



TEST REPORT

**Illinois Park and Recreation Association
Playground Surfacing Project
106 N. Schmale Rd.
Carol Stream, IL 60188**

**DTL REPORT NO. 082379-1
REPORT DATE 1/13/04
RECEIVE DATE 1/6/04
CUSTOMER REF 123003 ES**

ATTN: Ms. Elaine Sherman

SAMPLE DESCRIPTION

Illinois Park and Recreation Association submitted a combination of surfacing materials identified as Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. wt. mat. The assembled system included 22" x 18" geo-textile fabric bags filled with granular rubber, overlaid with approximately 1" depth loose fill rubber and topped with rubber mat designated 1.2 pound weight mat. Testing was performed on 1/7/04 and 1/13/04.

WORK REQUESTED/TEST SPECIFICATIONS

Wheelchair Accessibility Testing

1. Wheelchair work measurement method – straight propulsion with no material on a flat surface with a grade of 7.1.
2. Wheelchair work measurement method – straight propulsion with material and no grade.
3. Wheelchair work measurement method – turning 90° with no material on a flat surface with a grade of 7.1% .
4. Wheelchair work measurement method – turning 90° with material and no grade.

ASTM F1951-99, Determination of Accessibility of Surface Systems Under and Around Playground Equipment

Head Impact Attenuation

To perform testing to determine maximum critical fall height of Illinois Playground Safety Surfacing - Bag System "A" with 1.2 lb. Wt. mat at temperatures of -6°C, 23°C and 49°C, per ASTM F1292-99.

*Note: Illinois Park and Recreation Association requested to use temperature of -6°C.

ASTM F1292-99, Impact Attenuation of Surface Systems Under and Around Playground Equipment.

CONCLUSION

Wheelchair Accessibility Test

ASTM F1951-99, the average work force per Newton meter measured lower when rolling over the Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. Wt. mat than when rolling over a flat surface with a grade of 7.1%. The tested material, Illinois Playground Safety Surfacing bag system "A" with 1.2 lb. wt. Mat, has met the requirements of the above specification.

Head Impact Attenuation

The material thickness indicated above met HIC, (Head Impact Criteria), and G-Max requirements at the fall height indicated per ASTM F1292-99. The results reported herein reflect the performance of this playground surface system at the time of testing and at the temperatures indicated. Performance will vary with temperature, moisture content and other factors.

The maximum critical fall height of the Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. Wt. mat was determined to exceed Detroit Testing Laboratory's maximum test parameters of thirteen (13)ft.

TEST RESULTS

Wheelchair Accessibility

Test material, Illinois Playground Safety Surfacing Bag System “A” with 1.2 lb. Wt. Mat, was placed into test fixture following instructions submitted by the Illinois Park and Recreation Association. The system base included 22” X 18” Geo-textile fabric bags filled with granular rubber overlaid with approximately 1” depth loose fill rubber. The base material was compacted utilizing 6” diameter pneumatic compactor atop a ½” thick plywood sheet. The system was topped using a 1.2 lb. Wt. Rubber mat.

Sample material was tested propelling the wheelchair with four even pushes across the material within eight seconds. This procedure was repeated five times for each test, (straight and turn propulsion).

Wheelchair Rider Weight – 164.3 lbs.

Total weight, (Rider and wheelchair combined), = 199.4 lbs.

Run #	No Material work per Newton meter, (N·m)	With Material work per Newton meter, (N·m)
Straight Run 1	13.021	12.489
Straight Run 2	13.287	11.871
Straight Run 3	13.069	11.250
Straight Run 4	13.115	12.127
Straight Run 5	12.944	11.461
Average	13.068	11.819
Turn Run 1	13.896	8.456
Turn Run 2	13.351	7.984
Turn Run 3	13.690	7.957
Turn Run 4	13.774	7.093
Turn Run 5	13.613	8.084
Average	13.692	8.008

ASTM 1951-99 Work per meter average was determined discarding the high and low work per Newton meter values and averaging the remaining three trials.

