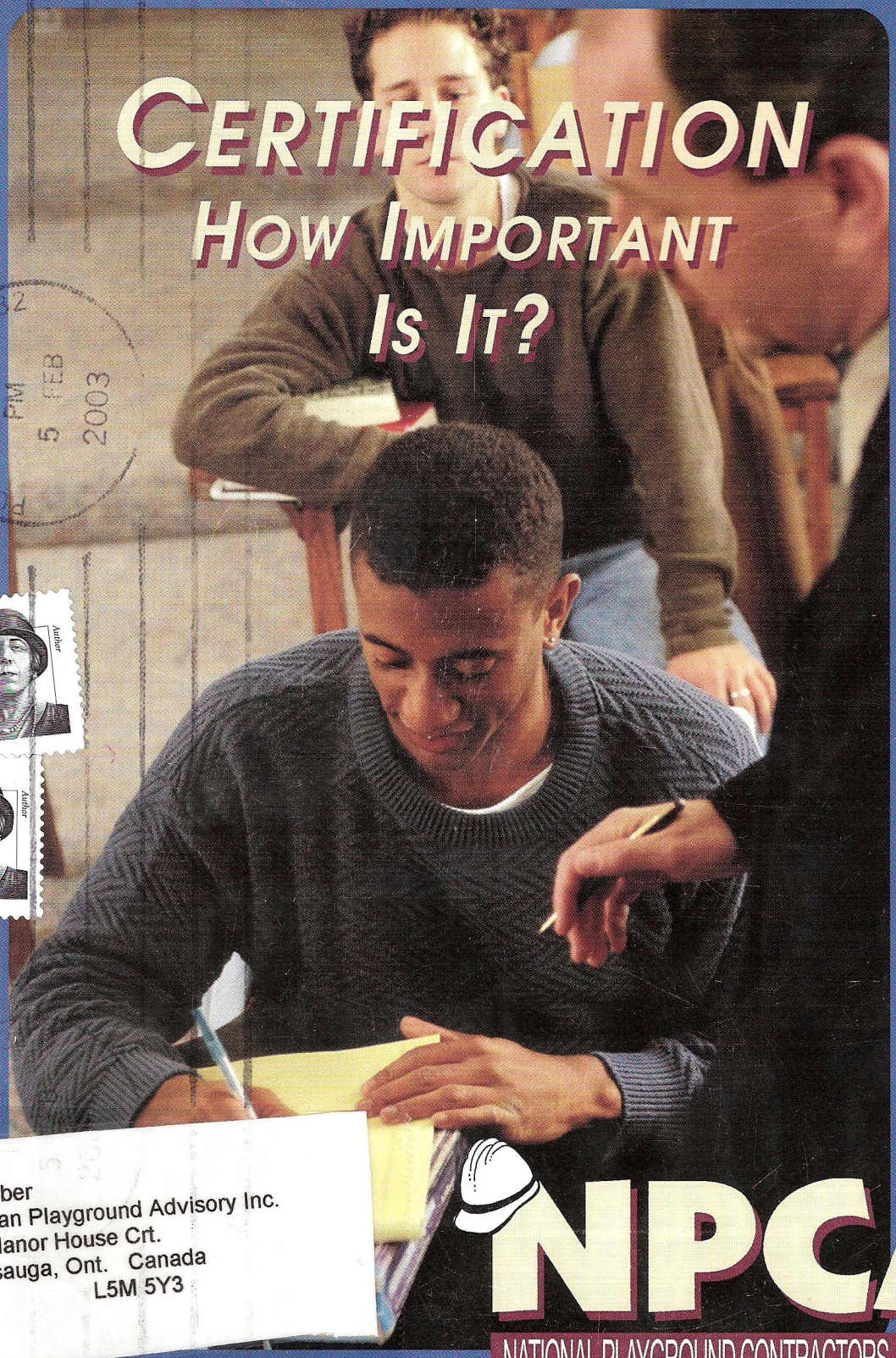
The Playbook

A QUARTERLY LOOK AT THE PLAYGROUND CONSTRUCTION INDUSTRY • FALL 2002



CERTIFICATION
HOW IMPORTANT IS IT?

