall have at least 3 risers.

#### **Specification:**

- The preferred angle of repose of Stairways should be within 30 – 38 degrees.
- Stairways for children with disabilities should be in accordance with AS 1428 Part 3.
- Treads should be equally spaced with the vertical distance between tread surfaces not less than 100 mm to 220 mm and may be open or closed.

- 
- NB. As the tread spacing is less than 230 mm, the treads should be enclosed to prevent head entrapment.
  - The minimum stairway width should be 450 mm for early childhood but otherwise 600 mm.
  - The minimum tread depth should be 140 mm but preferably 225 mm and the maximum tread depth should be 350 mm.
  - The horizontal angle of the tread should be plus or minus 3 degrees.

Handrail requirements:

- Supervised early childhood require continuous handrails on all stairways.
- Other equipment requires a minimum of 2 handrails on each side.

Height of handrail above step nosing:

- The height of the handrail above step nosing should a minimum of 450 mm and a maximum height of 700 mm for supervised early childhood.
- Other equipment should have a lower rail with a minimum height of 400 mm but no greater than 550 mm and a top rail with a minimum height of 800 mm but no greater than 1000 mm.

Where the height of stairs is less than 2000 mm above ground level:

- Intermediate landings shall be provided at a maximum of 2000 mm intervals.
- The stairs shall be offset by at least the width of the stairs OR change direction by 90 degrees.
- The landing shall be at least as wide as the stairs and a minimum of 1000 mm long.

## **Ramps**

Specification:

- Ramps which are installed at inclines in accordance with the AS Standard 1428 Part 3, with the gradient between 2.6 and 4 degrees, provide comfortable access.
- The incline for use by disabled individuals should be 1:14 and for non-disabled individuals the preferred range is higher than 10 degrees.
- However, as stated previously, consideration should be given to the concept of providing fun and challenge to all children. Installing ramps which have steeper inclines can not only provide for the children's needs to extend themselves but also help with the cost of equipment provision.

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The ramp should have a slip resistant upper surface and be level within plus or minus 3 degrees across its width.

- Consideration should be given to including kerbs (100 mm high) on both sides of the ramp as a guide for people with disabilities. For children with special needs refer to Australian Standard 1428 part 1- 4, 1992 “Design for Access and Mobility”.
- Handrails shall be continuous.
- For supervised early childhood the upper handrail should be 800 mm above outer edge of equipment.
- For other equipment upper handrail should be 1200 mm above the outer edge of equipment.
- The mid rail should be no less than 400 mm but no more than 500 mm above the standing surface and may be rigid or flexible.
- The handrail diameter should be no less than 20 mm but no more than 40 mm.
- Hand clearance shall be 60 mm.

## **(6) Ability Apparatus**

### **Climbing Walls**

- Scramble Net: Including tyre, chain, pipe, rope or other like forms.
- Handgrips or handrails should be provided at both sides of the top of the scramble net, i.e. a diameter of 20 mm (nominal) to 40 mm (nominal) or equivalent section.

Specification:

- The angle of incline of all scramble nets to be a minimum of 45 degrees and a maximum of 70 degrees.
- A maximum distance of 300 mm applies between the uppermost step of the scramble net and its adjacent standing surface.
- The apertures of the scramble net must be either less than 125 mm or between 230 to 300 mm to avoid entrapment.
- The distance between the stepping surfaces should be between 230 mm and 300 mm.

### **Scaling Wall**

Including timer, log and moulded plastic forms.

Specification:

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- The angle of incline of all scaling walls shall be a minimum of 45 degrees and a maximum of 90 degrees.
  - The chain or rope shall be attached at both top and bottom.
  - The timber planks or logs shall be attached parallel to ground surface, i.e. planks running vertically are not acceptable.

### **Bridges**

- Including any apparatus which provides a link between two platform decks; between a supporting frame and a platform deck; or between two supporting members - either in a horizontal plane or at a maximum angle of 20 degrees.
- For children with disabilities, either in a horizontal plane or at a maximum angle of 4 degrees.

### **General:**

- The walking surface of the bridge should be slip resistant.
- Bridges should be attached to a platform/landing surface in such a manner as to avoid tripping, entrapment, crush points or the like.
- Where bridges are free-standing, the step-up to the bridge surface from the surrounding playground surface must not exceed 300 mm unless an alternative access is provided (Refer Section 2(5) – Access). There should be no step if access is provided for children with disabilities.

### **Flexible Surface Bridges:**

- Includes Burmese Bridges (chain, rope, plank), Clatter Bridges, Plank Walk Bridges, Suspension Bridges, Sway Bridges, Swinging Log Bridges, Walk Bridges
- Bridges which have lateral movement should not be capable of contact with an adjacent member and should have a gap of at least 60 mm between it and an adjacent member at its nearest point.
- Bridges with a continuous standing surface which is less than 100 mm wide should be a maximum height of 500 mm above the surrounding ground surface.
- Bridges with a standing surface that consists of linked but separate members should be a maximum of 500 mm above the surrounding ground surface.
- Bridges with balance logs/steps at varying heights should be a maximum of 500 mm above ground level with variation between levels of not more than 300 mm.

