



ISWP Standards Working Group

March 10th, 2021 Meeting Recap

The ISWP Standards Working Group met by conference call on Wednesday, March 10th, 2021 from 12:00 p.m. to 1:30 p.m. U.S. Eastern Time. This document provides a recap.

Next call: Wednesday, June 9th, 2021, 12:00 p.m. U.S. Eastern Time/16:00 UTC

Discussion:

1. ISWP updates – Jon Pearlman, PhD

ISWP is currently transitioning as a non-profit organization outside of the University of Pittsburgh. The ISWP core focus is on products, services, training standards, building capacity for service providers, skills, and certification. During the next 4 to 6 months, the assets, training programs and IP will be moved out of the University. ISWP now has a founding board, with David Constantine as chair of the board. ISWP is finalizing bylaws and will hire an executive director this summer. ISWP has been in consultation with the team at UNICEF on their upcoming widespread procurement of wheelchairs, with the ISWP playing an important role in helping to shape the solicitation package. There have also been discussions with CHAI-Indonesia group, they are working on a project to develop and design a wheelchair in Indonesia. Link to founding board bios.

<https://wheelchairnetwork.org/iswp-founding-board/>

2. ISWP Wiki Wheelchair Testing Methods - Stephanie Vasquez

Stephanie provided updates of the Wiki, hosted on wheelchairnetwork.org. The Wiki covers wheelchair testing methods and is not intended to replace ISO material. In fact, it encourages users to attach to ISO documentation while providing free resources that detail best practices on how to do the tests. WIKI uses publications, expert contribution and research available to help testing centers around the world.

The Wiki has 4 areas: Wheelchair (WC) testing methods, webinar resources, WC testing centers, and request for contributions.

For the wheelchair (WC) testing centers, there are now 20 WC testing centers in 12 countries that have been identified. The WC testing centers map gives a snapshot of these testing centers, although there may be more testing centers that we are not aware of.

Many of the identified centers have basic tests and capabilities. Wiki link:

<https://wheelchairnetwork.org/wheelchair-testing>

Map of testing centers: <https://wheelchairnetwork.org/kb/wc-testing-centers-map/>

Stephanie encouraged participants to reach out to her about testing centers to start to create a network of testing centers.

A kick-off meeting will be happening the first week of April, 2021.



3. RR update - Holly

A scoping article on rolling resistance was recently published in the Journal of Rehabilitation and Assistive Technologies Engineering (RATE): “Scoping review of the rolling resistance testing methods and factors that impact manual wheelchairs” by Joseph Ott and Jonathan Pearlman. Also, a paper evaluating rolling resistance after simulated 2 year use of casters was recently completed and submitted. A correlation study is underway to compare component based RR (measured on our drum based equipment) to wheelchair system based rolling resistance. Strong correlation between the two methods has been seen, and we plan to publish these results later this year. There were several questions and discussion about measuring rolling resistance, soft surfaces, and wheel alignment effect on dirt roads and discussion about component versus system testing.

4. Caster update -Anand

The caster durability standard was submitted to ISO, and CD ballot comments were received back. The ISO standard is progressing towards completion. A paper was submitted and is currently in review for publication “Community-based wheelchair caster failures call for improvements in quality and increased frequency of preventative maintenance”. In terms of testing, the salt fog apparatus is currently not working, and we are working on addressing this. Testing will be resuming soon, and caster models have been selected for testing based on community failure information. Will look at replicating failures seen in the community, and the cycles and time to failure. In addition, a study evaluating bushings versus bearings is underway, with durability of bushings appearing as good as bearings, with the benefit of lower cost, lower weight, and better performance relative to corrosion. This could lead to further studies with user testing on ultralight manual wheelchairs to see how it works in the community. Another aspect of this is the potential of 3D printing of bushings, which has not yet been investigated but benefits would be availability and lower cost. Dust contamination effect on bushings has not yet been evaluated. There was a comment about durability and performance standards, and that these are both important and go together, otherwise the wheelchair user experience can be effected, and the importance of performance after extended use.

5. Group updates

5.1. Free Wheelchair Mission – Don

They are using the findings from their wheelchair test track results and are focused on manufacturing and what they’ve learned. An important learning was that the soft caster extends the life of the wheelchair. With harder casters, they transmit more energy into the frame, and for their design, they would have needed to add more welding to the attachment point for the casters, but using a soft caster resolved those issues. Testing the combination of the frame and casters is very important to understanding overall performance of the wheelchair.

