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ASTM F 1951-09b Surface Testing Report

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 **NDS** classified as subsurface structure with the brand name **EZ Roll Grass Paver**. This sample of EZ Roll Grass Paver **met** the maneuverability performance requirements of ASTM F 1951-09b.

Report prepared by: Peter Axelson, Testing Supervisor — 26 October 2012 Date

TEST SPECIMEN

Manufacturer	**NDS**
Name	**EZ Roll Grass Paver**
Type	subsurface structure
Source	Lindsay, CA
Mfr's lot no.	Not Applicable
Date of manufacture	06/18/2012
Thickness	6 in.

TEST DATE

11 October 2012

TESTING CONDITIONS

Surface water content	N/A
Surface temperature	55 deg F
Atmospheric temperature	55 deg F
Relative humidity	48 %

INSTALLATION, LEVELING & COMPACTION

Top soil was installed and compacted every 2 inches using a 10" x 10" hand tamp to a total depth of 4 inches. The EZ Roll surface was rolled out over the compacted top soil. The EZ Roll grid surface was filled with top soil, and then covered with sod. The sod was then compacted into the grid using a 10" x 10" hand tamp. The total depth of the installation was 6 inches. This system was watered every day and mowed as needed. The grass was cut to a length of 1.5 to 2.0 inches above the soil 1 week prior to testing.

See Appendix A for photo.

TEST WHEELCHAIR & RIDER

Manufacturer	Sunrise Medical/Quickie
ID no.	none
Model	Quickie II
Weight	31.5 lb.

Weight of test wheelchair rider	170 lb.
Front-to-rear weight distribution of wheelchair-rider system	40% - 60%

WHEELCHAIR WORK MEASUREMENT METHOD RESULTS

Straight Propulsion on EZ Roll Grass Paver

	Work per meter (N*m)	Trial Time (sec)
Trial 1	54.3	6.5
Trial 2	54.5	6.9
Trial 3	58.0	7.4
Trial 4	48.6	7.4
Trial 5	53.7	7.4

Average work per meter (n=3) 54.2 N*m

Turning on EZ Roll Grass Paver

	Work per meter (N*m)	Trial Time (sec)
Trial 1	53.3	6.5
Trial 2	50.6	6.5
Trial 3	52.9	7.1
Trial 4	50.9	7.1
Trial 5	57.6	7.2

Average work per meter (n=3) 52.4 N*m

Straight Propulsion on 7.1% Ramp*

	Work per meter (N*m)	Trial Time (sec)
Trial 1	75.1	6.5
Trial 2	74.3	6.4
Trial 3	74.9	6.6
Trial 4	71.1	6.6
Trial 5	74.4	6.9

Average work per meter (n=3) 74.5 N*m

Turning on 7.1% Ramp*

	Work per meter (N*m)	Trial Time (sec)
Trial 1	57.1	7.7
Trial 2	59.7	6.5
Trial 3	59.6	7.2
Trial 4	59.8	7.4
Trial 5	59.7	7.3

Average work per meter (n=3) 59.7 N*m

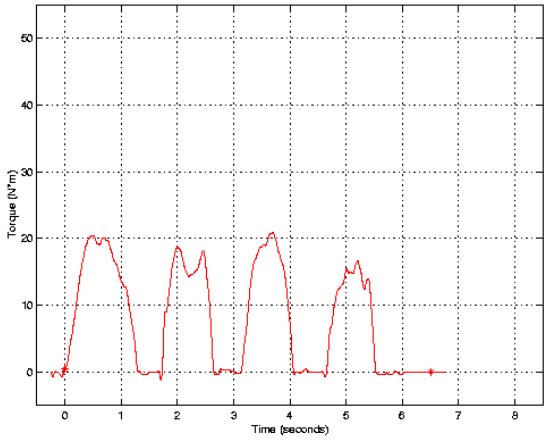
* Hard smooth surface with grade of 7.1+/-0.2% (1:14)

