

ORGANIZATION NAME		REGISTRATION NUMBER	NPO 165 -218
DOCUMENT NAME	The SASPI Code of Practice for the Installation and Maintenance of Wet-Pour Safer Surfacing for Playgrounds		
ORIGIN	Adopted from the SAPCA Code of Practice for the Installation and Maintenance of Wet –Pour Safer Surfacing for Playgrounds		
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CODE OF PRACTICE

FOR THE INSTALLATION AND MAINTENANCE OF WET-POUR SAFER SURFACING FOR PLAYGROUNDS

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INTRODUCTION

The South African Sports and Play Industry (SASPI) has with permission adopted the Sports and Play Construction Association (SAPCA) Code of Practice for the Installation and Maintenance of Wet-Pour Safety Surfaces for Playgrounds that has been produced to provide prospective clients and specifiers with guidance on the basic construction requirements, specification and maintenance currently employed in constructing wet pour impact absorbing surfacing in playgrounds.

The document calls on the experience of our member companies who have constructed a wide range of installations for a variety of clients over many years. The requirements of the relevant South African Standards are also incorporated, where appropriate, in the document.

Whilst it is not intended that this document should become part of a contract, it is hoped that it will prove useful in the selection of an appropriate system and surface and form a useful reference in the design and construction process.

Please Note: Users of the Code of Practice are advised to ensure that they are fully aware of any further technical requirements or criteria which may be imposed by a specific funding body for individual facility development projects.

Notes To Be Read In Conjunction with the Code of Practice

This Code of Practice is intended for use by play surfacing contractors, play facility design professionals and play facility purchasers and owners. The Code of Practice should not be used as a substitute for carrying out appropriate surveys and obtaining professional advice in individual circumstances. Although the Code of Practice has been produced by reference to facilities constructed under normal climatic conditions, the South African Sports and Play Industry cannot accept any responsibility whatsoever for any loss, damage or injury whatsoever arising from reliance on the specifications within the Code of Practice.

The Code of Practice provides minimum guideline specifications which members of the the South African Sports and Play Industry are committed to meet. As guideline specifications, however, they do not supersede a reasonable interpretation of the specification and terms of contract applying in each contract. For individual projects, variations in climate, soil conditions, topography, equipment design and other site specific conditions may necessitate standards of specification greater than those recommended in the Code of Practice. Parties not experienced in play facility construction are strongly advised to consult qualified contractors and/or consultants. The South African Sports and Play Industry (SASPI) can provide details of experienced contractors and consultants.

Whilst the term ‘asphalt’ is the internationally accepted technical name for all surfaces which are composed of a mixture of bitumen and stone, this Code of Practice uses the generic term ‘macadam’, as this is still the commonly used name for asphalts.

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In accordance with common practice within the construction industry (used, for example, in BS EN 13108-7), the depth of any individual construction layer is specified within the Code of Practice as the nominal compacted depth. The nominal depth can be regarded as the design depth of a layer of construction within a surfacing system.

The information contained within the Code of Practice, whilst accurate at the time of publication, may be subject to change at a future date. Due to changing technology and new developments in construction methods as well as the changing requirements of the Standards, revisions to the recommendations are likely, and only the most recent edition of the Code of Practice should therefore be used. A permanent joint committee will keep under review the use of the Code of Practice and will consider any suggestions for amendment, which should be addressed to the The Chairman, The South African Sports and Play Industry (jeremy@seamlessflooring.co.za). Revision to the Code of Practice will be made when it is considered appropriate. Due to the fact that many of the processes used in constructing wet-pour surfacing systems are highly susceptible to weather conditions such as temperature, humidity, rainfall, etc, it is advisable to check with the specialist contractor as to the most suitable time of year for the installation of their proprietary product.

South African Sports and Play Industry (SASPI)

As the recognised South African trade association, SASPI fosters excellence, professionalism and continuous improvement throughout the sports and play construction industry, in order to provide the high quality facilities necessary for the success of South African sport.

SASPI's Aims and Objectives

To promote high standards of design, construction and workmanship for sports facilities in the South Africa.

To regulate the industry through the vetting and monitoring of SASPI members.

To participate fully in the development of South African standards for the construction and performance of sports facilities, for all levels of play.

To liaise closely with the governing bodies of sport, both nationally and internationally.

To encourage the use of new technology in the design and construction of sports facilities.

To provide and support training and education for the industry's workforce.

To provide a strong voice for the sports construction industry in South Africa.

www.saspi.co.za

The SASPI website provides a wealth of valuable information for anyone involved in the development of sports facilities. Visit www.saspi.co.za for Industry News, Technical Guidance, Exhibitions & Events, the SASPI Membership Database, and more.

Acknowledgements

SASPI would like to acknowledge the assistance and permission of SAPCA who developed the production of this code of practice and allowed us to adopt their SAPCA COP.