6. Other updates

6.1 Ben - GRIT

The Freedom chair production has been affected by bike supply chain issues due to Covid. A challenge they received was to scale the freedom chair for pediatric use (4 to 10 year old). Grit Jr. was developed, and it uses a smaller seat pan with modified gearing for child push forces. They are making their first pilot run. With Grit Jr., kids can tackle terrain they couldn't handle before. A link is provided. Ben could present this at a future point in time. <https://www.gogrit.us/kids-wheelchair>

6.2 Elia Bernabeu – ICRC Niger

Elia is working on developing wheelchair (WC) services in Niger and is the PRP manager for ICRC in Niger. ICRC has been in Niger since 1982 responding to humanitarian needs. She was working in the Physical Rehabilitation Department, and although they were providing prosthetics and orthotics, they were not providing WC in Niger. The major issue is the sand, which causes the WC to sink, and the local viewpoint was that wheelchairs will never work, that they were not possible to use in this environment. The streets are full of sand, and there is only one month a year of rain when ground is semi-hard. When walking, feet sink into the sand down to the ankles. The approach was to identify the problem, look for solutions, test, evaluate and work to implement a solution. The context is the desert and the sand roads throughout Niger. There are a small number of tricycles used for people with disabilities, and there is local tricycle production, but there is currently no WC service delivery process. They are working with the local production of tricycles to improve them. Many people are on the floor, due to the lack of assistive devices, with no dignity.

There is currently no WC viable for use in the desert, and there are a lot of countries in sub-Saharan and large populations with rough terrain where WC's are not working. She shared an example of a girl with spina bifida, with ulcers because of a donated wheelchair that is not suited for her. She has been creating and training a team using the WHO wheelchair service training package - (basic level) and has trained physical therapists and OT's. She is changing the perception with people of what is possible. After training, they did some testing, and received ISWP certificate of achievement. This helped change perceptions of what was possible by professionals.

Several wheelchairs (Motivation, Motigo- Motivation, Hippocampe sand wheelchair and Grit freedom) were evaluated by local people over one month. Outcome measures (two physical tests), functional assessment and open feedback from users were used to evaluate their experience and how the WC's worked. The results were really positive for children and they identified a WC to start service for kids and are moving forward. For adults, none of the WC's were good enough. They saw a moderate increase in outcomes versus baseline. This year they will incorporate durability tests and versions that might work better in sand for user evaluations. They have enough data to justify the need and they



have they requested a budget from ICRC for the next year to open a WC service, including establishing a location/building.

The want a traction system that works for rolling in sand to increase reliability and performance. The solution needs to work contextually in the environment with the people. They are open for suggestions. Dr. Mhatre shared that SafariSeat, developed in Ethiopia, has caster/wheel designs developed for sand and rough terrains.

6.3 Laura Ramirez – Dominican Republic

Laura presented a new concept/device called MIRA that provides a fast, practical and subtle way to address accessibility issues in the community. The new device is a portable folding ramp which mounts on the wheel of the wheelchair, and unfolds to create a portable ramp, that can be used with extendable baton to pick up or place on the curb. It is easy to understand and use, gives independence to users. The mount on the wheel keeps the ramp in the same position even when the wheel is rolling, and the ramp snaps on to the mounting location.

Feedback on the design and suggestions for improvement were requested.

Feedback included: Good job; conduct lots of user testing. Evaluate if carrying the ramp affects mobility, with the ramp on the wheel all the time. A question was asked about rearward storage of the ramp, and a comment about going up the slope rearward being common in the UK. Their next steps are testing with real users and getting their feedback to understand the problems they find in use. They will also look at material selection to make it lighter.

6.4 Bob Appleyard & Jim Watson – Cranfield Impact Center (CIC) UK

Jim Watson is the manager of an impact center based at Frankford University in UK They conduct crash testing of wheelchairs at the CIC.

For the next meeting, they could provide a tour of the CIC and show a crash test. With zoom, it enables a close view of the test. At the crash test facilities, Jim and Bob have done ISO wheelchair crash tests. Their focus is solutions for transport.





Participants

	Bonnie Gonzalez, Free Wheelchair Mission		Andy Maynard, Mobility Worldwide
✓	Ben Judge, GRIT		Chris Rushman, Motivation
	Keoke King, Participant Assistive Products		Yetsa Tuakli, BambooAbility
	Daniel Martin, Shonaquip		Marjelle Scheffers, BambooAbility
✓	Matt McCambridge	✓	Anand Mhatre
	Mark Sullivan, Convoid	✓	Jon Pearlman
	Norman Reese, LeTourneau University		Maria Luisa Toro
	Chris Rushman, Motivation	✓	Nancy Augustine
✓	Don Schoendorfer, Free Wheelchair Mission	✓	Holly Wilson-Jene
✓	Scott Walters, Mobility Worldwide	✓	Stephanie Vasquez
	Eric Wunderlich, Latter-day Saint Charities		Marita Brundin
✓	Jack Fried	✓	Elia Bernabeu Mira
✓	Bob Appleyard	✓	Jim Watson
✓	Laura Ramirez	✓	Sara Munera

Prepared by: ISWP Pitt Team