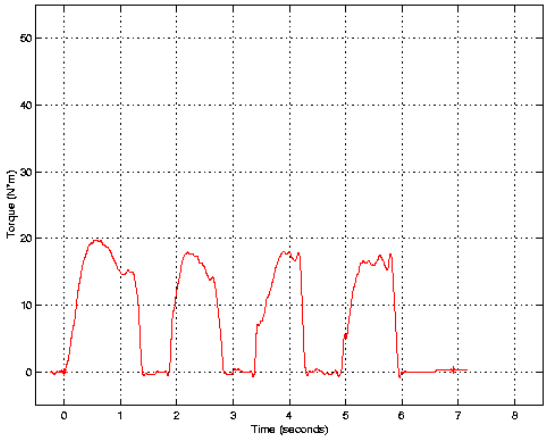
Straight Propulsion Work Ratio 0.727

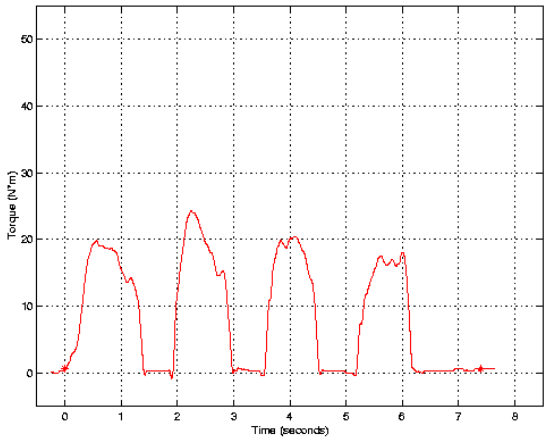
Turning Work Ratio 0.878

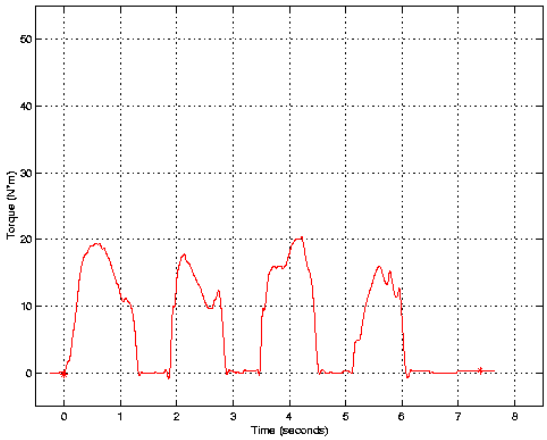
Work ratio = Avg work on surface/Avg work on 7.1% ramp. If both the straight propulsion and turning work ratios are less than 1.00, the surface system meets the performance requirements of F 1951-09b.

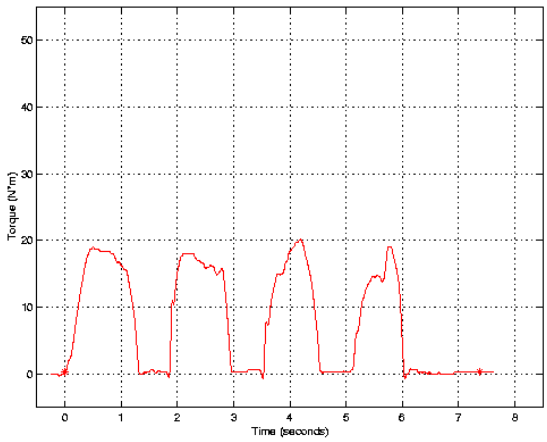
ASTM F1951 – 08 Part 6: Wheelchair Work Measurement Method – Straight Propulsion
NDS – EZ Roll Grass Paver