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### Net Bridges:

- Includes Cargo Nets, Chain Ramp Nets, Flexi Bridges (tyre, chain, rope, pipe etc).
- The angle of incline should be between 45 degrees and no greater than 70 degrees above horizontal.
- The height shall be no more than 1200 mm above the ground.
- Handrails shall be provided on one side for flexible bridges with a standing surface of between 100 mm and 500 mm above ground level.
- Handrails shall be provided on both sides for flexible bridges where the standing surface is in excess of 500 mm above ground level.
- Intermediate handrails are required on all bridges where the standing surface is more than 900 mm above ground level.
- The distance between handrails and the standing surface shall no exceed 1000 mm apart in a horizontal plane.
- The distance between the top step and the adjacent surface shall be no more than 300 mm.
- Apertures shall be 125 mm or 230 mm but no more than 300 mm to avoid head entrapment.
- Distance between steps shall be no less than 230 mm but no more than 300mm.

### **Bridge Handrails**

#### Handrail requirements:

- Supervised early childhood require continuous handrails on all bridges.
- Other equipment requires a minimum of handrails on each side.
- Height of handrail above step nosing:
  - The height of the handrail above step nosing should be a minimum of 450 mm and a maximum height of 700 mm for supervised early childhood.
  - Other equipment should have a lower rail with a minimum height of 400 mm but no greater than 550 mm and a top rail with a minimum height of 800 mm but no greater than 1000 mm.
- Handrails, or an equivalent section for gripping, should be provided on all flexible bridges having a standing surface width of less than 100 mm. Where the standing surface of flexible bridges is less than 500 mm above the surrounding ground surface, at least one handrail should be provided.

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- Handrails or equivalent section for gripping must be provided on both sides of all bridges (fixed or flexible) where the standing surface is greater than 500 mm above the surrounding ground surface.
  - Intermediate handrails must be provided on all bridges where the standing surface is greater than 900 mm above the surrounding ground surface.
  - Bridge handrails should be a maximum of 1.0 metre apart in a horizontal plane.
  - Bridges with a continuous standing surface:
    - Where the standing surface is less than 100 mm wide, the maximum height of the bridge above the surrounding ground surface should be 500 mm.
    - Bridges having a rigid standing surface (or continuous balance logs/steps) need not provide handrails where the standing surface exceeds 100 mm width and the height of the standing surface above ground level is less than 500 mm.
    - Where balance logs/steps are provided at varying heights, the maximum height of the standing surface above ground level should not exceed 500 mm and the variation between levels should not exceed 300 mm.
  - Guardrails shall be provided where the standing/walking surface is higher than 1200 mm above ground level. Refer Guardrails Section (P48)

### **Crawl Bridges and Crawl Tunnels**

- Includes arched, curved and inclined Crawl Tunnels, Creeping Crawlers, Rung Tunnels and Pipe Crawl Tunnels.
- The diameter of rungs shall be no less than 45 mm and a maximum of 200 mm.
- The distance between rungs shall be a minimum 230 mm and a maximum of 300mm.
- Grabrails are to be provided at deck access. Refer to Grabrails Section (P50).
- The diameter of the tunnel should be a minimum of 600 mm.
- Elevated tunnels shall be fitted on a horizontal plane.
- Elevated solid tunnels shall not have a top surface that is accessible from adjoining decks or apparatus.
- Tunnels (other than tunnel slides) or suspended parts of equipment open one end:

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- With an incline greater than 5 degrees when entering and internal dimensions of no less than 750 mm should have a minimum length of 2000 mm.
  - Tunnels (other than tunnel slides) or suspended parts of equipment open both ends:
  - With an incline greater than 15 degrees when entering and internal dimensions of no less than 400 mm should have a minimum length of 1000 mm.
  - With an incline greater than 15 degrees when entering and internal dimensions of no less than 500 mm should have a minimum length of 2000 mm.
  - With an incline greater than 15 degrees when entering and internal dimensions of no less than 750 mm have no length restrictions.
  - Where the incline is greater than 15 degrees and the internal dimensions are greater than 750 mm, no length restrictions apply but provisions for climbing are required, for example steps or handles.
  - Where crawl tunnels are elevated between two decks, they should be fitted on a horizontal plane. The top surface of the tunnel must not be accessible from any adjoining deck or apparatus.
  - The diameter of the tunnel should be a minimum of 600 mm.
  - The entry points on ground-mounted concrete tunnels should be fitted with a suitable impact absorbing buffer for head protection.
  - To prevent water and litter collecting pipes installed in a mound, pipes should be placed slightly above the surrounding ground level so that they drain adequately.

### **Fixed Rung Climbers**

- Includes any fixed steel rung apparatus which provides access from ground level to a higher plane at angles in excess of 25 degrees but excludes rung ladders.

#### Specification:

- Outside diameter of rungs to be a minimum of 20 mm (nominal) and a maximum of 45 mm (nominal).
- Distance between rungs should be a minimum of 230 mm but no more than 300 mm.
- Step surface or rungs to be a maximum of 300 mm apart.

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- Where the apparatus consists of rings or spiral climbs the inside diameter of the ring should be a minimum of 400 mm and a maximum of 600 mm.
  - Arched climbers must not be used at heights in excess of 1.2 metres above the surrounding ground level.
  - Maximum height of climber above take-off platform should be 400 mm.
  - Grabrail (or extended handrail) should be provided at the deck access (Refer Section 2 (3) – Handrails or Section 2 (4) – Grabrails).

