



Working toward
universal access
through research,
design & education

December 2014

Dear Friends & Supporters,

The Beneficial Designs' team had a busy year.

Our wheelchair test lab was quite busy this year and we continue to devote time and resources to wheelchair standards development. The trails and pedestrian access components of Beneficial Designs continue to grow. We are developing new technologies with USDA government-funded research and development that improve the efficiency of conducting assessments of outdoor recreation environments.

We are pleased to announce the availability of the 100 Series Rotational Penetrometers (RP), a portable, instrumented surface indenter for measuring the firmness and stability of all types of indoor and outdoor ground and floor surfaces, from carpet to wood chips to sand. The new 100 series RP model has increased accuracy and measures with a resolution of 0.0005 inches. The durability and precision of the RP has been greatly improved. For more information or an order form, visit:

<http://beneficialdesigns.com/products/surface-measurement-accessibility>

As a result of our work through our RERC RecTech on the Development of Uniform Standards for Accessible Fitness equipment, two standards addressing general criteria of all fitness equipment were published through ASTM this year. See news release:

www.astm.org/standardization-news/update/inclusiveuse-fitness-equipment-ja13.html

Our team for the RERC for the Advancement of Cognitive Technologies on the Development of Uniform Standards for Cognitive Technologies is seeking input on product usability, see:

www.facebook.com/CognitiveAccessibility

www.beneficialdesigns.com/universal-design-and-standards/development-of-uniform-standards-for-cognitive-technologies/survey

We are now offering sidewalk assessment services as a result of the successful completion of our Automated Public Right-of-Way Assessment Process. The associated equipment reduces the time to identify safety hazards and access issues in the sidewalk environment by 80 to 90%. The work was highlighted in the December 2013 issue of Wired Magazine.

We would like to share with you the status of our current projects and our successes over the last year. Thank you for your continued support of our work. We wish you the very best for the New Year!

STAFF

- ❖ **Peter Axelson**, Founder and Director of R&D, presents our work worldwide. He loves spending time with his daughter and is an avid mono-skier and pilot.
- ❖ **Allison Ansel**, Office Assistant, attends Douglas High School and enjoys a good book, listening to music, and playing her trombone.
- ❖ **Bill Blythe**, Technical Assistant, he enjoys spending time with his wife, likes to cook, play guitar, work with computers, and leads music at his church.
- ❖ **Barton Cline**, Software Developer and Electronics Technician, enjoys in-depth Bible study, family time, languages (incl. computer lang.), and loves his job.

- ❖ **Jaime McGuire**, Marketing and Project Manager, is attending Law School and enjoys spending time with her husband as well as dancing and singing.
- ❖ **Maegan McKean**, Office Assistant, attending WNC, loves a good book, running, acting, and playing the piano.
- ❖ **Stephen Pieters**, Wheelchair Technician, is happily married, enjoys riding motorcycles, fishing, and spending as much time as possible in the outdoors.
- ❖ **Paul Schnorbus**, Machinist, likes Legos, machining, target shooting, camping, and a well-told story.
- ❖ **Samuel Schnorbus**, Shop Assistant, attends WNC classes and enjoys snowboarding, paintballing, and shooting.
- ❖ **Stephanie Schnorbus**, Office Manager, enjoys making music, laughing with family and friends, and trying recipes from her grandmother's cookbooks.
- ❖ **Sierra Stulac**, Office Assistant, studying Psychology at UNR, loves to dance, run, and bake.
- ❖ **Cameron Tolbert**, Shop Assistant, a student at Douglas High School who enjoys playing drums, piano, and anything you can hit to make noise (which includes everything).
- ❖ **Nathan Tolbert**, Sidewalk Assessment Coordinator, loves hiking, fishing, and camping with his wife and sons, and enjoys coaching high school basketball.
- ❖ **Paola Vazquez**, Office Assistant, is homeschooled and enjoys being with family, jogging, and working with children.
- ❖ **Sharon Vazquez**, Office Assistant, loves to read, spend time with her family, and bake.