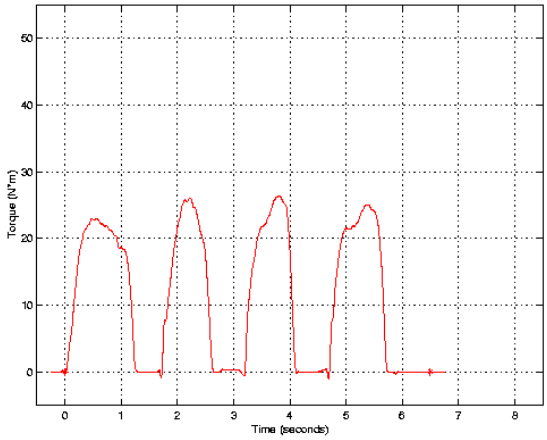


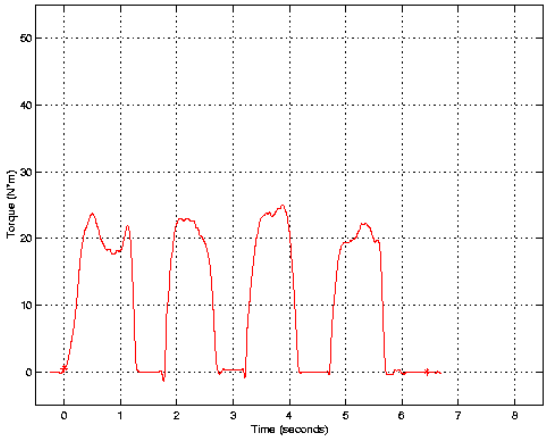


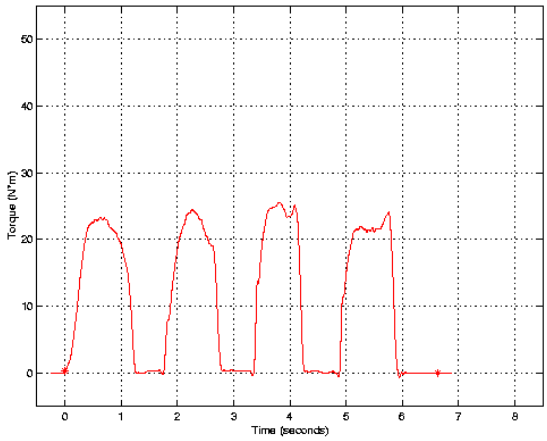


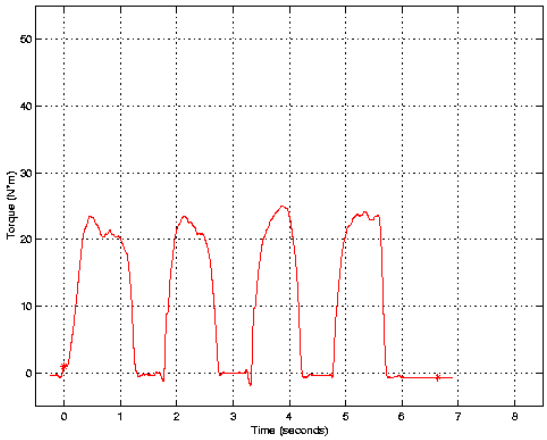


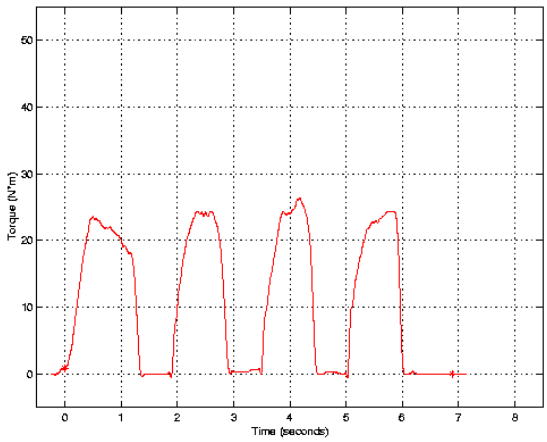
ASTM F1951 – 08 Part 6: Wheelchair Work Measurement Method – Straight Propulsion
Hard, smooth surface with a grade of 7.1 ± 0.2% (1:14)