PROLOGUE

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From the first considerations regarding the construction of a playground surface through to final completion, a clear understanding is required of the process. The processes and decisions that need to be made can be complex and will depend upon many contributing factors.

This code of practice for Wet-pour Safer Surfacing has six main sections that cover requirements and provide technical information on the installation and maintenance of a wet pour surface used in the construction of playgrounds.

The opening section of the code of practice introduces wet-pour as a system and how the document can be used throughout the construction of the playground surface. It also underlies issues that the reader must be made aware of.

The second section, standards and specifications, outlines the main standards set out and the range of tests the surface must pass to satisfy the safety and performance criteria. Even though every effort is made to ensure the code of practice is up to date, SASPI highly recommends that the standards are checked via the original source to ensure they cover the very latest requirements.

Section three covers the construction of the base structure outlining the general requirements that need to be in place. For instance, base structures can be created from new or utilising an existing hard surface.

Section four provides guidance on the installation of a wet-pour surface. It provides information and technical guidance on methods of installation, surface levels, jointing and the quality of the finished installation.

The penultimate section refers to the maintenance of a finished wet-pour surface. It covers issues from moss and algae to general cleanliness and what could be done in the case of snow and ice.

The warranty of the newly installed surface is the last issue to be detailed in the code of practice. The responsible party is outlined along with the general conditions of the warranty.

The diagram on the following page is designed to help potential clients make the correct decisions at the right times by looking at the ideal routes a project may take from proposal to completion and the information required at each stage.

Please note: depending on the size and cost of a project the full process outlined below will not be necessary. For example, small projects may not need to employ a consultant or indeed go through the same level of pre-build surveys. Many projects will involve a design and build element from the contractor and will consequently follow a different plan.

1. PROJECT BRIEF

This phase reviews the project brief and considers factors such as location; usage; funding; procurement and project management

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2. PROJECT FEASABILITY

This phase can include the development of a business plan; planning and funding application. A consultant can be appointed during this phase if required; this is normally for a large project.

3. SITE INVESTIGATION

Prior to the design phase a detailed site investigation is required. This includes topographical; geotechnical; electrical and drainage surveys. This may not be necessary on a small project.

4. DESIGN SPECIFICATION

This phase includes the production of full design specifications and technical drawings

5. TENDER PROCESS

In this phase a review of the tender submissions is undertaken. This includes tender evaluation; short listing and eventual contractor selection

6. CONSTRUCTION PHASE

This phase includes the construction of the facility. If required independent quality control is undertaken to assess build quality and design specification conformance

7. PROJECT COMPLETION

This phase includes the hand over of the completed project. If required conformance testing should be undertaken to ensure compliance. Additionally a maintenance regime should be provided by the installer.

8. AFTER CARE

This phase includes the ongoing maintenance programme and warranty period of the installation. As required performance testing is undertaken to monitor surface behaviour.

1. SECTION ONE: PREAMBLE

1.1 Wet-Pour Impact Absorbing Surfacing (IAS)

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In preparing this Code of Practice only wet-pour, in-situ laid, systems have been considered. Alternative systems such as pre-fabricated tiles, loose fill, synthetic turf, etc., do not form part of this Code. Wet-pour systems incorporate rubber granules bound in a polyurethane resin and may be constructed to provide a porous surface.

Many different wet-pour in-situ systems exist in the market but all utilise the basic material content of polyurethane resin binder and rubber granulate. The granulate may be manufactured from recycled truck and car tyres (i.e. Styrene Butadiene Rubber, SBR) or from EPDM (Ethylene Propylene Diene Monomer). Whilst the base colour for SBR rubber is black, it may also be colour coated. EPDM is manufactured in a wide range of coloured options.

Polyurethane resin mixtures are susceptible to temperature and humidity and it is recommended that the installation of in-situ systems does not take place when the surface temperature of the substrate is outside the range 5°C to 30°C or the Relative Humidity exceeds 85% unless the specialist contractor has previously provided a written assurance that this range can be exceeded without detriment to the product. Only experienced operatives should be employed to install wet-pour surfacing and a COSHH assessment is required as part of the Health and Safety plan for the operation. Wet pour, in-situ laid surfaces and their bases are designed for pedestrian loadings only.

2 SECTION TWO: STANDARDS AND SPECIFICATIONS

To satisfy safety and performance criteria play surfaces are subjected to a range of tests. This section provides details of the test methods from the most up-to-date available standards.

Please note: Whilst the information presented within this section is taken from the relevant standards it is highly recommended that information is obtained directly from the source material to ensure it meets the very latest requirements as these documents are updated on a regular basis. Every effort is made to keep the code of practice up-to-date but there will always be a delay in response to updates.

