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Surface Testing Report - ASTM F 1951 - 99

Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

SUMMARY OF RESULTS

Beneficial Designs, Inc. received a surfacing sample from **Invisible Structures, Inc.** classified as surface stabilizer with the brand name **Gravelpave2**. This sample of Gravelpave2 met the maneuverability performance requirements of ASTM F 1951-99.

Report prepared by: *Denise Chesney*
Denise Chesney, Director of Research

21 September 1999
Date

TEST SPECIMEN

Manufacturer **Invisible Structures, Inc.**
Name **Gravelpave2**
Type surface stabilizer
Source **Invisible Structures, Inc.**
Mfr's lot no. unknown
Date of manufacture unknown
Thickness N/A

TEST DATE

25 August 1999

TESTING CONDITIONS

Surface water content N/A
Surface temperature 86 deg F
Atmospheric temperature 86 deg F
Relative humidity 42 %

INSTALLATION, LEVELING & COMPACTION

Gravelpave2 was installed over a 6-inch layer of compacted 3/4 inch road base. Gravelpave2 was installed rings up, and secured to the base material with anchor pins. The rings were filled with 3/16 inch granite screenings such that just the top of the rings were visible.

TEST WHEELCHAIR & RIDER

Manufacturer Sunrise Medical/Quickie
ID no. none
Model Quickie II
Weight 33.2 lb.

Weight of test wheelchair rider 165 lb.
Front-to-rear weight distribution of wheelchair-rider system 41 % - 59 %



WHEELCHAIR WORK MEASUREMENT METHOD RESULTS

Straight Propulsion on Gravelpave2

	Work per meter (N*m)	Trial Time (sec)
Trial 1	26.0	8.0
Trial 2	25.1	7.9
Trial 3	26.8	7.7
Trial 4	30.3	7.6
Trial 5	25.1	7.8

Average work per meter (n=3) = **26.0 N*m**

Turning on Gravelpave2

	Work per meter (N*m)	Trial Time (sec)
Trial 1	29.6	6.8
Trial 2	30.4	7.1
Trial 3	32.1	7.0
Trial 4	29.1	7.6
Trial 5	28.6	7.5

Average work per meter (n=3) = **29.7 N*m**

Straight Propulsion on 7.1% Ramp*

	Work per meter (N*m)	Trial Time (sec)
Trial 1	69.6	7.4
Trial 2	70.9	8.0
Trial 3	69.7	7.7
Trial 4	69.2	7.3
Trial 5	67.4	7.6

Average work per meter (n=3) = **69.5 N*m**

Turning on 7.1% Ramp*

	Work per meter (N*m)	Trial Time (sec)
Trial 1	52.8	6.6
Trial 2	50.8	6.6
Trial 3	51.6	6.6
Trial 4	50.6	6.5
Trial 5	52.7	7.1

