CANADIAN ASSOCIATION OF PLAYGROUND PRACTITIONERS

L'ASSOCIATION CANADIENNE DES RESPONSABLES D'AIRES DE JEU POUR ENFANTS

Probability of Injury Relative to HIC (Head Injury Criteria) Scores

When a complete annual playground inspection is presented to you, you will note a level compliance relative to the requirements of the CSA-Z614-03 Playground Standard's acceptable limits of protective surfacing impact performance.

Section 10.1 of that Standard reads as follows:

The surfacing material in the protective surfacing zone shall have a Gmax not exceeding 200 and a HIC not exceeding 1000 when tested for the defined fall height. The test methods specified in ASTM-F-1292 and CEN-EN-177 are the acceptable methods to test protective surfacing.

The Canadian Standard's maximum allowable criteria are based entirely on statistical injury data. Many sources have statistically shown that 75% of all playground related injuries occur from falls. Although there has been no direct research relating the magnitude of an impact from a playground related fall relative to the severity of injuries sustained, both CSA and ASTM (American Society for Testing and Materials) have based their acceptable limits on data from experiments completed within the automotive and aircraft fields. The following chart represents probability data published within the ASTM-F1292-04 Standard that forms the basis for CSA's maximum allowable and acceptable HIC score of 1000.

Probability of Head Injury Relative to HIC Score

HIC Score	Minor Injury	Moderate Injury	Critical Injury	Fatal
0	0%	0%	0%	0%
250	40%	20%	0%	0%
500	80%	40%	2%	0%
750	95%	70%	4%	0%
1000	98%	90%	8%	2%
1250	100%	95%	10%	2%
1500	100%	98%	20%	4%
1750	100%	100%	45%	10%
2000	100%	100%	70%	30%
2250	100%	100%	90%	70%
2500	100%	100%	95%	90%
2750	100%	100%	98%	95%
3000	100%	100%	100%	100%

The values shown on this chart emphasize the importance of proper and effective playground surfacing. Even with an HIC score of 500, which is well below the acceptable CSA test limit, there is still an 80% chance of a "minor" injury and a 40% chance of a "moderate" injury!

Note: for this purpose, ASTM has defined a minor injury as: "a skull trauma without loss of consciousness; fracture of nose or teeth; superficial face injuries" and a moderate injury as: "a skull trauma with or without dislocated skull fracture and brief loss of consciousness. Fracture of facial bones, without dislocation; deep wound(s)."

The above chart along with the impact test data results included within your inspection report should assist you in developing a specific maintenance program relative to your particular protective surfacing needs and performance.

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