CONSULTANTS

- ❖ **Mary Axelson**, Technical researcher and writer for the Cognitive Technologies Standards project, loves to read, write, and roam the Colorado Mountains with her husband and teenage daughter.
- ❖ **Ben Hubbard**, Graphic Artist, is currently traveling on charity work with his wife and loves to paint and hike.
- ❖ **Seanna Kringen**, Research Associate, focuses on universal design projects, enjoys traveling with her husband and three children.
- ❖ **Mike Passo**, Trails Project Specialist, provides technical expertise in trail accessibility and sustainability.
- ❖ **Carla Shepard**, is now the fulltime bookkeeper at Max Mobility, for past employee Mark Richter, making the new SmartDrive. Carla continues to assist with our grant work accounting as a consultant.
- ❖ **Jo Anne Snarr**, Accountant, owner of The Balance Sheet, is our bookkeeper working here in the Carson Valley. Jo Anne loves to ride her bike, ride horses, and play golf when she is not crunching numbers.
- ❖ **Jeremy Vican**, Trails Assistant, enjoys hiking, photography, and trail-related projects.

BOARD MEMBERS

- ❖ **Bill and Nancy Axelson**, Mr. and Mrs. Ax have long advised BD on a variety of financial, management and marketing issues. They continue to provide advice and guidance. Bill has an extensive background in sales and marketing. Nancy is an accomplished watermedia artist.
- ❖ **Chris Lynskey**, is intimately familiar with the sidewalk assessment process and with his vast range of financial and management experiences, he is able to guide and advise BD when needed. He loves golf, skiing and gets regular exercise when he and his wife are walked by Micah their golden retriever.

INTERN

- ❖ **Irene Hsu**, Intern, working on the DORAP project at BD as part of her clinical doctorate work in occupational therapy (Washington Univ., St. Louis), enjoys sports – badminton, basketball, volleyball – and is learning to ski.

UTAP & TrailWare^{2.0} Workshops

NIH/NICHD SBIR Phase II Grant #2 R44 HD29992-02

NIH/NICHD SBIR Phase II Grant #2 R44 HD36538-02



There are currently over 1,100 trail enthusiasts who have been trained to lead assessments using the Universal Trail Assessment Process (UTAP). Workshops have been held this year by the Florida Parks Service

in April and by Beneficial Designs at the California Trails and Greenways Conference in Palm Springs, CA in May. Beneficial Designs also conducted training for the National Parks Service and Conservancy at the Golden Gate National Recreation Area, as well as a trail assessment project and specialized training for the State of Hawaii, Division of Land and Natural Resources on the Island of Maui in April of this year. Scheduled Trainings for 2015 include one in mid May at the 2015 International Trails Symposium in partnership with the Professional Trail Builders Association sustainable Trails Workshops and Outdoor Demo Area. Beneficial Designs provides the UTAP training materials and tools through PaxPress while American Trails coordinates the training courses. TrailWare 2.0 can be used to generate Trail Access Information, signage, and trail management reports. Data is uploaded to the TrailExplorer Website, www.trailexplorer.org. contact trails@beneficialdesigns.com or visit www.americantrails.org for more information.

Accessible Trail Gate Barrier

USDA SBIR Phase II Grant # 2005-00325

The Pedestrian and Motorized Vehicle Trail Traffic Counter is now available for commercial purposes. The counter is designed to identify and count trail entry and exit by both pedestrians and motorized vehicles. A mechanical trail gate barrier is also available to be used on its own or with the electronic system. Contact trails@beneficialdesigns.com for more information.

Nevada Recreation Trails Program & NV State Parks

NVRTP Grant #FY 2008-22 & FY 2010-11



We are finishing our third Nevada Recreational Trails Program project to provide signage throughout Nevada. Our goal is to continue making Trail Access Information (TAI) widely available in Nevada for a variety of trails and trail users. To date, we have assessed over 200 miles of trail in 26 different park areas. We have installed 73 different panel maps and over 200 TAI signs. We are currently updating the State's Web information for each park to include uniform, detailed information, as well as access information about the conditions and amenities of each park.