Average work per meter (n=3) = **51.7 N*m**

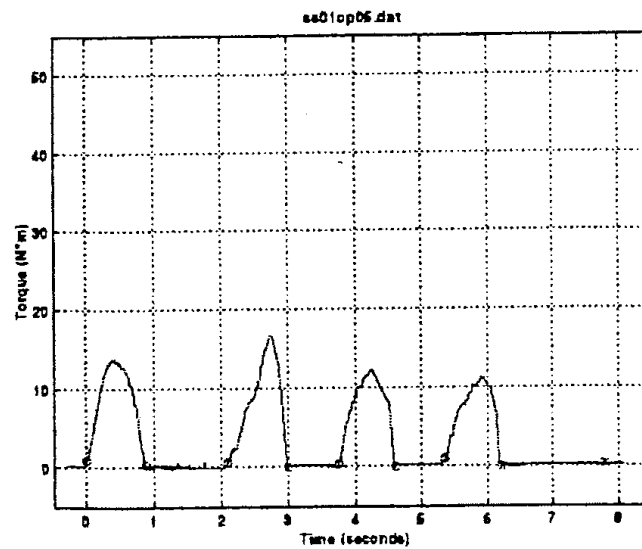
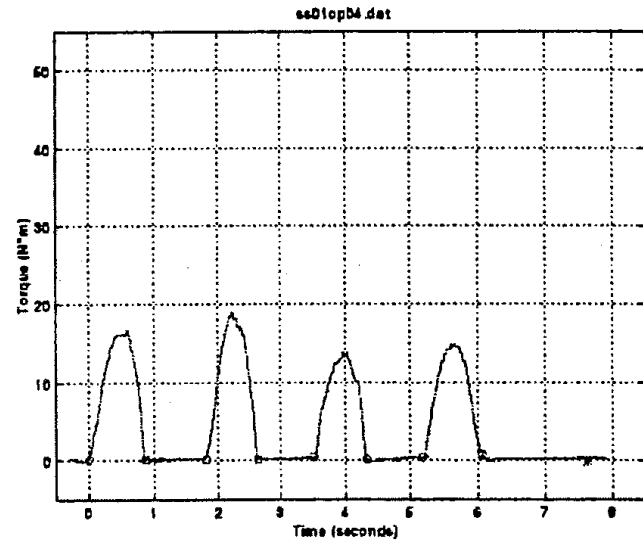
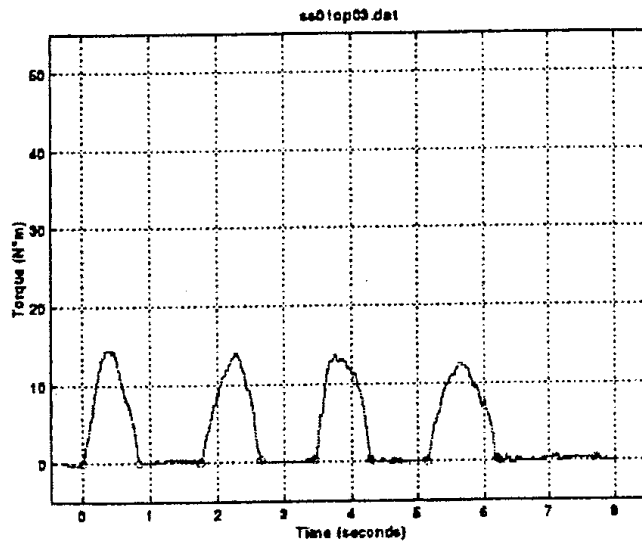
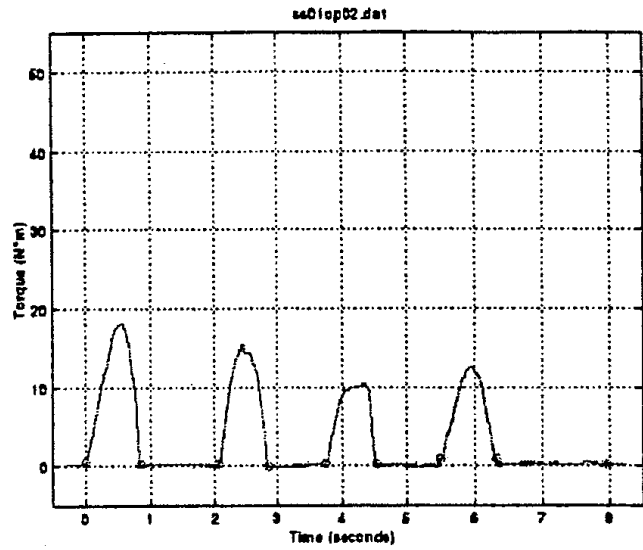
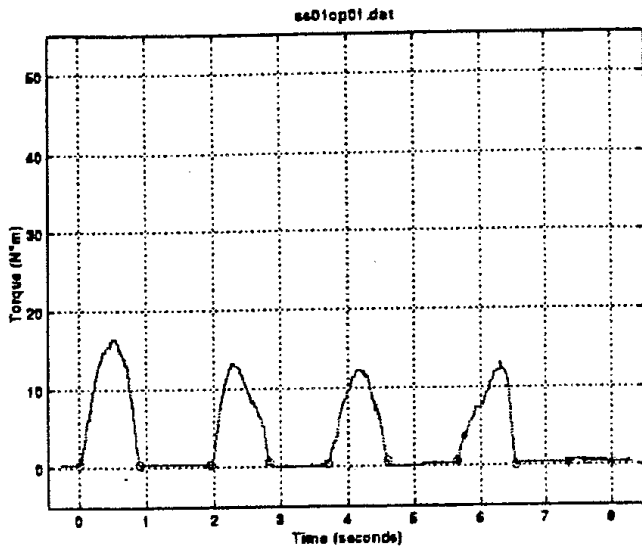
* Hard smooth surface with grade of 7.1+/-0.2% (1:14)

Straight Propulsion Work Ratio **0.374**

Turning Work Ratio **0.574**

Work ratio = Avg work on surface/Avg work on 7.1% ramp. If both the straight propulsion and turning work ratios are less than 1.00, the surface system meets the performance requirements of F 1951-99.

ASTM F1951 – 99 Part 6: Wheelchair Work Measurement Method – Straight Proj Invisible Structures, Inc. – Gravelpave2



ASTM F1951 – 99 Part 7: Wheelchair Work Measurement Method – Turning Hard, smooth surface with a grade of $7.1 \pm 0.2\%$ (1:14)