### **Inclined Sliding Poles**

- Outside diameter of poles should be a minimum of 30 mm (nominal) and a maximum of 50 mm (nominal).
- Distance between poles should be a maximum of 350 mm and a minimum of 230 mm.
- Angle of poles should be within the range of 25 - 40 degrees.
- Maximum height of take-off platform 2.0 metres above the surrounding ground level.

### **Fire poles**

- Outside diameter of poles should be a minimum of 30 mm (nominal) and a maximum of 50 mm (nominal).
- Clearance between pole and fixed structure should be a minimum of 400 mm and a maximum of 500 mm.
- Maximum height of take-off platform 2.0 metres above the surrounding ground level.
- Maximum height of pole above take-off 1.5 metres.

### **Overhead Apparatus**

- Including all apparatus either free-standing or linking within an activity station (eg., horizontal ladders; roman rings/triangles and similar). The apparatus provides opportunities for users to move, by use of their hands and upper body, along the length of the apparatus.

#### **Specification:**

- Outside diameter of handgrips should be a minimum of 20 mm (nominal) and a maximum of 40 mm (nominal).
- The maximum horizontal distance between handgrips should be 450 mm.
- The end handgrips should not exceed a horizontal distance of 200 mm from the take-off point.

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- The height of the handgrip above the surrounding ground surface should be a maximum of 2.2 metres.
  - The fall height should not exceed 2.2 metres.
  - If access has been provided for children with disabilities the height should be a maximum of 1.5 metres.
  - For equipment designed specifically for use by the junior age group, the maximum distance between the handgrip and the surrounding ground surface should be 1.8 metres.
  - The distance between the upper-most take-off (ladder or deck) and any handgrip should be a minimum of 1.6 metres.
  - The enclosed section of handgrips must comply with head entrapment guidelines.
  - Where an elevated platform deck or other apparatus is linked to the beam of overhead apparatus, the beam must not be accessible for use as a balance walk.

### **Parallel Bars, Chin-up Bars and Roll-over Bars**

- These apparatus should be provided as free-standing units, i.e. not attached to activity stations.

#### **Parallel Bars**

- The maximum vertical distance between the top of the parallel bars and the surrounding ground level should be 1.2 metres.
- The horizontal distance between the two bars should be a minimum of 500 mm and a maximum of 700 mm.
- The outside diameter of the bars should be a minimum of 30 mm (nominal) and a maximum of 40 mm (nominal).

#### **Chin-up Bars**

- The maximum height of the bar above the surrounding ground level should be 2.0 metres.
- The outside diameter of the bars should be a minimum of 30 mm (nominal) and a maximum of 40 mm (nominal).

#### **Roll-over Bars**

- The maximum height of the bar above the surrounding ground level should be 1.2 metres. Bars intended specifically for junior age groups should have a maximum height of 800 mm.

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- The outside diameter of the bars should be a minimum of 30 mm (nominal) and a maximum of 40 mm (nominal).

### **Steel Climbing Frames, Gyms and Grids**

- Swings and swinging trapeze bars should not be attached to steel frames which incorporate climbing apparatus.
- Vertical climbing grids and ladders should comply with the requirements for rung ladders (Refer Section 2 (5) – Access).
- Vertical climbing grids should be a maximum height of 2.0 metres above the surrounding ground level.
- Horizontal ladders should have access rungs at one end only.

### **(7) Slides**

Including straight, trough, spiral, roller, tunnel, wave or other slides either free-standing or attached to a platform deck.

- (a) The maximum height of the slide sitting surface above the surrounding ground level should be 2.5 metres.
- (b) Free-standing slides should have either a stairway, step ladder or rung ladder access with appropriate handrailing (Refer Section 2 (3) – Handrailing; Section 2 (5) – Access).
- (c) A horizontal sit-down section should be provided at the top of all slides for a minimum distance of 350 mm with a slope of 0 – 5 degrees in the direction of the slide. If possible this should be part of the slide construction even when it is attached to a platform; however the platform may be used as the starting (sit down) section on attachment slides.
- (d) Slides for use by children with disabilities should be accessed from ground level or by ramp in accordance with AS 1428 Part 3. The slide sitting surface above the surrounding ground level or platform should be no greater than 500 mm. The distance between the three sides of the platform (which should have vertical barriers to prevent the wheelchair falling off the platform), and the sitting surface should be 1.0 metre either side of the slide. The sitting surface should be 1.5 metres long and if possible independent of any deck surface.
- (e) The sides of the slide bed should be:
  - a minimum of 50 mm at heights but not more than 1000 mm above ground level
  - a minimum of 100 mm at heights but not more than 1000 mm above ground level

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- a minimum of 200 mm for the length of the slide of all spiral slides or of sufficient height to avoid any possibility of a user falling out of the slide bed when in motion.
- (f) The minimum contact width of the slide bed should be 350 mm.
- (g) The sliding surface should provide a smooth, continuous sliding action with all joints treated appropriately.

Straight slides should be a minimum of 350 mm wide.

Helical or curved slides should be more than 700 mm wide measured at a point 100 mm below top of the slide side.

- (h) Grabrails or handrails should be provided either as an integral part of the sit-down entry to the slide or on the deck edge to which the slide is attached.

Barriers/guardrails at the starting section for:

Free Standing Slides:

- With heights up to 500 mm but no more than 1200 mm then a barrier of no less than 700 mm is required.
- With heights up to 1200 mm but no more than 2500 mm then a barrier of no less than 900 mm is required.