2.1 CURRENT STANDARDS

2.1.1 The South African Standards

The South African Standards that currently apply to impact absorbing surfacing are as follows:

- ✓ SANS 51176 (2010) Parts 1 to 7 & 10 & 11 Playground Equipment
- ✓ SANS 51177 (2010) Impact Absorbing Surfacing: Safety Requirements and Test Methods
- ✓ BS EN 7188 (1998) Impact Absorbing Playground Surfacing: Performance Requirements and Test Methods

2.1.2 Test Report

The supplier of the wet-pour IAS must supply the client with a test report from UJ University or other independent registered test laboratory who is preferably a member of the Professional Services group of SASPI. This test report must show that each product (or thickness of product) being offered has been tested to SANS 51177: 2010 for Critical Fall Height determination.

The test bed for the Critical fall height evaluation must be a solid concrete slab though tests taken on alternative test beds, e.g. stone may be shown as a comparison.

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2.1.3 British Standards Compliance Test

A separate test report must also be supplied showing compliance with the requirements of BS 7188: 1998 (incorporating amendment No 1). The specific tests required under BS 7188: 1998 are as follows:

- ✓ Section 4 Determination of Resistance to Abrasive Wear
- ✓ Section 5 Determination of Slip Resistance
- ✓ Section 6 Determination of Resistance to Indentation
- ✓ Section 7 Determination of Ease of Ignition
- ✓ Section 8 Tensile Properties

2.1.4 Performance Requirements and Test Methods

The results of these tests must fall within the following limits, which are published in BS 7188: 1998 (incorporating amendment No.1)

Impact absorbing playground surfacing: performance requirements and test methods.

- ✓ Resistance to Abrasive wear
 - Wear Index less than 1.0
 - Wear ratio between 1.0 and 3.0
- ✓ Slip Resistance (see Figure 1)
 - Not less than 40 when tested wet or dry
- ✓ Resistance to Indentation
 - The residual indentation shall be not more than 5.0 mm, nor shall there be any cracking, splitting or perforation around the point at which the load was applied
- ✓ Ease of Ignition
 - The surface shall have a 'low' radius of effects of ignition.
- ✓ **Tensile Properties**
 - For specimens cut from the upper wearing layer of a surfacing system, the tensile strength shall be not less than 0.4 MPa and the elongation at break shall not be less than 75 %. For specimens cut from any lower unexposed, supporting layer (where such a layer exists), the tensile strength shall be not less than 0.1 MPa and the elongation at break not less than 25 %.

Please note: Appendix A provides further details on these tests.

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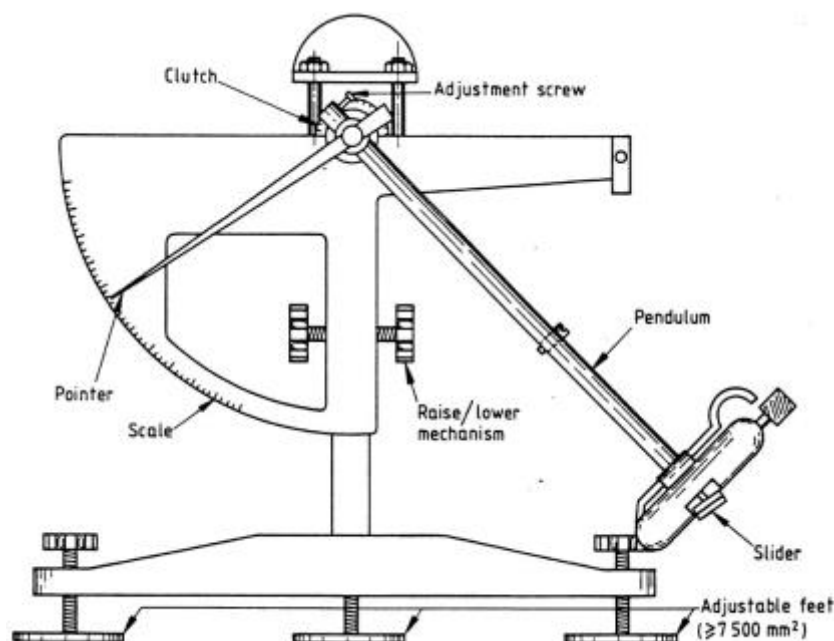


Figure 1 Apparatus for Slip Resistance (TRRL Skid Resistance Tester) After BS 7188: 1998

2.2 CRITICAL FALL HEIGHT

2.2.1 South African Standards for Impact Absorbing Playground Surfacing

SANS 51177 limits the tolerance level on impact with a surface to a Head Injury Criteria (HIC) of 1000. This limit is based on extensive research aimed at reducing deaths and permanent injuries due to head impacts. These limits were never intended to prevent other forms of injury such as long bone fractures, etc.

Compliance with SANS 51177 does not mean that injuries in the playground will be eliminated. “IAS cannot prevent accidents. They may, if correctly installed, reduce the seriousness of injury. Providers should consider surface materials as one of a range of design elements in the development of a safe and successful playground.” Fields in Trust: Play Safety Guidelines.

