

## Making Assistive Technology and Rehabilitation Engineering a Sure Bet

### **Impact of Cross Slope and Surface Type on Wheelchair Propulsion**

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#### **ABSTRACT**

The objective of this study was to evaluate wheelchair propulsion biomechanics under cross-slope degrees and surface types. Testing course consisted of three cross-slopes (0°, 1°, and 2°) and three types of surfaces (Blind-Guide, Teflon, and Wood). We compared biomechanics data using two-way repeated-measures ANOVA. The result showed that the resultant force, torque, and cadence were not significantly different between surface types and cross slope conditions. While self-selected speeds decreased with the increase of cross slope angles ( $p=0.026$ ) and subjects tended to slow down on the Teflon surface. Push angle had liner decreasing relation with increasing cross slope angles and remained consistently larger among subjects on the Teflon surface. These results indicate that slight cross-slopes, slippery and rough surfaces may not result in significant biomechanics loading on a short duration. However, the difference noted between degrees and surfaces highlight the change of push pattern and decrease propulsion efficiency.

#### **KEYWORDS**

Cross-Slope; Surface Type; Kinetic; SmartWheel, Wheelchair Propulsion

#### **ACKNOWLEDGEMENTS**

This work is supported in part by the US Access Board TPD-ARC-07-00090 and the U.S. Department of Veterans Affairs, Rehabilitation Research and Development Service Center of Excellence for Wheelchairs and Rehabilitation Engineering (B3142C).

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