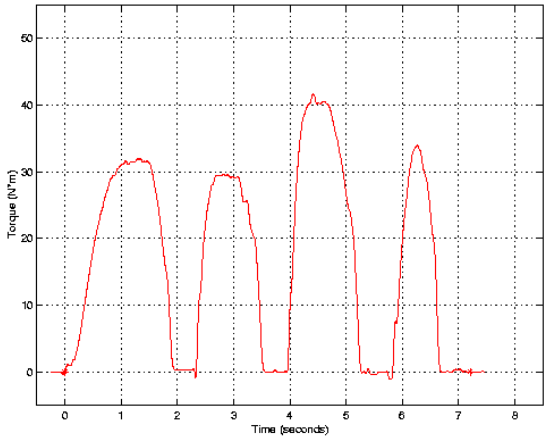


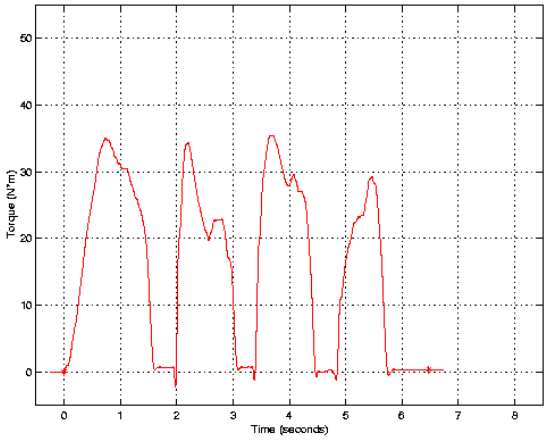


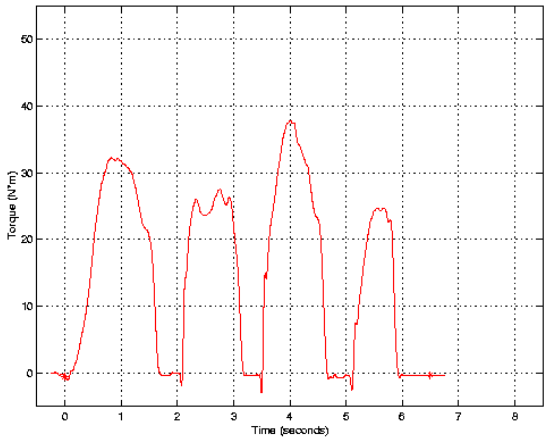


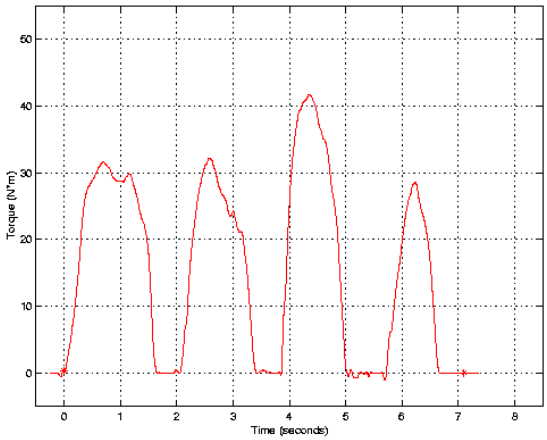


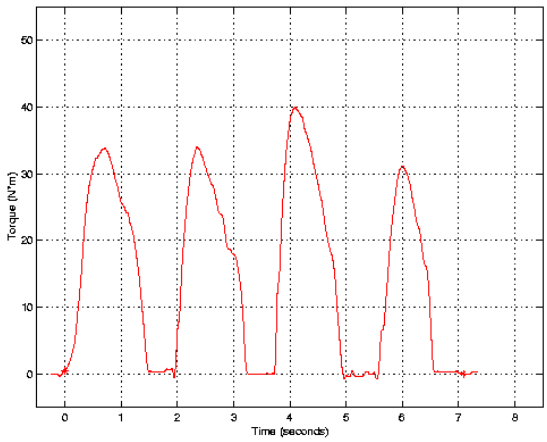
ASTM F1951 – 08 Part 7: Wheelchair Work Measurement Method – Turning
NDS – EZ Roll Grass Paver