Attachment Slides:

- If the starting edge is less than 200 mm from the platform then barriers or guardrails are to be provided as for free standing slides.
- Where the height of the slide is less than 1000 mm, an access rail across the opening shall be provided of no less than 700 mm but no more than 900 mm above the sit down section.
- The slide run-out should be of sufficient length to provide a maximum exit speed of 2.5 metres/second (walking speed) with a horizontal slope of 5 degrees.
- Where the slide is more than 1500 mm long the run-out shall be no less than 300 mm.
- Where the slide is no less than 1500 mm but no more than 7500 mm the run out shall be no less than 500 mm.
- Where the slide is more than 7500 mm the run out shall be 1500 mm.
- The angle of the slide should not exceed 60 degrees at any point but on average should not exceed 40 degrees for length.

Fall Zone:

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- Starting section has a standard fall height zone.
  - Sliding section as for starting section or 1500 mm whichever is the lesser.
  - Run-out section no less than 1000 mm.
- (i) Where possible slides should face south.
- (j) Tunnel Slides should not be used unless the following design features are evident.
- Internal fasteners should be designed in such a way as to prevent hazard to the user even in the event that the tube is curved.
  - The internal diameter of the slide is sufficient to enable the user to ride in a seated position with a minimum height of 585 mm and a minimum width of 585 mm.
  - The upper-most casing of the slide is inaccessible for use as a slide or a climbing device.
  - The run-out must extend beyond the upper casing; tunnel section may extend into run-out section.
  - The slide complies with all of (a) – (j) in this Section.
- (k) Roller Slides should comply with (a) – (j) above in addition to the following:
- The hazard of hair and clothing entrapment is prevented, and the rollers are clean and free of foreign objects.
  - For additional information please refer to AS 4685:2004 Part 3 - Particular Safety Requirements and Test Methods for SLIDES (this Standard superseded AS 1924 – 1981).
- (8) Swings**
- (a) General
- All swings should be freestanding, and not attached to any other play item or platform decks.
  - The distance between the swing support beam and any adjacent apparatus should be a minimum of the extended length of the swing chain plus 2.5 metres in the direction of the swing motion.
  - The solid impact-attenuating surface should be 1750 mm plus length of the swing chain at an angle of 60 degrees.
  - The loose fill impact-attenuating surface should be 2250 mm plus length of the swing chain at an angle of 60 degrees.
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- The swing support beam should be inaccessible for users.
  - The swing seat should be made of a light, impact-absorbing material.
  - The swing seat should not have any unsecured ropes or chains which may have been provided to secure young children to the seat.
  - The maximum number of swings per swing unit should be two.
  - Swing seats should be supported by chain or other flexible material and should be attached in such a manner which avoids hazardous protrusions and finger or hand entrapment.
  - Seats should have a ground clearance of not less than 350 mm when laden.
  - Seats should be a maximum of 550 mm above ground level.
  - Swings should be attached to the support beam with an appropriate bearing.
  - Boat, cradle and plank swings must be immobilised or removed.

(b) Free Space

- The space around and above the user during use of playground equipment or the space around and above the user taking into account the possible movements of the equipment required to prevent contact between the user and the equipment.
- When standing there should be a radius of 1000 mm and a height of 1800 mm.
- When sitting there should be a radius of 1000 mm and a height of 1500 mm.
- When hanging, there should be a radius of 500 mm and a height of 300 mm above and 1800 mm below.

(c) Oscillating Pendulum Swings

- This group includes those swings which are normally suspended from two swing bearings.
- There shall be a maximum of two swings per swing unit.
- The swing support beam should be inaccessible by users.

The swing seat:

- Must not have unsecured rope or chain when provided to secure young children.

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- Must be supported by proof tested short link type chain or other flexible materials with no finger entrapments.
  - Split links should be avoided to join seats to chains.
  - Toddler seats shall have a retaining strap or chain across the opening.

Specification:

- The distance between the outside edge of the swing seat and the nearest structural member should be calculated as 20% of length of chain plus 200 mm.
- The distance between swing seats should be calculated as 20% of length of chain plus 300 mm.
- The distance between the top swing bearings should be calculated as 5% of length of chain plus the wide of the swing seat.
- The distance between the swing support beam and any adjacent equipment shall be the extended length of the swing chain from the support beam plus 2500 mm in the direction of the swing motion.
- The support beam attachment should be attached with an appropriate bearing; fully rigid suspension members shall not be used.

Width of swing seats for:

- Supervised early childhood shall be 300 mm.
- Flatseats shall be 400 mm.
- Flexible seats shall be 400 mm.
- Cradle seats and toddler seats shall be no less than 300 mm.
- Seat height shall be a maximum of 550 mm above ground level but no less than 350 mm when laden.
- Ground clearance of swing seats for:
  - Supervised early childhood shall be 300 mm.
  - Pendulum swing shall be 350 mm.
  - Tyre swing shall be 400 mm.
  - Single point suspension swing shall be no less than 400 mm.

The fall zone shall be:

- The extended length of chain plus 2500 mm

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- A solid impact attenuating surface of 1750 mm plus the length of the chain at an angle of 60 degrees.
  - Loose fill impact attenuating surface of 2250 mm plus the length of the chain at an angle of 60 degrees.

(d) Rotating Space Swings

This group includes those swings which are normally suspended from one swing bearing.

