Manitoba Association of School Trustees

PLAYGROUND SAFETY MANUAL

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Preface

This booklet is designed for the use of school maintenance supervisors, trustees and other school personnel entrusted with the care and custody of playground equipment. It is highly recommended by the Manitoba Schools Insurance Program.

Sincere thanks are given to Tom Fred of the City of Winnipeg Parks and Recreation Department for his

many hours of time and advice. Dennis Dart of St. JamesAssiniboia S. D. #2 and Jim Parsons of St. Boniface S. D. #4 gave of their time to offer valuable ideas in the preparation of this booklet. Thanks are also due to Glen Sawyer of Brandon S. D. #40 who encouraged the writers to continue when the amount of material seemed ominous and the time very short.

This material could not have been completed without the hours or computer time put in by Linda Lagrou who suffered through many pages of hand written notes.

Any errors in this booklet are mine and I accept full responsibility for them.

Keith Thomas,
Risk Manager/Editor
May 11/1988

Regular Inspections

Supervisors of facilities are requested to make sure that all playground equipment is inspected on at least a weekly basis. All schools will maintain a file as a record of these inspections. Supervisors should feel confident that these inspections are taking place and as a matter of course will ask to review the file and periodically accompany the custodian on a spot check basis as the inspection is done. Major repair work to any equipment should be called in immediately to the supervisor of facilities.

- the best time to carry out a detailed inspection would be Monday morning. This would catch any weekend damage that may have occurred. It should not take more than 15 minutes to check out the playground and make sure that conditions are safe.

- the custodian should be prepared to rake and level out the base material. Any broken glass would be found and removed and any base material that has blown out can be replaced.

- school boards will need to keep a supply of base material on hand and be prepared to replace this material in the play areas as necessary. Each spring a supply of new material will probably be necessary.

- proper maintenance of playgrounds will be a budget item requiring regular attention to equipment and surface area.

Introduction

The purpose of a playground is to develop both social and basic motor skills within young children. A playground usually includes some type of equipment and this equipment can be extremely varied from playground to playground and even within a single playground, there can be a great diversity of equipment.

The type of equipment used to be very simple and this was true in Canada until the 1960's when we heard the terms adventure playgrounds and creative playgrounds. New structures were now included in many playgrounds alongside the swings and slides of a simpler age.

The modern day playground also has its share of modern day problems. These problems include expensive insurance, lawsuits and vandalism. Examples of these problems include:

A child's fall in a playground in Chicago in 1985 ended up with most pieces of equipment being removed from Chicago's parks. A two year old fell from the top of a slide and suffered brain damage. His family sued the manufacturer of the slide, the contractor who installed it and the Parks Board. A settlement was reached for $1.5 million. The insurance coverage was canceled but eventually renewed for much less coverage at a greatly increased price. "Playgrounds are a terrible risk for any carrier to have to assume," says the manager of the insurance company.

Recent vandalism in Winnipeg saw the removal of all bolts from a major piece of playground equipment. The discovery was made just prior to recess when many young children would have probably climbed onto the structure and the collapse of the equipment could have injured many children. Fire damaged equipment, graffiti and broken glass are discovered on a weekly basis in many playgrounds. For these reasons and for normal replacement of worn equipment, it is strongly recommended that a weekly, detailed inspection be carried out. A copy of a form used in many school divisions is found in the appendix.

The Risk Manager of the Manitoba Schools Insurance Program will annually request information on and verification of the playground maintenance program. This information will be presented to the insurance underwriters and may be used as evidence in legal proceedings.

If your school division/district is planning a new playground or if a parent's group is donating equipment, the information in this booklet should be very valuable to you. Sections should be referred to when any new equipment is in the planning stage. Parents or other sponsors should be aware of these guidelines and if the proposed equipment cannot measure up, then the equipment should be politely declined and the reasons given for such a decision. It is in your interest to do this preplanning because once the equipment is put in place, you are stuck with the maintenance of it. The children who use your playground will continue to use this equipment and if the design is faulty you will be frustrated in your attempts to repair it or keep children off.