Nature Trail

Fort Churchill
State Historic Park


Length 1.6 mi (2.5 km)

Elev Gain 45.2 ft (13.8 m)


Elev Loss 265.7 ft (81.0 m)

 Hikers

 Bikes

 Dogs on Leash

 No Equestrians

 No Motorized Vehicles

 Grade

Typical Grade 3.8%

8% of trail is 10% to 20%

132 ft (40 m) is 20% to 37%

Standard Ramp Grade 8.3%

**Trail Access
Information
Signage Sample**

Development of Uniform Standards for Cognitive Technologies

RERC NIDRR Grant #H133E090003 and the Coleman Institute for Cognitive Disabilities.

We are in year one of another five-year RERC for Advancing Technologies for Adults with Cognitive Impairments (RERC-ATACI) through the University of Colorado. This project houses the RESNA Standards Committee on Cognitive Technologies (CT), whose goal is to develop universal design standards to increase product usability, such as cell phones and other consumer products. We have completed two rounds of Straw Polls on the Draft RESNA Standard for Cognitive Technologies – Volume 1: Universal Criteria for Cognitively Inclusive Technologies. RESNA CT is now collaborating with ISO/TC 173/WG 10 Assistive products for cognitive disabilities. The next RESNA CT meeting is on June 12, 2015 in conjunction with the RESNA Conference in Denver, CO. All are welcome to attend this conference, visit www.resna.org.

High Efficiency Trail Assessment Process (HETAP)

USDA SBIR Phase II Grant # 2005-03226



This project created the Wheeled Instrumentation Sensor Package (WISP) to collect more accurate, objective information about trails, including shared-use paths, backcountry single-track trails, OHV, and cross-country ski trails. HETAP systems are being purchased by private entities, state and city land managers, and the National Park Service throughout the U.S. and Canada. This system has been commercially available through Beneficial Designs since 2009. HETAP workshops are available to help train personnel on using the HETAP software and hardware (see UTAP & TrailWare^{2.0} Workshops). A

new HETAP software release (HETAP 2.5) has just been made available that includes improved functionality. We have also revised the three-wheeled cart and rolla-wheel platforms and are shipping the Wheeled Instrument Sensor Package (WISP) version 2.0. The new cart design boasts a stronger 1.0 inch frame, with solid "no-flat" tires and new upholstery that provides improved storage and functionality. With the recent software improvements, we are able to create a custom summary report for your agency and embed it into your software. If you have been spending time translating the summary report into a format specific to your agency, send us that form and we will create a custom summary that you can install into your HETAP Software. For more information, contact trails@beneficialdesigns.com.

Wheelchair Standards

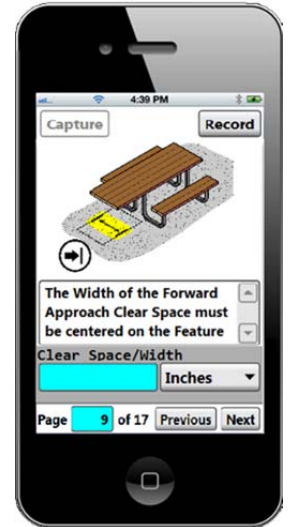
PVA & Beneficial Designs

As Secretary of the RESNA Standards Committee on Wheelchair (WCS), Peter is the US delegate to the ISO Wheelchair standards work. BD conducts experimental testing to develop new test procedures to keep up with the development of new technologies.

A Standardized Assessment Process of Outdoor Recreation Facilities (DORAP)

USDA SBIR Phase I & II Grant # 2008-33610-18906

Since the Accessibility Guidelines for Outdoor Developed Areas (AGODA) became law for Title I entities in September 2014; it is only a matter of time before a similar version is adopted for Title II entities. BD was awarded a Phase II grant in 2013 to complete the development of the Developed Outdoor Recreation Assessment Process (DORAP). This



project will create repeatable measurement methods for assessing the accessibility of outdoor constructed features found in outdoor recreation areas such as parks and campgrounds. A process and collection method will be created to assess the 18 features defined in AGODA, plus a generic feature for other elements provided that are not specifically defined in the guidelines. These features include among others: picnic tables, tent pads, outdoor rinsing showers, grills, and fire rings. The result of this project will include the collection process provided in a mobile app that will be available for select mobile platforms.