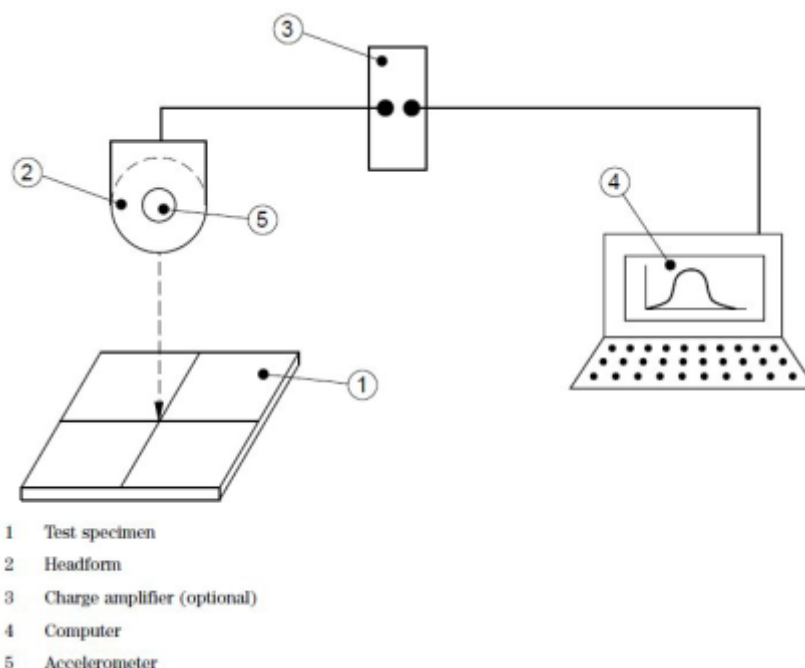
2.2.2 Critical Fall Height Value

The Critical Fall Height for a specific surface thickness is defined as the thickness of surfacing required to limit the HIC to a value of 1000.

2.2.3 Free Fall Height Comparison

The Critical Fall Height, as stated on the test certificate, (Clause 2.1.2) should be equal or greater than the ‘free fall height’ of the item of play equipment under which it is installed. The free fall height should be provided by the equipment supplier/manufacturer or calculated

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From SANS 51176: 2010.

Figure 2 Apparatus for Head Impact Criteria (HIC) After SANS 51177 (2010)

2.2.4 Maximum Free Fall Height

The maximum free height of fall for an item of play equipment is defined in the standard as follows:

- For equipment on which the child stands, it is the height of the foot platform above the ground, regardless of whether there are higher guard rails.
- For equipment on which the child hangs, it is the height of the hand support above ground level.
- For equipment on which the child sits, it is normally the height of the seat above ground level with the exception of swings (to-and-fro or rotating).
- For swings, both to-and-fro and rotating, it is the height of the seat when at an angle of 60 degrees from the vertical
- The standard suggests that low play equipment with fall heights of 600 mm and less do not require to comply with the Critical fall height requirements but the surface below should have 'some impact attenuating properties.'

2.3 EXTENT OF SURFACING

2.3.1 South African standards for Playground Equipment

The extent of surfacing required around each item of play equipment should, ideally, be provided by the equipment supplier/manufacture. In the absence of this information the area should be calculated to conform to SANS 51176.

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2.3.2 Height of Playground Equipment

The higher an item of equipment, the further away from the equipment the child could fall (Figure 3). Special rules apply to swings, slides, runways and carousels where there is horizontal movement of the equipment in use. Reference should be made to SANS 51176 Parts 1-6 for details of these specific requirements. For static and rocking equipment (including see-saws) the protected area should extend at least 1.5 metres around the equipment. This applies to fall heights from 0.6 to 1.5 metres and thereafter the distance rises to 2.5 metres around the equipment at the maximum permitted fall height of 3.0 metres (Figure 4).

2.3.3 Low Free Fall Height Equipment

Where the item of equipment is less than 600 mm in free fall height, for instance a spring mobile, it is recommended that a 'nominal' thickness of surfacing be provided to a distance of at least 1.0 metre from the item of equipment. For slide 'run-outs' and roundabouts there are specific requirements contained in SANS 51176 - 3, Section 4.8 and SANS 51176 – 5, Section 5.2.

2.3.4 Surface Tolerance (At the time of installation)

Where it is intended for the Impact Absorbing Surface to be laid either flat or to a uniform fall, any localised bumps or hollows shall be such that when a 3 m long straight edge is placed in any position on the surface, the gap between the straight edge and the surface shall at no point be greater than 8 mm, nor greater than 3 mm when a 300 mm straight-edge is placed in any position on the surface. The finished IAS shall finish flush with the top of the surrounding edging and provide no tripping hazard. Steps in excess of 3 mm between the synthetic surfacing and the surrounding area (i.e. at edges of synthetic surfacing) will not be accepted. Additionally there shall be no ridge, groove, crease or change in surface texture anywhere on the area such that would be deemed to cause a trip hazard to users (with the exception of cases covered in section 3.3).