Specification:

- The clearance between any part of the swing support structure and the base of the swing seat, when extended towards the support, should be not less than 400 mm. All other conditions apply.
- For additional information please refer to AS 4685:2004 Part 2 - Particular safety requirements and test methods for SWINGS (this Standard superseded AS 1924 – 1981).

**(9) Dynamic Rides**

(a) Track Rides

- Track rides should be located as free-standing units within the play space.
- The track ride pulley/carriage should be inaccessible to the user, lightweight and should have no sharp protrusions.
- The track ride beam should not be accessible by users.
- A handgrip with a minimum diameter of 20 mm (nominal) and a maximum diameter of 30 mm (nominal) should be provided.
- The maximum height of the handgrip above the surrounding ground level should be 2.2 metres. For units designed specifically for the junior age group, the maximum clearance above the surrounding ground level should be 1.8 metres.
- The lateral distance between the support frame of the track ride and the handgrip/seat should be a minimum of 600 mm at each end and 600 mm for intermediate supports.
- A single person seat may be provided on the track ride as an alternative to the handgrip.
- Seats should finish at levels specified for swings.
- Where decks are provided at each end of a track ride, the following guidelines should apply:

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- A maximum height of 400 mm between the deck and the surrounding ground level.
  - A minimum deck length of 1.0 metre.
  - Decks must be rectangular or square.
  - The maximum height between the handgrip and the landing/take-off surface should be 1.6 metres.
  - No seat should be provided on a track ride spanning from one deck to another.

(b) Cable Flying Foxes (Track Rides)

- Cable flying foxes should be located as freestanding units within the place space.
- The flying fox pulley/carriage should be designed to be stable, inaccessible to the user, lightweight and have no sharp edges.
- The flying fox cable should not be accessible.
- A handgrip with a minimum diameter of 16 mm (nominal) and a maximum diameter of 45 mm (nominal) should be provided on the flying fox.
- The lateral distance between the support frame of the flying fox carriage and the handgrip/seat should be a minimum of 600 mm.
- A single, thick, knotted rope may be provided as an alternative to the handgrip.
- Handgrips shall not be enclosed and shall have an impact surface area of no less than 15 cm<sup>2</sup> at end of grip.
- Seats shall be designed so that the user can get out of the seat at any time.

Ground clearance:

- For main cables shall be no less than 2000 mm when measured unladen in the centre of travel.
- The sitting position (below feet) shall be no less than 400 mm when measured loaded with 130 kg.
- The hanging position (below feet) should be no less than 1500 mm at starting point with a cable fixing height at start of no less than 2500 mm (i.e. requires a starting platform of 1000 mm).
- Cable clearance (seated type) shall be a minimum of 2100 mm between the seat and the cable.

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Free height of fall:

- Sitting position (beneath seat) shall be a maximum of 1500 mm when measured with the traveller loaded to 130 kg.
- Hanging position (beneath handgrip) shall be a maximum of 2100 mm when measured with the traveller loaded to 130 kg.
- Fall zone impact area of surfacing is to be provided to a distance of no less than 2000 mm in all directions.
- Decks should not be provided at the termination of the flying fox run.
- The angle of the flying fox should enable the carriage to stop prior to its terminal supporting frame.

**(10) See-saws and Spring-mounted Play Items**

**(a) See-saws**

- NB. When providing specifically for junior play areas it is recommended that preference be given to spring supported see-saws of limited vertical movement.
- The height of the see-saw seats above ground level should not exceed 1000 mm when at rest in a horizontal position.
- The angle of the see-saw seat should not exceed 20° to the horizontal at its extremity of movement.
- The height of the seat at its extremity of movement and the surrounding ground level should be 1.5 metres.
- A car tyre or similar should be embedded in the ground at the point where the see-saw seat would normally contact the ground or impact-absorbing surface.
- Handgrips should comply with entrapment guidelines and should not protrude more than 100 mm above the surface of the seat in front of the user.
- Handgrips should have an outside diameter of a minimum of 20 mm (nominal) and a maximum of 30 mm (nominal).
- Footholds are optional. Where footholds are provided, the foothold should not make contact with the ground and should be a minimum of 230 mm above the ground level at its lowest point to avoid crushing, unless damped and thus not required.
- The suspension mechanism of the see-saw should be fully enclosed and free of finger entrapment and crush points.

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- The lateral deviations when measured at a distance of 2000 mm from the axis point shall be more than 140 mm.

(b) Spring-mounted Play Items

- Springs should be maintained in an upright position when unladen.
- Springs should be mounted in such a manner to avoid entrapment or shear, pinch or crush points.
- Seats mounted on the springs should be slip resistant and rounded in their upper-most section to minimise hazard to user.
- The maximum height above ground level of the seat should be 1.2 metres. Single user spring rockers should have a maximum seat height of 800 mm.
- Rocking Seesaw-2-Way should have a maximum seat height of 550 mm when at rest in the horizontal position.
- Rocking Seesaw-4-Way should have a maximum seat height of 780 mm when at rest in the horizontal position.
- Multiple Spring Rockers should have a maximum seat height of 1200 mm above ground level.
- Multi-point Seesaw should have a maximum seat height of 500 mm when at rest in the horizontal position.
- Multi-point Rocker should have a maximum seat height of 780 mm when at rest in the horizontal position.