AT Standards

RESNA & Beneficial Designs

As Vice-Chair of the RESNA Assistive Technology Standards Board (ATSB), Peter oversees the work of the RESNA Assistive Technology Standards (ATS) Committees. There are 12 ATS Committees that develop National ATS for the US, while harmonizing where possible with International standards, such as those developed through ISO. RESNA ASE-1 Adaptive Sports Equipment was revised and published in 2014 and RESNA SS-1 Support Surfaces was published in 2104. RESNA ATS are available for purchase through the RESNA store at www.resna.org.

Wheelchair Testing & Design

We continue to provide testing and design services on a consulting basis for the wheelchair industry. For more information, contact mail@beneficialdesigns.com.

Public Right-of-Way Assessment Process to Determine Accessibility

US DOT #DTRT57-08-C-10058 & DTRT57-10-C-10081



Beneficial Designs has developed the automated Public Right-of-Way Assessment Process (PROWAP) that systematically measures elements within the pedestrian environment, such as curb ramps, severe cross slopes, trip hazards, and pathway obstructions. We are able to reduce the time to perform assessments by 80-90% of the time generally required to perform assessments manually. In addition to the assessment cart, we have wireless devices to measure tripping hazards and linear measurements of features and sidewalk panels. This past year, BD completed contracted work with the Nevada Department of Transportation and another local agency to provide assessment services. We have been actively seeking opportunities to provide assessment work for other agencies to help them prepare their federally required ADA Transition Plans for the sidewalk environment. Our proposals were selected as finalists for four projects and we have contracts pending with two college campuses as well as two local agencies in Southern California. The PROWAP System received national recognition in a profile in the December 2013 issue of Wired magazine.

Canoe Seating System

NIH/NICHD SBIR Phase II Grant #2 R44 HD36944-02A1

The Universal Design Canoe Seat is now commercially available. The seat replaces or attaches to the existing bench seat in a canoe. It provides adjustable pelvic, back, and lateral supports to improve balance and comfort. For more information, contact Chosen Valley Creating Ability at www.creatingability.com.



Surface Accessibility

NIH/NICHD SBIR Phase II Grant #2 R44 HD30979-02
Beneficial Designs is now shipping the new Series

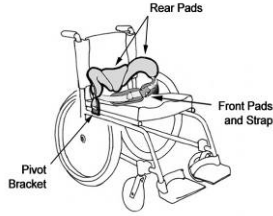


100 Rotational Penetrometers (RP). RPs are precision measurement devices that have calibrated, spring-loaded surface indicators to measure firmness and stability. BD has re-engineered the heart of the system to provide an increase in resolution and accuracy of readings for measurement of all surfacing. Parks, recreation programs, and school systems should use an RP to ensure that the surfaces of their playgrounds are kept in firm and stable condition. When the DOJ published the 2010 ADA Standards for Accessible Design (15 Sept. 2010), the standards expanded to include requirements for playgrounds. The requirements state that ground surfaces shall comply with ASTM F1951 and shall be inspected and maintained regularly and frequently to ensure continued compliance with ASTM F1951. With the new RP, the results received when testing playground surfaces correlate with the ASTM F1951 standard. In court cases regarding playground surfacing, the National Center on Accessibility has investigated surfaces using the RP to convey the presence or lack of firmness and stability. Therefore, an agency can now implement a maintenance schedule using the BD Series 100 RP to verify that required firmness and stability is maintained. For more information about the RP and outdoor surfaces, please visit the US Access Board Website and review the published research under the "Exterior Surfaces" header: www.access-board.gov/research/completed-research and the "Accessible Exterior Surfaces Technical Report" dated 24 April 1999: www.access-board.gov/research/completed-research/accessible-exterior-surfaces.