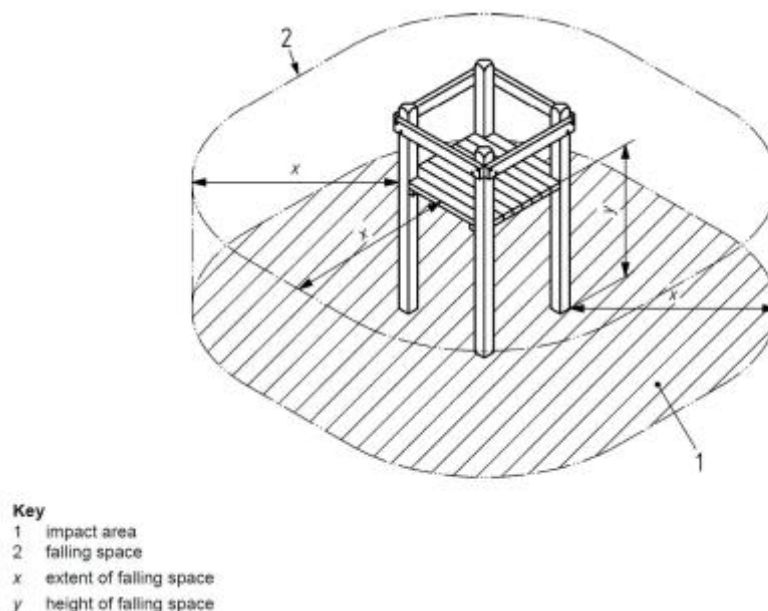
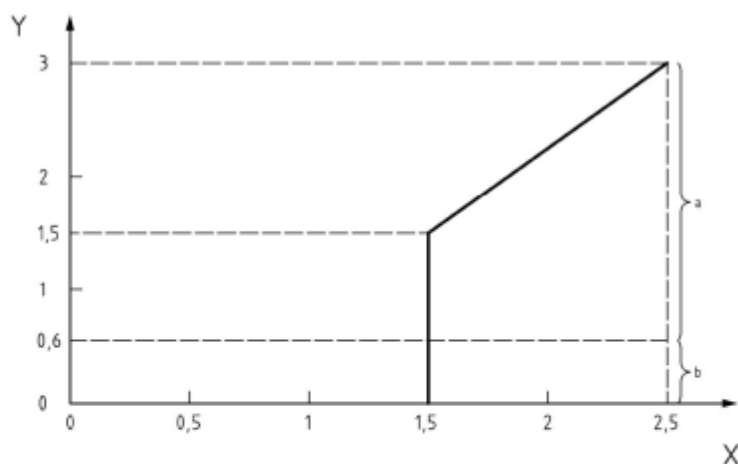


Figure 3 Falling Space Impact Area; After SANS 51176-1 (2010)

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If $0,6 \leq y \leq 1,5$ then $x = 1,5$ (in metres)

If $y > 1,5$, then $x = 2/3 y + 0,5$

Key

Y free height of fall

X minimum dimension of impact area

a impact attenuating surface with requirements

b surface with no requirements, unless there is forced movement

Figure 4 Extent of surfacing relative to free fall height; After SANS 51176-1 (2010)

The table below shows the calculated values in tabular, rather than graphic format:

FH	SURFACING EXTENT	FFH	SURFACING EXTENT
1.5m	1.50m	2.3m	2.03m
1.6m	1.56m	2.4m	2.10m
1.7m	1.63m	2.5m	2.16m
1.8m	1.70m	2.6m	2.23m
1.9m	1.76m	2.7m	2.30m
2.0m	1.83m	2.8m	2.37m
2.1m	1.90m	2.9m	2.43m
2.2m	1.96m	3.0m	2.50m

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3 SECTION THREE: BASE CONSTRUCTION

3.1 GENERAL

Wet pour IAS can be laid on most existing hard surfaces such as macadam, concrete, etc. in a good sound condition. A good quality base is an essential for a stable surface and to ensure maximum useful life from the surface.

When constructing a new play area, it is possible to install IAS at thicknesses of 40 mm, and greater, directly on to a dry-stone base without a macadam layer. When the IAS is to be laid at thicknesses less than 40mm, a bituminous macadam or porous concrete layer should always be used. If the new surfacing is designed to be porous, through drainage will only be possible if the base is also permeable.

3.2 CREATING A NEW BASE STRUCTURE

3.2.1 Site Levelling and the Formation

Turf, vegetation and topsoil should be removed from the area to a depth of at least 75 mm. If a greater depth of topsoil is present containing significant quantities of vegetable or organic matter then all such soil should be removed. The client should be consulted on disposal of topsoil and satisfactory arrangements made for use on site or offsite disposal.