Average work per Newton meter straight, no material, grade of 7.1% = 13.068(N·m)

Average work per Newton meter straight with material = 11.819(N·m)

Average work per Newton meter turn, no material, grade of 7.1% = 13.692(N·m)

Average work per Newton meter turn with material = 8.008(N·m)

The average work per Newton meter values for straight propulsion and for turning with material should be less than the average of work per meter for straight and turning on flat surface with a grade of 7.1%.

Head Impact Attenuation

Test material, Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. Wt. Mat, was tested to determine the maximum critical fall height at temperatures of -6°C, 23°C, and 49°C. An impact test consists of three drops at the same impact site at each height. Calculate the average of the second and third drops.

Note: DTL's maximum system parameters were attained at 13 feet while testing the material. Consequently, DTL reports impact evaluation at 11', 12' and 13' drop heights.

Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. Wt. Mat, (-6°C)

Drop #	Height ft.	HIC	Peak G-Max
1	11	640.44	90.25
2	11	557.06	84.25
3	11	551.03	84.25
Average		554.04	84.25
1	12	643.78	89.25
2	12	633.82	90.25
3	12	629.63	89.25
Average		631.72	89.75
1	13	532.35	88.25
2	13	607.38	93.25
3	13	575.97	91.25
Average		591.67	92.25

Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. Wt. Mat, (23°C)

Drop #	Height ft.	HIC	Peak G-Max
1	11	519.91	83.25
2	11	404.84	71.25
3	11	396.46	68.50
Average		400.65	69.87
1	12	459.51	73.25
2	12	439.37	73.25
3	12	438.37	72.00
Average		438.87	72.62
1	13	531.84	79.50
2	13	521.20	78.25
3	13	521.65	79.50
Average		521.42	78.87

Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. Wt. Mat, (49°C)

Drop #	Height ft.	HIC	Peak G-Max
1	11	522.72	93.25
2	11	384.67	77.25
3	11	354.94	74.25
Average		369.80	75.75
1	12	426.38	80.00
2	12	352.12	79.25
3	12	390.68	75.50
Average		371.40	77.37
1	13	697.50	107.25
2	13	528.86	90.25
3	13	454.14	90.25
Average		491.50	90.25

*For head impact graphs of Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. Wt. Mat, please refer to Attachment A, (27 pages)

Requirements

ASTM F1292-99, using an average of the last two (2) of three (3) drops, no value shall exceed 200 G-Max or 1000 HIC.

TEST EQUIPMENT

Detroit Testing Laboratory, Inc.'s calibration system meets the requirements of ISO 17025:1999.

Wheelchair Accessibility

- DTL Wheelchair Accessibility fixture
- Lebow Strain Gauge Reaction Torque Sensor, Model 2110-110-500, ID# 09715-Z, calibrated to 8/25/04
- Daytronics Signal Conditioner, Model 3370, ID# 09357, calibrated to 9/18/04
- Quickie Wheelchair, Model Q2, N.C.R.
- Taylor Digital Humidiguide, Model 5566, ID #09887 calibrated to 04/25/04
- GSE 620 weight indicator, ID #02259, calibrated to 7/21/04
- Mitutoyo Digital Protractor, Model Pro 360, ID#09696, calibrated to 6/2/04
- 6" diameter pneumatic compactor, Rental, No calibration required

Head Impact Attenuation

- K.M.E., HIC Computer, Model 300 Series, ID #08392, calibrated prior to use
- Piezotronic Accelerometer, ID #09119, calibrated to 9/08/04
- DTL impact tower, guided wire, ID #08704, no calibration required
- ANSI "C" Headform – per designation F355-95, no calibration required
- Thermotorn Environmental Chamber, ID #ECO10 , calibrated to 12/24/04
- Thermotron Environmental Chamber, ID #ECO34 , calibrated to 11/19/04
- Tape measure, Craftsman ID #10285, calibrated to 4/11/04

SAMPLE DISPOSITION

Sample material, Illinois Playground Safety Surfacing Bag System "A" with 1.2 lb. Wt. Mat, will be retained by DTL for 30 days then disposed of at the discretion of DTL unless otherwise instructed by Illinois Park and Recreation Association.

Reported by:

DETROIT TESTING LABORATORY, INC.

Keith A. Ward
Test Technician

David Splane
Certification Programs Coordinator

KW/DS/jg

Enclosure: Terms and Conditions