The maximum slope for seat/stand is:

- Rocking Seesaw-2-Way 30 degrees
- Rocking Seesaw-4-Way 30 degrees
- Multi-point Seesaw 30 degrees
- Multi-point Rocker 30 degrees

The free height of fall is:

- Rocking Seesaw-2-Way maximum of 1000 mm
- Rocking Seesaw-4-Way maximum of 1000 mm
- Multi-point Seesaw maximum of 1000 mm
- Multi-point Rocker maximum of 1000 mm

The fall zone is:

- 
- 1500 mm around equipment
  - 2000 mm between any two pieces of rocking equipment

Ground clearance for:

- Rocking Seesaw-2-Way is optional
- Rocking Seesaw-4-Way shall be no less than 230 mm
- Multi-point Seesaw is optional
- Multi-point Rocket shall be no less than 230 mm.

NB: Ground clearance is not required when damp.

- Handgrips with a minimum diameter of 20 mm (nominal) and a maximum diameter of 40 mm (nominal) should be provided to assist in maintaining balance.
- Footholds (where provided) should be a minimum of 100 mm above the ground level when laden at its lowest point to avoid crushing.
- Rocking Seesaw-2-Way required
- Rocking Seesaw-4-Way optional
- Multi-point Seesaw required
- Multi-point Rocket optional
- Where platforms are mounted on springs, the platform should not exceed 500 mm above ground level when unladen and should have a minimum clearance of 100 mm with the surrounding level when laden.

### **(11) Maypoles and Witches' Hats**

Maypoles and witches' hats are recommended for immediate removal or, in the case of the latter, immobilisation.

Rotating Equipment: (round-a-bouts, carousels)

Types:

- A Rotating chairs
- B Classic carousel
- C Spinning mushrooms, hanging glides
- D Track driven carousel
- E Giant revolving disks

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NB: All Maypoles should be removed and all Witches Hat Roundabouts should be removed or immobilised. Other roundabouts should only be provided if they comply with the following

**(12) Round-a-bouts**

- (a) Round-a-bouts should only be provided if the following design features are included:
- Lightweight to enable user control over motion or fitted with speed restricting device
  - Speed at periphery under normal circumstances should be no greater than 5 metres per second.
  - Underside of round-a-bout should be smooth and should have a minimum gap above the ground surface of 250 mm and a maximum of 350 mm.
  - Axis shall be no more than 5 degrees from vertical
  - Clearance on the underside should be no less than 250 mm but no more than 350 mm above the ground surface
  - No parts shall protrude beyond the outer circumference.
  - Clearance to the side of the carousel should be no less than 2000 mm radially.
  - Head clearance shall be no less than 2000 mm above the carousel.
  - Handrails to be provided on the spinning platform to be a minimum of 16 mm (nominal) and a maximum of 45 mm (nominal) diameter and to be a maximum of 900 mm above the standing surface.
  - The outer diameter should be a maximum of 3 metres.
  - Free height of fall shall no greater than 1000 mm at any point.

**Rotating Chairs**

Should include the following design features:

- a diameter of 2000 mm
- a ground clearance of 400 mm
- a minimum of 3 equally spaced user stations.

**Classic Carousels**

Should include the following design features:

- 
- For a rotating platform, flush with the ground vertical gaps between the ground and the edge of the carousel should be 6 mm.
  - For a rotating platform not flush with the ground a clearance of 60 mm but no greater than 110 mm for distances less than 300 mm under the carousel where the carousel is low mounted type is required.
  - Where clearance is no less than 110 mm but no more than 400 mm the angle of the protective skirt from the underside of the platform shall be 60 degrees from horizontal.
  - Where the clearance is less than 400 mm the angle of the protective skirt from the underside of the platform shall be 45 degrees from horizontal.

### **Spinning mushrooms, hanging glides**

Suspended stations shall be of equal height using ropes or chains.

### **Track driven carousel**

- Cranks or pedal drives shall be designed for use by hand or feet and shall be fitted with free wheel devices.
- All drive components with any openings larger than 5 mm shall be covered.

Distance between crank arms and covers to be less than 12 mm.

### **Giant revolving disks**

- Shall be circular with axis centrally mounted.
- Ground clearance shall be no less than 300 mm for loose fill surfaces and an no less than 400 mm for firm surfaces.
- Fall zone at side of revolving disk shall be less than 3000 mm.

## **(13) Spinning Barrels**

- (a) The maximum width of the barrel should be 1.0 metre, suitable for use by one person at a time.
- (b) The maximum height of the barrel above the surrounding ground level should be 600 mm.
- (c) Hand supports should be provided.
- (d) The surface of the barrel should have a slip resistant surface with no abrasive coatings or protrusions.
- (e) The barrel spinning mechanism should be sealed with no entrapment, shear or crush points. Likewise, no such points should exist within the supporting structure or adjacent surfaces.

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(f) Hand spun barrels may be provided for children with disabilities.

For additional information please refer to AS 4685:2004 Part 5 - Particular Safety Requirements and Test Methods for CAROUSELS (this Standard superseded AS 1924 – 1981).

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## **APPENDIX B**

### **Ground Surfacing Under Playground Equipment**

A major cause of severe playground injuries is attributed to falls from play equipment onto the underlying ground surface. In order to minimise the effects of the falls and reduce the severity of the injuries it is essential that an impact absorbing playground surface is provided under all play equipment.

AS/NZ 4422:1996 Playground Surfacing details the specifications, requirements and testing methods for playground surfacing.

This Appendix provides a guide to the selection of appropriate ground surfaces for different applications and should be considered in conjunction with the Standards.