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NPCA
NATIONAL PLAYGROUND CONTRACTORS ASSOCIATION
-Setting The Standard For Playground Construction-

"Do you know where you'll Land"

By Rolf Huber
EVERPLAY™ play and recreation surfaces

Injuries as a result of falls still account for up to 70% of all injuries in the playspace and the total number of injuries is on the rise rather than diminishing. The question is whether the existing Standards are able to address the issue or is the lack of inspection to the Standards and follow-up repair and maintenance the culprit? Are the injury opportunities, a circumstance or set of circumstances that could result in an injury being created by designers, manufactures, installers and owner/operators?

The latest statistics for Canada are available for the year 1996 and indicate that each year, "more than 10,000 Canadian children are injured on playgrounds". This study reported that what could be termed generally as falls (fell off equipment to bad landing) accounted for 72% of injuries. There is a tendency to understate the number of injuries as the collection of statistics in Canada, as prepared by Health Canada using the CHIRRP, are generated in only 15 hospital reporting centers across the country and then extrapolated. The injuries that are dealt with in family practices, walk in clinics and non CHIRRP hospitals are not specifically reported.

The National Electronic Injury Surveillance System (NEISS) of the U.S. Consumer Product Safety Commission considers injury data from hospitals, doctor,s offices/clinics, ambulatory surgery centers and hospital emergency rooms. In 1998 the total number of injuries for individuals under 20 was 509,650 with a total cost of US $9.8 billion. This cost includes medical, legal and liability, pain and suffering and work loss expenses. The highest cause of the injuries is impact with the surface or another piece of equipment, 74% with falls to the "protective playground surface" being 58% of total injuries. Consistently injury reports stipulate "inadequate surfacing" as the cause of an injury. If a determination is able to be made after the occurrence of an injury that the surface was inadequate, why can this determination not be made before and the problem responded to prior to the injury. Could it be that the surface in actual fact is adequate and the injury is not preventable, given that certain children will challenge themselves and the playspace as part of their normal activity.

The determination of the "adequacy" of a protective surface can only be through the application of established test methods and Standards. In Canada these Standards are the CSA Z614 and the test methods are those in ASTM F1292 and EN1177 for measuring the impact attenuation of the surface. In the United States the Standards are the ASTM F1487 and ASTM F1292. Additionally the U.S. Consumer Product Safety Commission has published a Handbook for Public Playground Safety. The goal of Standards is to eliminate the life-threatening and debilitating injury opportunity, and reduce the severity outcomes of the injury opportunities that are inherent in the activity.

What makes a surface "adequate or inadequate"? In the case of playground surfacing the measure for the Standards has been the life-threatening head injury as a result of the impact. This is measured using a scientific device (headform) that measures both the g-max (maximum deceleration experienced during impact) and the HIC (head injury criteria). Head impact injuries with a g-max not exceeding 200 or a HIC not exceeding 1000 are not believed to be live-threatening. For this reason no surface when tested while it is in service should exceed these values.

A key element for the measurement of the "adequacy" of the surface is the height from which the headform is dropped or the child could fall. The various Standards provide minimum "fall heights" for each piece of playground equipment. These are generally from the location where the manufacturer/designer of the structure have intended the children to play, commonly called the designated play surface. In some cases this does not take into consideration that children, as a part of normal play, will see challenges and take risks. The Standard for surfacing, ASTM F1292, requires that the test performed at the playspace be from the height established by the owner/operator prior to purchase. This is where the dilemma begins for the designer of the playspace.

The CSA Z614 Standard defines the fall height as "the vertical distance between a designated play surface or the top of a guardrail and the protective surfacing beneath it." In Canada the fall height is taken from the tops of guardrails on the structure, while in the case where there are barrier panels, which are to "prevent inadvertent and deliberate attempts to pass through the device and discourage climbing", the fall height is taken from the platform height. In the United States the fall height is the platform irrespective of whether there is a guardrail or a barrier. It is difficult to justify that when a child is on the protective surface outside a protective barrier that they traveled from the height of the platform and not the top of the barrier panel. As part of the due diligence, the owner/operator or the playspace designer must determine if there is an injury opportunity at a height greater than that stated as the minimum in the Standards. Liability could well extend to the installer of the playground protective surface as they would have specialized knowledge as to the properties of the surface being installed and would, by the nature of their industry, have an understanding of the "play" that could be expected.