The exposed formation should be compacted and levelled to a tolerance of + 25 mm/-50 mm and must provide a stable base for the foundation layer. Any soft spots that are evident should be removed and backfilled with sub-base material as described below.

3.2.2 Weed Killing

Where necessary, and when specified, the area should be treated with an appropriate herbicide following the manufacturer's recommended dosage rates and method of application. Only suitably qualified individuals should apply herbicides.

3.2.3 Geotextile Membrane

In certain cases it may be necessary to provide a separation layer at formation level using a geotextile membrane to ensure that the clean stone base is not contaminated by formation materials.

3.2.4 Foundation Layer (Sub-base)

The sub-base to any surface construction should be designed to meet the following criteria.

It should be capable of supporting – and transmitting to the existing ground – the loads of all vehicles, plant, machines and materials to be used in the construction, without causing deformation of the site.

After the surface is installed, the sub-base should be capable of supporting and transmitting all pedestrian loads on the surface without permanent or long-term deformation of the play surface. Such loads arise mainly from users and pedestrian operated, light weight maintenance equipment. In case of doubt, the installer should be consulted.

It should ensure that water, whether rainwater or natural ground water, will drain away freely through the sub-base material, either into the natural subsoil or into the drainage system.

Foundations should be constructed using hard, clean, crushed frost-resistant aggregates, such as MOT Type 1. The grading of the sub-base material must be such as to provide stability while at the same time remaining porous. The material should be laid in layers not exceeding 100mm, each layer being compacted before the next is laid. The thickness of the sub-base will depend on ground conditions and may vary between 300 mm and 100 mm.

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The minimum compacted thickness of sub-base stone should be 100mm. The sub-base material should be well compacted such that, upon completion, there shall be no detectable movement. The surface level tolerance should be within the range + 0 mm – 10 mm of the design level, and, when checked with a 3 m straight edge, there should be no deviation greater than 10 mm.

Figure 5 Typical Cross Section of Edge Detail

SEE PAGE 21

3.2.5 Perimeter Edging

A perimeter edging should be installed to contain the IAS. Pre-cast concrete kerbs, or preformed sections such as blocks or bricks, and sometimes rubber edgings, are used. A flexible aluminium section is also available which is useful where curved edges are required. Whichever detail is chosen it must be firmly bedded in concrete and be straight and level. There should be no deviation detectable by the human eye, and the level tolerances of Section 2.3.4 should apply. The level of the edging must not be higher than the IAS, since this would constitute a hazard.

3.2.6 Structural Layer (Macadam)

Bound macadam bases are the traditional form of road construction, as well as sports surfacing construction, consisting of a single course or two courses of open-textured bituminous macadam to **BS 594987:2007 and BS EN 13108-7 (Figure 5).**

A typical specification would normally include the following:

Single-course construction

An open textured binder course consisting of 40 mm nominal compacted thickness (minimum compacted thickness not less than 30 mm at any point) of 10 mm nominal sized aggregate to **BS EN 13108-7.**

The binder should be a straight run, 200 penetration, without cut-back oils and the materials should be laid and compacted to **BS 594987:2007.**

The surface tolerance of the macadam layer should be in the range +0 mm – 5 mm of the design level, and, when checked with a 3 m straight edge, there should be no deviation greater than 5 mm under a three metre straight edge placed in any direction.

Newly laid bituminous macadam will have a glossy finish and some volatile oils may be present until the surface ‘cures’. As the surface layer hardens it loses its sheen and it is recommended that the IAS layer is not installed until this curing process is complete. This is somewhat weather dependent and can be up to two weeks in the normal laying season.

3.2.7 Structural Layer (Concrete)

A structural layer may be constructed from a ‘no-fines’ concrete. No-fines concrete drains in the same way as open textured macadam and are mixed on site from clean, coarse, single sized aggregate and cement. The aggregate may be washed gravel or clean crushed rock, depending on availability. The minimum depth of the concrete layer should be 50mm.

A typical mix design would incorporate one part cement to four parts aggregate by weight and the water/cement ratio must be carefully controlled to ensure no washout of the grout.

The concrete must be protected, during the early part of the curing process, from rain and from rapid drying. This may be achieved by covering with hessian or polythene for at least 24 hours after mixing.

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The surface tolerance of the concrete layer should be in the range +0 mm – 5 mm of the design level, and, when checked with a 3m straight edge, there should be no deviation greater than 5 mm under a three metre straight edge placed in any direction.

3.3 UTILISING EXISTING HARD SURFACES AS BASES

3.3.1 General

Most hard surfaces such as asphalt, bituminous macadam, concrete, etc., will form satisfactory bases for a new IAS. If the new IAS is designed to be porous, the base must also be porous and so impervious surfaces, such as asphalt, may require to be drilled with 25 mm diameter holes, at 1.0 m centres, or as required, to ensure the porosity of the system.