#### **What type of ground surface is required and where?**

Surfaces such as brick, stone, concrete or bitumen are not suitable for use under any play equipment or within the fall zone of the equipment.

Surfaces such as well maintained grass, mulch and naturally occurring sandy soils can be used under play equipment where the fall height from the equipment to the ground surface is less than 500 mm.

Where the fall height from the equipment to the ground surface is greater than 500 mm, an impact-absorbing surface should be used. Only previously tested materials should be used and should be provided at recommended depths for various applications.

As a general guide pine chips should be provided to a depth of 250 – 300 mm and maintained at that depth by raking and replenishment.

#### **Which material is best?**

There are many different types of ground surfacing material currently available which generally fall into either of two categories: loose fill materials such as bark chips; shredded rubber; or solid surfacing such as sheets, tiles, mats or wet pour substances.

Loose fill materials are generally cheaper to provide in the first instance but require significant monitoring and maintenance (including regular topping-up). Solid surfacing is generally more expensive to provide in the first instance but is often cost-effective in the longer term.

In considering which material is best for particular applications, the following checklist may be useful.

## Checklist for Ground Surfacing Selection

Feature	Comment
<b>Physical Characteristics</b>	
<p>Is it abrasive?</p> <p>Can it be inhaled?</p> <p>Will it stain?</p> <p>Will it splinter?</p> <p>Is it fire resistant?</p> <p>Is it aesthetically pleasing?</p> <p>Is it easy to install/spread/maintain?</p>	
<b>Cost</b>	
<p>What is initial cost of supply? Including borders</p> <p>What is transportation cost?</p> <p>What is maintenance cost?</p> <p>Replenishment cost?</p>	
<b>Effectiveness</b>	
<p>Does it comply with standards?</p> <p>Is it durable?</p> <p>Does it degrade easily?</p> <p>Does it allow access to equipment (by wheelchairs/perambulators)?</p> <p>Does it need retaining?</p>	

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<b>Maintenance</b>	
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Is it easy to maintain?	
How often does it need replenishing?	
Does it drain easily?	
Is it vandal resistant?	

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### **What area should the impact absorbing surface cover?**

As a general guide, the surface should be provided in the fall zone of the equipment which will vary depending on equipment type and height.

The minimum fall zone which applies in most applications is 2.5 metres (early childhood equipment being the exception at 1.9 m).

The fall zone is measured from:

- The perimeter of the equipment where the equipment has no moving parts.
- The furthest extension of a moving component where the equipment has a moving component (e.g. Swing).
- A combination of the above when the equipment has moving and non-moving components.
- Materials such as softfall edging, rocks and other equipment should not be placed in the fall zone of the equipment.

### **How should the impact absorbing surfaces be retained?**

Loose fill surfaces are usually retained by either excavating the site and backfilling with loose fill or by providing a retaining border outside of the play equipment fall zone with loose fill provided on the natural surface.

Either application is suitable however, care should be given in ensuring that the site is well drained where excavation is the preferred option and that the border does not present a tripping hazard where a border is provided.

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## APPENDIX C

### Sample Employee Advice Sheet

Inspection and maintenance of playground equipment and the general area surrounding the equipment

#### Playground Inspection

Playground areas have to be inspected on a regular basis. Ideally this should be done when a grounds person does the routine mowing or other duties associated with a reserve.

While in the playground, that person should check for any obvious problems/damage such as:

- (a) Broken glass, or other unsuitable objects in sandpits or softfall areas or around play equipment;
- (b) Broken equipment such as loose boards, damaged steps, tree limbs fallen over equipment, damaged seats or sprinklers;
- (c) Check for hygiene, ie. dog, cat and human excreta, condoms, syringes and cigarette butts that may be on or near any equipment;
- (d) Broken fences or obstructed gateways;
- (e) Any flooding or water being retained near the equipment;
- (f) Rake softfall and replace it to the lading area.

All of the above, or any other dangerous situation, is to be cleaned up or secured to make it safe and then reported to the appropriate person so that repairs can begin immediately.

#### Playground Equipment Checks

##### (1) Monthly

Monthly safety and wear checks will also need to be carried out by a competent operator to ensure that playground equipment is safe to use.

The equipment is to be inspected using the Playground Equipment Check List.

This inspection is to be carried out on every piece of playground equipment every month and recorded to ensure that every playground has been checked and that the appropriate action has been taken to render the equipment as safe as possible. When all remedial work has been carried out, lists should be classified on the relevant files.

##### (2) Structural

Periodic checks should be undertaken on all play equipment to ensure its structural integrity. Such checks should be undertaken by a competent operator (eg., Structural Engineer) and any equipment deemed to be structurally unsound should be replaced

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or removed. Results of such checks should be recorded with details of action taken and retained for future reference.

### **Playground Equipment Repair List**

Once any repairs have been carried out on any piece of playground equipment, the person carrying out those repairs should fill out a Playground Equipment Requiring Repair Form and, if required, forward it to a Supervisor who will inspect the repairs and if satisfied will sign the form and put it on file.

Problems discovered during the playground inspection or equipment check should be recorded in writing and the date noted. If remedial action can be taken on the spot this also needs to be recorded. Items requiring more detailed repair should be rendered inoperable if a danger exists to users of that equipment.

### **Keeping Records**

The repairs and inspection sheets should be consecutively numbered and kept on permanent record.

