Recycled Organics Unit

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Manufacturing Quality Products

Introduction to Australian Standard AS/NZS 4422–1996 for playground surfacing

Playground surfacing

Over the last few years in Australia and New Zealand there has been an increased interest in the use of soft surfacing underneath and around playground equipment.

This *surfacing* is variously known as soft fall, soft surfacing and undersurfacing.

Adequate surfacing is required underneath and around all playground equipment from which a child might fall, in order to reduce the effects of those falls.

Mulches with certain physical attributes — classified as *loose fill materials* — can be successfully used as soft fall. Playground surfacing, therefore, represents a potentially valuable market for recycled organic products.

The Australian and New Zealand Standard for Playground Surfacing (AS/NZS 4422–1996) gives a method for assessing the suitability of materials for use as soft fall.

The Standard simply outlines a method of determining a *head injury criteria (HIC) value*, which is a calculation of the severity of a deceleration impact on a child's brain during a fall.

The Standard also sets out requirements for the depth of undersurfacing, and a guide to allowable *free fall heights* from playground equipment onto such surfacing.

Adequate surfacing will minimise the incidence and severity of head injury, and will also reduce the occurrence of bone injury.

Organic products suitable for playground surfacing

The most suitable organic material for use as soft fall is 'soft and fluffy' size reduced bark, containing no physical contamination and no woody particles that have an ability

Plate 1. Soft-fall applied around playground equipment. The soft-fall material pictured below has been prepared from pine bark and is commercially available in New South Wales.

to splinter and cause injury (Plate 1).

Obviously, soft fall mulch needs to be contaminant free, as serious injury can result during a fall if the mulch is contaminated with hard materials such as plastics, glass, metal and stones.

Relevance to composting

Unlike mulches that are used in landscaping or gardening, mulches used as soft fall in playgrounds do not require pasteurisation to eliminate weed seeds and plant pathogens.

Soft fall mulches are applied in confined playground areas where there is minimal risk of weed seeds and plant pathogens impacting on the environment.

Organic materials that have been pasteurised or composted, however, are not likely to be suitable for use as soft fall.

This is because during the decomposition process physical structure decreases (e.g. porosity decreases and bulk density increases), making them less able to absorb or attenuate an impact during a fall.

Assessing Head Injury Criteria (HIC) Values and Critical Fall Heights for Mulched Products

Assessment of HIC and g_{max} values of a mulch allows the calculation of critical fall height.

g_{max} is the maximum deceleration experienced during an impact.

Critical fall height is defined as the minimum free fall height above which head injury is likely to occur with a particular type of soft fall material.

Materials differ in their ability to absorb the impact of a fall. Some materials can better absorb the impact of a fall, and are therefore suitable for use as soft fall surfacing beneath playground equipment where large falls can occur.

Materials with a lower ability to absorb the impact of a fall can be used as surfacing beneath playground equipment where only small falls can occur.

HIC and g_{max} values can be determined on-site with test fall headform, accelerometer and impact measurement equipment.

Such tests should be performed by an accredited laboratory or testing service.

The critical fall height of a soft fall mulch—or the maximum height a soft fall mulch can be used to safely absorb the impact of a fall—is established when the HIC value approaches 1000 or when g_{max} approaches 200.

Performance data pertaining to a batch of soft fall mulch should be provided to customers. Such information should include:

- Anticipated service life of the product when installed and maintained in accordance with the supplier's recommendations;
- Flammability of the material; and
- Instructions about correct installation, maintenance and inspection procedures.

Further details regarding the testing and use of soft fall materials for playground surfacing can be obtained from AS/NZS 4422 (1996).

Testing to Meet Requirements of AS/NZS 4422–1996

To demonstrate compliance with the Standard, samples of product need to be periodically tested by an independent off-site laboratory.

Further details regarding off-site laboratory testing can be found in Information Sheet No. 3-5.

Further details regarding product certification systems can be found in Information Sheet No. 3-2.

Definitions

Surfacing
The surface of a playground from which the use of the equipment commences.

Loose Fill Material
Material of a particulate nature, installed to a specific depth, absorbing the energy of an impact through its displacement.

Head Injury Criteria Value (HIC)
A measure of the impact severity that considers the duration over which the most critical section of the deceleration pulse persists as well as the peak level of that deceleration.

Free Fall Height
The greatest vertical distance between a part of the equipment to which the child has reasonably foreseeable access, and the surface or part of the equipment beneath.

g_{max}
The multiple of g (Earth's gravity) that represents a maximum deceleration experienced during an initial impact.

Notes:

Important references

- Standards Australia (1996). Australian Standard/New Zealand Standard 4422–Playground surfacing–specifications, requirements and test method. Jointly published by Standards Association of Australia and Standards Association of New Zealand, Homebush, NSW, Australia.

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