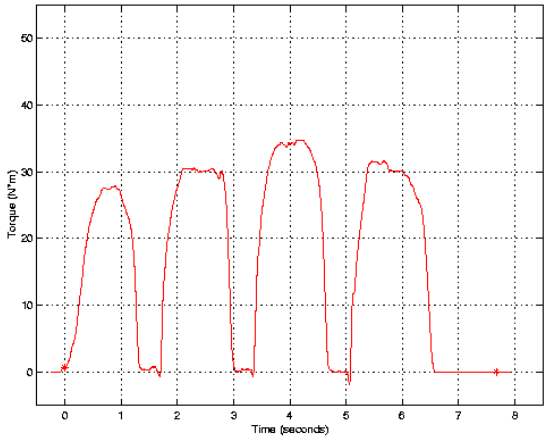


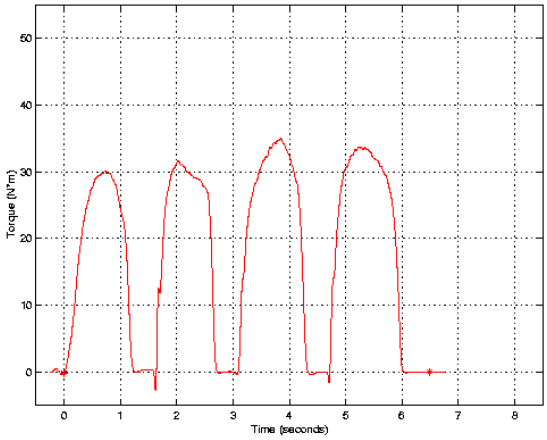


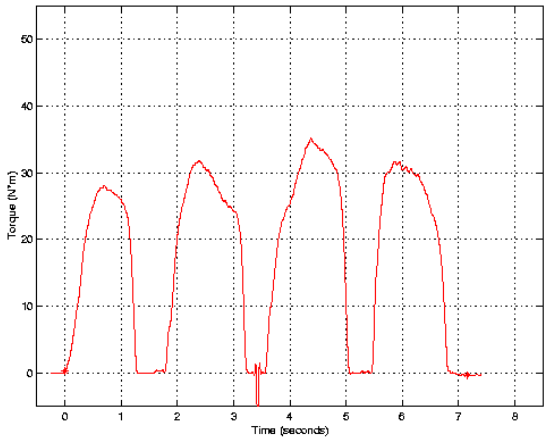


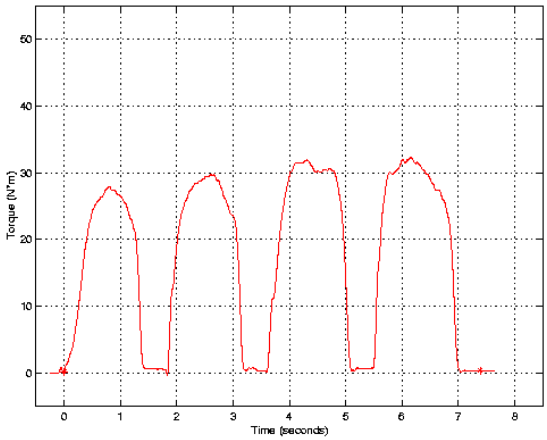


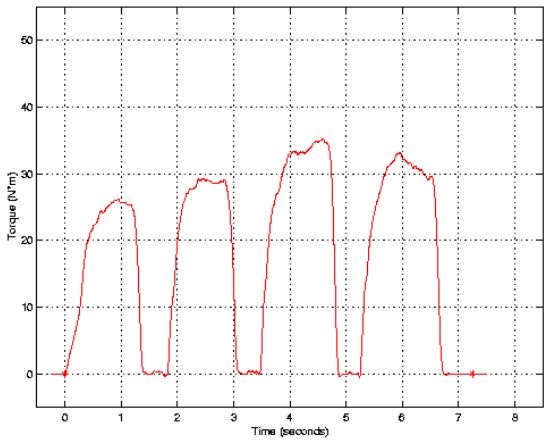
ASTM F1951 – 08 Part 7: Wheelchair Work Measurement Method – Turning
Hard, smooth surface with a grade of 7.1 ± 0.2% (1:14)











Appendix A