In the case of the injury from a fall, the injury opportunity is a combination of:

- the height from which the child falls.
- the impact absorbing properties of the surface.
- the nature in which the child falls.

Horseplay or a child challenging their physical abilities beyond their capabilities is not material to the outcome if the surface upon which the child falls does not absorb the impact in the manner that has been stipulated. When the drop height for the protective surface is stipulated as the platform, the stakeholders in the playspace may have created an injury opportunity. In the case of the fall from the top of a guardrail, the

minimum additional height above the platform will be 740mm (29%), whereas for a fall from the top of a barrier panel, the minimum above the platform will be 740 mm (29%) where intended for users 2-5 years and 970mm (38%) where intended for 5-12 years. If the surface has only been installed to the minimums of the Standards, that is platform height and g-max not to exceed 200 and HIC not to exceed 1000, the additional height above the platform would be expected to result in a potentially life-threatening head injury. This failure of the understanding of the anatomy of a fall presents a serous injury opportunity throughout the playspace.

The impact absorbing properties of the surface will be set at the time of installation. The manufacturer/supplier/installer will have been presented with specific requirements prior to installation from the owner/operator as to the drop height from which the surface will be tested and the maximum g-max and HIC to be allowed. Many warranty clauses will extend this requirement for the warranty period. The owner/operator will have made an assessment of the injury opportunities on the play structure and the anticipated use of the structure by the children. The surfacemanufacturer/supplier/installer delivers a protective surface system, whether it is a synthetic unitary material or loose fill to comply with the specifications. In the case of unitary surfaces, very little change can be made to the impact absorbing properties once it has been installed. In point of fact there is a tendency with these surfaces to become more rigid over time, thereby reducing the impact absorbency. Loose fill materials are more easily modified and generally the addition of more material and increasing the depth of the surface will increase the performance characteristics in relation to impact absorption.

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All playground "protective surfaces" will have gone through a manufacturing process. In the case of loose fill surfaces, the material will have been selected (sand, pea gravel, wood, rubber chips) and the particle sizes selected through a mechanical process of crushing, cutting and/or screening. For unitary materials the selection of raw materials and the installation technique will also be developed prior to the delivery of the surface. As a result the manufacture/supplier and in most cases the installer of the "protective surface" know the performance characteristics of the material in the playspace.

It is at the time of installation of the "protective surface" that there is a physical and visual understanding of the injury opportunities of the play structure and whether the properties specified for the "protective surface" will be appropriate for the fall potential of the structure. This is the last opportunity to exercise due diligence and therefore the liability for the "protective surface" and its properties will fall upon the owner/operator, the designer of the playspace, the manufacturer/supplier of the surface and the installer of the surface. Where the surface is installed with significant injury opportunities, the rationale should be recorded for future reference.

Once the "protective surface" has been installed it must be tested at a minimum of 3 locations for each distinct play structure from the drop height specified by the owner/operator using the test method in ASTM F1292. The results are to be recorded and any areas failing the requirements of the specification are to be brought into compliance and the play structure not used until the surface complies.

What remains is the maintenance of the surface for the entire life of the playspace. This is the obligation of the owner/operator with the assistance of the surface manufacturer/supplier/installer. Maintenance instructions shall be provided to assist in this effort. In addition, it is a requirement of most surface materials and at best a good practice that any replacement, topping up or repairs to the surface be done using the same materials as originally installed.

Play must challenge a child,s mental, physical, social and emotional abilities to allow the child to learn about themselves, their peers and their environment. The playspace provides a controlled environment in which a child can develop. Because of the nature of the play participant(s) and the influences on them to challenge themselves and strive to greater achievements, there cannot be an elimination of injuries in the playspace. The best that can be done is for the providers of the playspace to understand the nature of the play that will occur and take the reasonable steps to remove the injury opportunities that could be present. The result and goal should be the elimination of the life-threatening and debilitating injury and the reduction of the severity of any other injury that might occur.