HipGrip

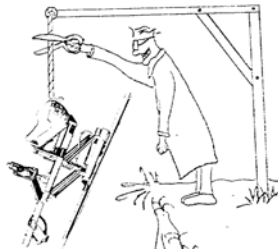
NIH/NICHD SBIR Phase II Grant #2R44 HD36156-02A2

The HipGrip is a dynamic, spring-loaded pelvic support device for people who have difficulty maintaining pelvic positioning in their wheelchair. The HipGrip allows the user to lean forward and provides variable resistance to assist the user back into an upright position. The HipGrip is manufactured and distributed worldwide by Bodypoint. For more information, contact Bodypoint at www.bodypoint.com.



Adaptive Ski Equipment Standards

Peter is the Chair of the RESNA Standards Committee on Adaptive Sports Equipment (ASE) that developed specifications and test methods for adaptive ski equipment. A revision of the American National Standard, RESNA ASE-1, was published in 2014. The committee meets each year in December in conjunction with the Ski Spectacular event in Breckenridge, Colorado.



Wheelchair Training Guides

PVA Research and Education Foundation

The 2nd Edition of the Manual Wheelchair Training Guide is now available. The Powered Wheelchair Training Guide and A Guide to Wheelchair Selection also provide wheelchair users and therapists with step-by-step instructions for selecting wheelchairs and negotiating various environments. These books are used as textbooks by professors teaching courses for future occupational and physical therapists. PaxPress, a division of Beneficial Designs, is distributing the books electronically through Amazon and Nook. Contact paxpress@beneficialdesigns.com for more information or see our website at www.beneficialdesigns.com.

Special Thanks & Acknowledgments

- ❖ **Past Consultants:** Martin Clemons, Harmony Hilderbrand, Ted Nagel, and Kent Nelson.
- ❖ **Past Employees:** Rebecca Wrucke.

FlexRim®

NIH/NICHD SBIR Phase II Grant #2 R44 HD36533-02A2

The FlexRim® is a compliant handrim that replaces the rigid interface between the wheelchair wheel and the handrim, reducing the gripping force and the impact forces. The FlexRim is manufactured by Spinergy and has been commercially available since September of 2007. For more product information, visit Spinergy www.spinergy.com or Max Mobility www.max-mobility.com.

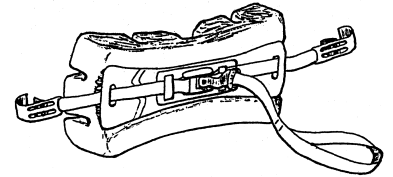
Expert Witness Services and Forensic Testing of Mobility Devices

As an expert on mobility devices, Peter Axelson has been able to help represent many claims based on evidence found in testing. Peter has been an expert witness in over 90 cases throughout the United States and continues to support and represent both plaintiffs and defendants. To discuss a specific case or to learn more about Beneficial Designs' expert witness services please contact peter@beneficialdesigns.com.

PaxBac

NIH/NICHD SBIR Phase II Grant #2 R44 HD29983-02

The PaxBac is a lightweight back support that provides lumbar/ sacral back support on wheelchairs with sling upholstery. It was manufactured by Invacare for a limited time. It will soon be manufactured again by BES Rehabilitation, Ltd. and will be distributed in the U.S. by Bodypoint at www.bodypoint.com.



Funding Agencies and other Acronyms:

DOT	Department of Transportation
DORAP	Developed Outdoor Recreation Assessment Process
ISO	International Organization for Standardization
NICHD	National Institute of Child Health and Human Development
NIDRR	National Institute on Disability and Rehabilitation Research
NIH	National Institutes of Health
NVRTP	Nevada Recreational Trails Program
PVA	Paralyzed Veterans of America
PROWAP	Public Right-of-Way Assessment Process
RERC	Rehabilitation Engineering Research Centers
RESNA	Rehabilitation Engineering and Assistive Technology Society of North America
SBIR	Small Business Innovation Research
USDA	United States Department of Agriculture