## Sample Check List

### Playground Equipment Maintenance Checklist

Playground/Reserve		
Inspector		
Check List	Tick if OK “X” if not	Remarks
All items of equipment complete		
All nuts, bolts, screws, clamps and other fixings secure and intact		
All bolts flush with outside edge of nuts (i.e. no protrusion or abrasive edges)		
All nails hammered flush with surface with no protruding ends		
All cables, tyres, seats free of protrusions		
All wood & fibreglass items free of splinters		
All steps, ladders and other means of access free of obstruction		
All cables and ropes securely knotted, spliced & lashed		
All structures clear of obstruction		
All supporting posts fixed, secure & immobile		
All bearings and moving parts greased		
All metal components free of corrosion, excessive rust, cracked welds		
All metal components monitored for wear		
All softfall material of sufficient depth for surface type & fall height (pine chips 250mm)		
All equipment vandal & graffiti free		
All equipment secure		
Area free from tripping hazards, rocks, stones, glass etc.		

**Signed:**

**Date:**

**Signed:**

**Date:**



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## APPENDIX D

### Sandpits

Fine loose friable materials such as dirt and sand have universally been a favourite play medium for children of all ages. It provides for creative, imaginative and constructive play. Sandpits will always be one of the most popular items and it is highly recommended that they be included in any play space.

Deep, large, irregularly shaped sandpits provide hours of fun.

Shade is essential. There are many attractive ways of providing shade for children at play outdoors, such as:

- trees and shrubs
- verandas and pergolas topped with brush, wooden slats, shade-cloth, sailcloth or canvas
- portable beach shades or umbrellas with approved safety anchorage.

If possible choose an item which suits the site as well as the budget.

Ensure children have enough room to play comfortable (at least 4 – 5 square metres for 2 – 3 children) and provide sections for individual play especially if mechanical toys are located in part of the sandpit.

Irregularly shaped sandpits or additional attached sections to square or rectangle sandpits provide pockets for one or two children to work uninterrupted away from larger groups.

Locate the sandpit away from the active equipment area.

Older children enjoy playing with sand. Supply more than one sandpit in playgrounds catering for children of a wide age range.

Supply a large box of useful items to help with digging and constructions. These can be purchased inexpensively or collected.

A variety of edging can be selected for interest and use, such as sleepers, rocks, log-ends, plants, timber, cement and logs. Some flat surfaces should be available for utensils, sandcakes and seating.

Hardy, perfumed and textured plants with many hues should be grown around the perimeter to provide children with useful additional accessories such as trees for miniature cities or icing for sandcakes.

Wind protection may be required and a windbreak may need to be erected or planted.

Water should be located in close proximity to the sandpit if possible. Dry sand can become unworkable.

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Good drainage is essential otherwise the sandpit may become saturated with water and stagnate. How the sandpit should be drained depends on the site and the soil condition. If the site has natural drainage where the soil is sandy or loamy and/or has a good slope, the water will soak away. Therefore the sandpit can be dug into the ground without fear of it holding water.

If the site has poor drainage with clay soil, no natural slope or a high water table, more preparation for the pit will be necessary and it even may have to be placed above the ground level.

Sand for the purpose of forming shapes, digging and burrowing should hold together and not collapse too easily. It should be a balanced mixture of particle sizes ranging from coarse, preferably less than 1.5 mm, to very fine 0.25 mm. Preferably use rounded grains which are not too abrasive on skin.

It is recommended that the depth is at least 400 mm but if possible make it a metre deep.

For a sandpit 3.6 metres (12 feet) by 2.7 metres (9 feet) and 500 mm (1.5 feet) the sand required would be about 4.5 cubic metres (5.5 cubic yards).

It would also need about 1.0 metre of screenings and 150 bricks to lay for the base.

Sand is readily available from the local landscaper or builders' suppliers but make sure the supplier knows it is required for a sandpit and check it before purchasing.

The sand should be clean and free of clay, iron oxides, silt and other contaminants.

The possibility of contamination by animals is occasionally given as a reason for hesitating to include a sandpit in a play area. However, it is not an insurmountable problem and the value of sand play outweighs any effort made to overcome this matter.

In playgrounds where public access can be controlled, small bottles of ammonia with only the neck showing can be placed around the perimeter of the play area when the playground is closed to prevent contamination. The bottles must be removed carefully before children return to use the area. Generally animals are creatures of habit. When the area is being established prevent it from being part of their territory; this should prevent any present or future problems. Covers made from sailcloth, mesh, shade-cloth plasticised sheets, polyfabric, hinged panels or trellis with light timber or wire-netting discourage animals' use of the sandpit.

Maintenance is essential

The sand should be raked regularly to remove debris and to ensure that no broken toys, glass or other sharp objects remain.

The sand should be turned over periodically to its full depth to avoid anaerobic conditions and it should be replaced entirely should it become contaminated or dirty.

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Sunlight has traditionally been recommended as a disinfectant and exposure of the sand to the sun and air will keep it fresh.

A regular treatment of a solution of sodium hypochlorite will disinfect the sand to ensure that it does not become a vehicle for cross-infection. The solution can be easily applied by the use of a watering-can containing sodium hypochlorite at the rate of 400 grams to 20 litres of water to treat 8 cubic metres of sand. When making up the solution follow the directions carefully and always add the chemical to the water and stir well. All utensils used for mixing should be rinsed well with clean water immediately after use and never allow undiluted sodium hypochlorite to come in contact with metal.