Holes should be filled with pea gravel, or similar, and compacted. Where existing equipment within a play area is being retained, ground clearance must be checked between the new IAS and the platforms of the equipment, e.g. at carousels, swings, etc., to ensure requirements of SANS 51176 are met.

3.3.2 Edge Details

If the area of IAS is to be installed within a larger hard surfaced area, it is possible to cut a perimeter chase to ramp the new surface into rather than cut out and install perimeter kerbs (Figure 6). This ramp should be at a minimal gradient to avoid trip hazard and the limitations are as follows:

For IAS of 50mm thickness and less, a maximum gradient of 1 in 2

For IAS greater than 50mm thick, a maximum gradient of 1 in 2.5

Figure 6 Edge detail on existing hard surface

Trip edges must be avoided and every effort made to minimise the slope at the edge of the new IAS. The DDA (Disability Discrimination Act, 1975) suggests that, ideally, a maximum gradient of 1:12 is desirable and that for independent users of manual wheelchairs the maximum gradient should be 1:7 whilst for chairs, pushed by a helper, the maximum gradient should be 1:5.

The minimum dimensions of the perimeter chase should be 60 mm wide and 15 mm deep.

The installer should specify the dimensions of the ramped edge intended to be used for specific installations. The ramped edge should be additional to the area of IAS required and determined from Section 2.3.

4 SECTION FOUR: WET-POUR SURFACING INSTALLATION

4.1 INSTALLATION METHODS

4.1.1 Mixing

The materials for wet-pour surfacing are mixed on site in a controlled environment. The mixing process is such that only specially manufactured mechanical mixers will achieve the correct consistency of mixed material. Conventional 'cement' type mixers are not suitable for this purpose. Critical aspects of the mixing process are the time taken to satisfactorily mix an individual batch and the time taken to place the material in final position following initial addition of the binder.

4.1.2 Placing

The mixed material is normally transported from mixer to final location by dumper or barrow and placed on the prepared base by shovel, rake and/or loot. Speed of operation is of the essence due to the fact that the material will be gradually curing and will become

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difficult to work in a period, which will vary depending on the ambient weather conditions, but may be as little as fifteen minutes after mixing.

The finished level is achieved by trowelling off the polymeric mixture and compacting by a combination of hand trowelling and/or rolling with a smooth wheeled roller. On completion the finished surface should be inspected to ensure that no roller marks, in excess of the requirements in Section 2.3.4, remain. It is important to ensure that construction joints or overnight joints are kept to a minimum within each individual area of IAS. Construction joints are, however, a necessary part of the installation process and may be required due to the overall dimensions of the area, weather problems, etc. All joints should be constructed in a straight or curved line which must be regular in appearance.

Compaction must be ensured at any joints and around equipment legs, edging kerbs, etc. To aid adhesion it is advisable to prime edgings should with a diluted binder solution prior to placing the surfacing.

4.1.3 Surface Patterns

It is possible to inlay patterns of different shapes and colours within the wet-pour surface. This may increase the 'play value' of the surface and improve the aesthetics of a particular installation. These patterns of contrasting colours may be achieved by using shaped moulds of the same thickness as the top layer of IAS, manufactured from plywood, polystyrene, or similar. The basic colour of the top layer is installed with the mould in place and, when this layer has cured, the mould is removed and the contrasting colour is trowelled into the shape left by the mould.

On completion, the installer must ensure that the joint between colours is properly compacted with no trip edges or open areas at the interface.

4.2 Quality of Finished Installation

The finished installed Impact Absorbing Surface shall comply in all respects with any reference sample submitted to the client and be within the following limits:

Colour should be uniform at the time of installation, though it should be noted that, with certain colours this can be difficult to achieve. The binders which are universally used are based on MDI-type isocyanates. These chemicals go yellow/brown on exposure to light. The chemistry is similar to the 'browning' of peeled apples. The rate of colour change depends directly on UV levels and humidity during the curing period. There is no evidence to show that this phenomenon causes any deterioration of the physical characteristics of the wearing surface. It is common for the original granule colour to be gradually restored due to wear on the surface binder. Over the passage of time the effects of UV, natural ageing, weathering, light and shade, etc will have an effect on the colours of granules used in IAS.

Composition; the composition of the material installed on site shall match that of any reference samples submitted in respect of physical characteristics, i.e. thickness, density, homogeneity, weight per unit area, particle shape and size, etc.

Tensile Strength; the tensile strength of the wearing layer of any reference sample and the material installed on site, shall be greater than 0.40 MPa. The tensile strength of the supporting layer of any reference sample and the material installed on site, shall be greater than 0.10 MPa.

Elongation at Break; the elongation at break of the wearing layer of any reference sample and the material installed on site shall be nowhere less than 75 %. The elongation at break of the supporting layer of any reference sample and the material installed on site shall be nowhere less than 25 %.