Now is an excellent time to become familiar with the contents of this booklet.

PLAYGROUND DEVELOPMENT GUIDELINES

Site Evaluation

Existing Conditions

building/structures	location, types, sizes, heights, materials, doors and windows, internal spaces, potential hazards
adjacent private/public properties	residential, commercial, industrial, institutional, waterways, retention ponds
adjacent transportation corridors	streets, lanes, railway lines, airports
athletic/sports fields	soccer, football, baseball, hockey

playground apparatus	sandbox, swings, play structures, slides, climbers, etc.
hard surfaces	concrete/asphalt sidewalks, parking lots and play/sport court areas
soft landscaping	trees, shrubs, sod, sanded areas and gravel walkways
Utilities/services	types, sizes, locations, underground structures, potential hazards
site grades	drainage swales, berms, hills, drainage flow, water ponding, catch basins
fencing	types, heights, materials, locations, potential hazards
passive area	natural landscape
lighting	direct, peripheral
outdoor furnishings	benches, picnic tables, waste receptacles, barbecues and signage

Neighbourhood Influences

adjacent private/public owners' concerns	noise, visibility, potential hang-out potential and vandalism
neighbourhood character	type, size, population, age groups and traffic patterns - vehicular/pedestrian
emergency vehicle access	police, fire and ambulance
vandalism/crime	types, frequency, locations and local/site hang-outs
security	police, site visibility and neighbourhood watch

Environmental Influences

climatic conditions	winds, rain, sun, snow and shade
water table/flow	location, depth and quantity
soil conditions	saline, lime and silt
animals	wild, domestic, pets, waste, hazards and proper pet control

User Evaluation

User Group Characteristics:

age groups	nursery, daycare, elementary, secondary, adult
physical nature	physically/mentally disabled, normal
anticipated quantity	user and supervisors
academic background	elementary, junior and senior
hardiness of users	urban vs rural

primary activities of various users	creative play, organized play, jumping, climbing, running and socializing
times of playground use	hour, day, month and season
vandalistic nature	potential of damage to playground and hazard to user groups

User Group Requirements

who is the playground actually being provided for	
questionnaire of user needs	
primary activity requirements of various users	creative play, running, jumping, climbing, swinging, games and sports
special needs user group requirements	physically/mentally disabled
age group needs	component sizes and locations
age group activity separation requirements	

User Group Supervision Requirements

type of supervision	direct, indirect, school, parent and elderly
role of supervisor	participate, control, watching, safety
full visibility of entire play area for ease of supervision	no hidden areas or obstructions
visibility of play area from indoor facility	school, house daycare and community centre
general supervision requirements	seating areas, rain and sun protection, waste receptacles and walkways
activity separation barriers	plantings and fencing
central control access points	gates and controlled openings into activity areas
lighting for visibility into site at night and to reduce vandalism	

Playground/Play Apparatus Guidelines

Types of Playgrounds

Creative playgrounds	play areas in which the design of the play apparatus and layout of the site is based on a specific theme or idea which invokes the user group to utilize the play area in a creative way. For example, a site could be developed based on either a railway, an old west, a pirate ship or outerspace theme to name a few. Such playgrounds are highly recommended
Adventure playgrounds	play areas in which the user group is provided with real tools and construction materials to build their own play huts and climbing structures. This type of playground requires very controlled and highly trained supervision. Such playgrounds are not recommended.
Traditional playgrounds	play areas which have no specific theme and provide common play apparatus components found in most typical playgrounds. These components include swings, a sandbox, a climbing structure and a rocking/seesaw apparatus. Such playgrounds are recommended
Water playgrounds	play areas in which the main play element is water. This element maybe in the form of a wading pool, spray pad or water slide. This type of playground requires high maintenance, operating costs and controlled, trained supervision. Such playgrounds are recommended only when the issues of cost and supervision can be adequately provided for
Winter playgrounds	play areas which are designed for winter play activities. These activities include sliding, skating and skiing. Such playgrounds are highly recommended because of Manitoba's climate
Hard surface playgrounds	play areas in which a hard surface, such as asphalt, is required to play various games. These games may include hopscotch, tetherball, basketball, squares and tennis. Such playgrounds are highly recommended in combination with other types of playgrounds
Natural playgrounds	play areas in which natural environments are utilized for play and education in a safe way. These environments include existing treed areas, creeks, natural elevations and undistributed grasslands. Such playgrounds are highly recommended as educational tools
Wheel Sport playgrounds	play areas which are designed specifically for wheel sport equipment. This equipment includes skateboards, roller skates, tricycles and bicycles. Such playgrounds are recommended, to reduce the use of this equipment on streets and sidewalks, however must be highly designed for safety and located well away from other play areas