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4.3 Surface Levels (At the Time of Installation)

Where it is intended for the Impact Absorbing Surface to be laid either flat or to a uniform fall, any localised bumps or hollows shall be such that when a 3m long straight edge is placed in any position on the surface, the gap between the straight edge and the surface shall at no point be greater than 8 mm, nor greater than 3 mm when a 300 mm straight-edge is placed in any position on the surface. The finished IAS shall finish flush with the top of the surrounding concrete edging kerb and provide no tripping hazard. Steps in excess of 3 mm between the synthetic surfacing and the surrounding area (i.e. at edges of synthetic surfacing) are not acceptable. Additionally there shall be no ridge, groove, crease or change in surface texture anywhere on the area such that would be deemed to cause a trip hazard to users (with the exception of cases covered in Section 3.3).

4.4 Jointing

The method of jointing shall be such that no ridge, groove, crease, or change in surface texture shall be apparent along any joint to the extent that it may cause a potential hazard to users. Cracking, splitting or separation of joints formed within in-situ surfaces is not acceptable. On completion, joints within in-situ surfaces are to be flush with no step or ridge.

4.5 Quality of Surface

The installed surfacing is to match the quality of any reference sample submitted with the tender and, if tested to the methods described in SANS 51177: 2010 and BS 7188: 1998 (incorporating amendment No.1) Impact absorbing playground surfacing – Performance requirements and test methods, the surfacing shall satisfy the performance requirements in Clause 2.1.4 above (see also 4.2 above).

5 SECTION FIVE: MAINTENANCE

There is no such thing as a maintenance free surface and all impact absorbing surface installations will require some degree of routine maintenance throughout their life. The installer should be consulted on their specific maintenance recommendations as neglecting the recommended maintenance regime may invalidate any warranty.

5.1 Moss and Algae

In certain situations and in some seasons algae or moss can become established on the surface. Since prevention is very much more effective than cure, it is important to treat the affected areas of the surface with a good proprietary moss-killer and algicide at least once a year.

Moss is not usually found on the parts of the surface that are trafficked by play, and although it may not be essential to treat these areas it is still a wise precaution to do so. However, particular attention should be paid to perimeter and other areas that are not trafficked, especially if they are shaded by walls or buildings or are overhung by trees or are under equipment. Any good proprietary product should be satisfactory provided that it is not oilbased, however, the manufacturer's instructions should be closely followed. Some installers can supply specially formulated moss-killers.

Where moss becomes established it should be treated immediately, the application being repeated after the dead spores are removed until eradication is complete. The dead moss may be removed by using pressure water jetting apparatus but care must be taken to ensure that excessive pressure is avoided as this can permanently damage the surface.

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It should be emphasised that moss is only a serious problem if it is allowed to become established. An annual prophylactic application of moss-killer is an easy way of preventing this.

5.2 Cleanliness

IAS will become contaminated with dirt from children's' shoes, windblown dust and various contaminants such as chewing gum, soft drinks, etc. The most effective method of cleaning is by use of water jetting apparatus, though chewing gum is best dealt with using a freezing spray to embrittle the gum and make it easier to remove. can supply specially formulated moss-killers.

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If the IAS is not cleaned regularly, the slip resistance will be impaired and the surface could become hazardous.

5.3 Weeds

No matter how much care is taken, weeds may occasionally appear on the surface, usually as a result of wind-blown seeds. Small numbers of weeds can be removed by hand without damaging the surface. If the weeds are removed by hand, it is important to ensure that the full root of the weed is extracted, not broken off. Some weeds are more prolific if they are simply cut off at surface level. If the weeds are deep-rooted it is advisable to kill them off with an appropriate weed-killer.

Localised areas of weed seedling infestation can be treated with domestic weed-killers without causing damage to the IAS. Oil-based weed-killers should not be used.

5.4 Snow and Ice

Snow and ice are not harmful and can be permitted to melt through. Metal shovels or scrapers may damage the surface and should not be permitted. Rock salt should not be used. In certain cases vacuum-dried salt or urea have been used as effective preventatives when applied in advance of the weather deteriorating.

If the play area is used when the IAS is in a frozen state, the degree of shock absorption will also be substantially reduced and clients should be made aware of this fact.

6 SECTION SIX: WARRANTY

6.1 General

The installing company should provide a warranty for at least a two year period after installation to cover the client for faulty workmanship and/or materials used in the installation of the surface.

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6.2 Conditions of Warranty

Any warranty given will exclude any defects which arise from:

Incorrect or inadequate maintenance

Defects in the underlying surface or foundations (where this did not form part of the installation contract)

Adverse ground conditions

Misuse and vandalism

Fair wear and tear

The defect should be reported to the installing company promptly and the company must be allowed access to examine and assess the defect.

Note:

The installing Company will pass a copy of the standard warranty in the SASPI format to the client on completion and handover of the works

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