Play Apparatus General Safety Guidelines

Protection against falls from heights	Height is only one means of providing challenge to the child, and must be used in moderation with other stimulating experiences. No piece of equipment shall have a standing surface at a height exceeding 2.3 m (7 1/2 ft.) above ground level. All play equipment above 1 m (3 1/2 ft.) or where the child is in motion during play shall be located on a resilient surface that extends around it to cover the zone of use. All standing surfaces above 1 m

	(3 1/2 ft.) above ground level shall be protected by guard rails. Children should not be able to climb the guard rails or enclosures. High climbing structures (except slides) shall provide intermediate points where a decision can be made to halt ascent and to pursue an alternate means of descent. High horizontal supports, particularly for swings shall be designed to discourage climbing or balancing on them. Horizontal ladders may be installed beneath a horizontal surface to prevent children climbing on top and falling from or through them. There are to be no hard or sharpedged equipment parts within the zone of use which a child can hit in free falling more than 500 mm. (Chamfered support posts are excepted). Surfaces used in the play space must be appropriate to its intended use. The layout and design of the play space shall minimize the danger of collisions and falls. The play space shall have well demarcated zones for play activities. Play equipment shall be appropriately located so that children are able to approach, use and depart from the equipment, without colliding with other children.
Protection against injuries resulting from sharp or rough edges and projections	There shall be no accessible sharp edges or points that can cut or puncture human tissue, or projections that cut skin or entangle clothing. If the edge or point is questionable in terms of its injury potential, it should be considered as being sharp and unacceptable. It is desirable that nails not be used. If they are used they shall be of the spiral, hot dipped galvanized type and they shall be inset. Woodwork shall be chamfered or rounded (minimum radius of curvature 8 mm) and splinter free. Sheet materials less than 2 mm thick shall be finished on the exposed edges with a neat roll or rounded capping. The exposed open ends of all tubing not resting on the ground or otherwise covered shall be provided with caps or plugs which have a smooth finish, and are tight fitting. It is desirable that pipe ends should be capped flush. A tool shall be required for removal, and shall not be removable by a 7 kg (15 lb.) force when tested in accordance with US Title 6 Code of Federal Regulations, Section 1500.53(f). Tubing shall not be bent to form a loop unless it provides no risk of clothing entanglement or head and neck entrapment. All bolts, screws or set screws used in wood equipment shall be either counter sunk or dome head. All bolt ends shall be counter sunk, or have smooth finished caps. Covers or the equivalent should be provided for the purpose of covering accessible bolt ends. When properly torqued, the recommended length of the protruding bolt end shall be such that the cap or covering fits against the nut or surrounding surface. No rough edges shall remain. The caps or coverings shall not be removable without the use of tools. All protrusions shall meet the test described in A Handbook for Public Playground Safety, Vol. 11: Technical Guidelines for Equipment and Surfacing, US Consumer Product Safety Commission, 1981. Projections shall allow for head clearance
Protection against shear, pinch or crush points	There shall be no pinch, crush or shear points caused by junctures of two components moving relative to one another which can cause injury to a user's finger or limb. If such points are unavoidable they shall be made inaccessible
Protection against injuries from suspended or protruding hazards	There shall be no individual cables wires, cords or other similar elements of less than 25 mm (1") diameter suspended or stretched horizontally between components or between a component and the ground in a manner that could be contacted by a user in motion. It is desirable that cables, wires or cords

	greater than 25 mm be brightly colored for greater visibility. There shall be no projections greater than those where a user can come in contact with it during use. This includes structural members and extensions on guardrails
Protection against head entrapment	No components or group of components shall form an angle or opening that can trap a user's head If openings are large enough for a child's head to pass through, 100 mm 250 mm (410") there should be no possibility of contact with any moving part for a distance of 200 mm behind the opening. It is desirable that such openings be shielded. If such enclosures or openings are shielded, the shield shall only be removable by the use of tools
Protection against abrasion	All seating and sliding surfaces shall contain no rough textures capable of cutting human skin, nor any joints. In long or spiral slides, where such joints are unavoidable, the method of jointing used shall ensure a smooth finish without protrusions or indentations at the joint and the joint shall be permanent. All wood should be milled smooth. Where roughness is introduced for gripping, there shall be no danger of abrasion or splinters. Wood should not be used for a sliding surface. Rope structures shall be designed to minimize skin burns. Exposed edges of materials shall be rolled to a radius of not less than 6 mm. If thickness of the material prohibits the above profile, material should have curled in edges or rounded permanent capping. The resulting openings shall be enclosed

Play Apparatus Specific Safety Guidelines

Swinging apparatus	includes tire swivels, baby swings and belt swings. The design shall permit the child to be able to approach and mount the swing, and dismount and withdraw without being struck by the same swing or by an adjacent swing. The design of the swinging component or seat shall minimize the potential for serious injury to the head. The design shall ensure that the child in motion shall not strike the lateral or vertical supports, by standers or another child on a neighbouring swing. The design shall ensure the child is secure when swinging and ensure that no injury is incurred while swinging or setting the swing in motion. An impact absorbing surface shall be placed under and around the swing standard to reduce injury from falls
Sliding apparatus	includes straight beds, wavy beds, half tube sliders, spiral sliders, banister poles and fire poles. The design shall permit the child to be able to ascend in an upright position to the top of the slide in safely by using the means provided. The design shall permit the child to be able to stand on the landing or platform without danger of falling out while waiting for his turn. The design shall permit the child to be able to start descent in a sitting position with immediate access to hand grips at the sides. The slide bed shall be designed to slow the user's decent sufficiently to maintain balance while existing from the slide and generally in a vertical seated position. An impact absorbing surface shall be placed under and around the slide to reduce injury from falls. No slide shall have a height exceeding 2.3 m (7 1/2 ft.) above ground level
	includes spring mounted toys and teeter totters, and tire mounted toys and

Rocking/seesaw apparatus	teeter totters. The design shall allow the child or children to start or stop the rocking or seesaw motion. The design shall allow the child to be able to anticipate movement and take appropriate action. The design shall ensure that the child cannot get his foot, leg or knee trapped under the apparatus. The design shall ensure that the child has a secure hold and is seated securely during movement. The design shall ensure it is impossible to have the child thrown off by abrupt or violent movements. The design shall ensure the child will not be able to collide his head on the play component while in use. An impact absorbing surface shall be placed under and around this apparatus to minimize injury.
Climbing apparatus	including geodesic, gymnastic, rocket and animal climbers, and play structures involving single and multi-platforms, and multi-play components. The design shall ensure that all play equipment safety guidelines stated in Section 3.2 be adhered to. An impact absorbing surface shall be placed under and around the climbing apparatus to minimize injury

Play Apparatus Materials and Finishes Guidelines

All materials, hardware and finishes used in the construction of play spaces and apparatus shall comply with existing standards for manufacture, performance and application/installation

Wood	all wood used in play equipment shall be of structural grade. All wood, except redwood and old growth cedar should be pressure treated with a safe preservative to existing standards of retention Components of manufactured equipment shall be pressure treated with a safe preservative after drilling and cutting. When custom building, all cuts and drill holes in pressure treated wood must be treated with a safe preservative prior to assembly
Metals	in playgrounds and neighbourhoods where high vandalism occurs, steel and aluminum materials are recommended in the manufacture of play apparatus, except in the case of flooring materials which must have nonslip surfaces. Metals subject to corrosion or deterioration shall be plated, galvanized, painted, preserved or otherwise treated
Chains	chains shall provide no risk of pinching or entrapment or they shall be covered
Cables	cables shall be coated or be galvanized. Cable ends shall be inaccessible or capped
Tires	steel reinforced tires shall not be used because the steel bands tend to protrude through the casing and could cause injury. Tires shall be provided with one or more drain holes, each 100 mm in diameter. Tires shall be joined together in a manner that reduces the risk of tearing
Ropes	ropes should be selected on the basis of durability, strength, elasticity, weight, resistance to vandalism, resistance to causing skin burns and abrasion, and requirements for maintenance

Plastics	plastics shall be able to tolerate cold temperatures or -45 C without becoming brittle

Impact Absorbing Surface Guidelines

Protection against injuries from fall requires detailed study. As most playground accidents occur when children fall from a structure, it is imperative that the underlying surface be able to cushion the fall and reduce the possibility of a serious accident.

In Manitoba, the base material under playground equipment is usually mortar sand, torpedo sand or pea gravel. Each type has its advantages and disadvantages:

Mortar Sand (Grand Beach Type)	very fine drained and thus readily blown by the wind so it can be used only in a sheltered area
Torpedo Sand	coarser drained and doesn't generally blow away but rain tends to push it into the ground. The main problem with sand is that children carry it into school on their runners and the sand quickly erodes the surface on the floor
Pea Gravel	tends to spread out over the ground and this cuts down on the thickness component. It also becomes very slippery on top of asphalt. Pea gravel is also bad for lawn mowers as it can become a missile when the grass is being cut and possibly injure someone in the proximity of the playground. Pea gravel does not transport easily into the school building
Wood Chips	not usually found around Manitoba schools because chips are hard to keep clean, are edible, and cause slivers or splinters to stick in the skin as chips readily decompose or disintegrate into smaller pieces
Edging	the edging around base material is usually 6 by 6 timber or tires. Pressure treated timbers without creosote are recommended if wood is to be used for edging. The thickness of base material should be a minimum of 6 inches and frequent leveling is necessary to maintain an even thickness

Ample space should be left around all structures to lessen the possibility of a collision or injury because of a fall.

Area of Base Material:

- there should be a minimum of 8 feet of base material between any structure and the edging around the base.
- slides should have frontal allowance of 10 feet of base material.
- in calculating space for swing structures, allow the height of the swing plus 2 feet

If the swing is a tire swing then allow one more foot or height of swing plus 3 feet.

Landscape/Structural Amenities Evaluation

Landscape Components	landforms, hills, berms and drainage swales
- pathways	woodchips, crushed stone, asphalt, concrete and paving stones
- furniture	benches, waste receptacles, picnic tables and drinking fountains
- vegetation	trees, shrubs, flowers, beds, sod
- water	playgrounds should not be located in close proximity to retention ponds, rivers or streams
Structural Components	
fencing	wood planks, chain link, post and chain
sun/rain shelter	picnic, seating, sandbox, play structure, playhouse
washroom facility	toilets, sinks, drinking water, maintenance storage
maintenance storage facility	
water play components	water slides, wading pools and spray pads

Site/Playground Layout

Review of existing site conditions: (see **Existing Conditions**)

- positive conditions
- negative conditions/hazards

Play component requirements and interrelationships:

- special requirements
- component activity relationships
  types of equipment in relation to age groups and types of activities
- relation of play areas to existing conditions/hazards
- safety, security andÌ3ÿÌervisor relationships to play areas

Landscape/Structural Layout:

- landforms
- pathways
- pavement
- vegetation
- furniture
- fencing
- sun/rain shelter
- washroom facilities

- maintenance/storage facilities.

Site Construction Process:

Construction Site Safety Guidelines

Timing for construction	construction of a play area and installation of the play apparatus should be carried out when the user group is least likely to be present. For example, the development of a school play area should occur during the summer months when the children are away from the school
Site fencing	temporary fencing should be installed prior to construction to reduce the risk of injury to children present in the area around the work site
Construction Material Placement	all materials should be stored or placed in a safe, secure area to reduce theft and potential injury to children
Debris removal	at the end of every working day all construction debris materials should be removed and disposed of to reduce the risk of injury
Machinery protection and safety	all construction machinery should be safely stored during non-construction periods to prevent vandalism and injury
Site security	if a construction site can not be made reasonably safe at the end of each working day, security should be provided
Site safety inspections	site inspections should be carried out during the construction process to ensure both the site and play components are being installed safely and correctly
Play component erection control	as play components are being installed, they should be made safe to use at the end of each working day to avoid injuries
Impact absorbing surface development	as play components are being installed, the proper safety surface should also be placed simultaneously to avoid injury

Construction/Product Quality

- product quality inspection before installation
- foundation quality time of the year
- repair of damaged components before installation
- heights, joints and connections inspected during erection
- final inspection be carried out before use by user groups to ensure safety and quality of products

Contractor Reliability

- insure contractor is financially stable
- insure contractor has appropriate insurance coverage
- insure contractor has reliable quality standards

Site Safety Inspections and Maintenance Control

Safety/Maintenance Requirements

- funds should be available for proper maintenance
- maintenance requirements checklist to be provided to ensure manufacturers and safety standards are maintained.
- a maintenance inspection schedule should be developed on a daily, monthly and annual basis.
- maintenance should occur immediately upon notice of problems occurring.
- component replacement quality
  - grounds maintenance grass cutting, tree and shrub watering, garbage removal, cleaning and replacement of impact absorbing surface
  - proper water drainage maintenance

User Group Safety/Maintenance Involvement

- users and supervisors should inspect site and components for hazardous conditions before use
- users and supervisors should report all hazardous conditions to maintenance staff
- users and supervisors should remove hazardous debris where possible
- users and supervisors should attempt to maintain
- clean site
- users groups and supervisors should be taught how to use play equipment safely.

Use of Sprays

- school boards today often receive parental input advocating non use of chemicals to control weeds. There is a great fear that chemicals approved today by Workplace Safety and Health may in the future prove to be injurious to children and the environment.
- if the decision is made to continue use of chemicals then the first step is to check with Workplace Safety and Health for approval. An approved product should be applied only

when children are not present and wind conditions are right to limit the possibility of over spray.

- as an alternate to chemical spraying, regular preventative maintenance can control weeds. Some divisions have produced a bar with scarifier blades that can be pulled behind a truck or tractor to remove weeds from tracks. A pass by a motor grader will remove heavier weed growth. The custodian will rake up the broken weeds and haul them away. Regular moving should eliminate weed growth in lawns and grass areas.

Playground Success/Safety Evaluation

Playground Safety Evaluation

- all accidents, large or small should be reported
- all incidents which were avoided because of proper design should be noted
- if warranted, all repairs or alterations should be made immediately to avoid future accidents.

User Group Evaluation

- upon the use of playground both user and supervisors should be questioned regarding success of playground
- if warranted, all repairs or alterations should be made immediately to avoid future accidents

Neighbourhood Evaluations

- affect of playground on immediate neighbourhood and how to resolve potential or existing problems
- affect of vandalism on play equipment and how to repair and prevent
- playground user security and protection by neighbourhood and police and how to alleviate potential or existing problems.

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