Standards Working Group Meeting Recap
June 8, 2022

The ISWP Standards Working Group met by conference call on Wednesday, June 8 12:00 – 1:30 pm U.S. Eastern Standard Time/17:00 – 18:30 GMT. This provides a meeting recap. Action items and individuals responsible are shown in bold/underline.

Next call: Wednesday September 7 , 2022 12:00 p.m. U.S. Eastern Standard Time/17:00 GMT.

1. **ISWP Update:** ISWP is making steady progress as a stand-alone charitable organization, with the founding board established and by-laws, policies and procedures under development. The global search for the position of executive director is underway, and there are over 80 applicants, with many impressive candidates. Interviews will be starting soon, and it is anticipated that someone will be named by end of summer. A funding extension is in place from USAID to support ongoing operations and staffing for the remainder of 2022. Currently we are working on negotiating additional funds to support the ongoing operations of ISWP.

   The work of developing wheelchair service standards with the WHO is ongoing, and the first draft is anticipated in early fall. We have applied for more funding to support additional standards work, and as part of this, proposed developing procurement guidelines that would help large purchasers understand how to assure quality in products and support their growth of product testing globally.

2. **Wiki and Wheelchair Testing Centers.** The fifth Wheelchair Testing Centers meeting took place on May 11 with two presentations: Dean Mubaiwa from Shonaquip South Africa presented fatigue and curb drop test demonstrations based on ISO 7176-8:2018. Jim Watson and Bob Appleyard from Cranfield Impact Centre (CIC) in UK shared crash simulation testing and the equipment in their lab.
   The meeting recording is available here: https://wheelchairnetwork.org/kb/meeting-recordings/ Testing centers: https://wheelchairnetwork.org/kb/wc-testing-centers-map/

   The next Wheelchair Testing Centers' meeting is on September 14, 2022, 9:00 a.m. U.S. Eastern Standard Time/14:00 GMT.

3. **Rolling Resistance Testing:** Currently working on testing a series of different surfaces with a group of rear wheels and casters on the drum-based rolling resistance testing equipment.

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4. **Caster Testing:** Jack Fried defended his Master's thesis *Utilizing community data and laboratory testing to raise wheelchair caster testing* in May. The thesis covers three areas: Community failure data analysis, time-to-failure study, and bushing/bearing comparison study. The manuscript for the bushing versus bearing study was submitted to RATE, and is being revised per peer-review feedback for acceptance. The ISO/DIS 7176-32 caster standard has officially been approved.

5. **Norman Reese, LeTourneau University**

***Test Dummy & Calibration Chair Designs*:**

Norm and his students developed an easy to manufacture wheelchair test dummy & calibration chair, along with detailed plans to build these items, including instructions, drawings and parts lists for each subassembly, instructions, and photos.

Test dummy: The team built a test dummy from oak wood, with 13" width so it will fit in narrow chairs. The wood can be any sturdy locally available wood, and the design uses commonly available sizes for ease of fabrication.

Calibration Chair: The team built a calibration chair in Guatemala using locally sourced wood. For simplifying center of gravity calculations, an excel calculator is available.

Power Wheelchair and Power Attachment Adapter:

Inexpensive power wheelchair: Their goal was to make an inexpensive joystick controlled wheelchair, using off the shelf electric wheel technology. Only one electric wheel that met their cost and performance goals was identified, and lead acid batteries were used. (three batteries = 36V). The team went to Guatemala over Christmas break to locally build and evaluate the wheelchair. They brought key components (electric wheels, joystick controller, battery, and battery box) and used a locally produced Beeline model wheelchair (seat/frame/casters), with a total estimated cost of $900.

They found that testing the chair on rough roads and steep hills quickly drained the batteries. The range on level ground was about 30 km versus 4 km on steep inclines. Their testing identified a few design challenges: tipping issues, the need for an emergency brake, and delay/responsiveness issues with the joystick.

Their second design iteration placed the electric wheels in the front, with two front and two rear casters for added safety and stability and shock absorbers were added to provide some suspension. Drop testing reached 4025 drops before a stock caster broke.

Power wheelchair attachment "Buzz drive" was developed to attach to a three wheel Motivation wheelchair, and utilizes a catch mechanism to attach. Multiple prototypes were made to refine the catch attachment mechanism. Four 12 V batteries provide 17 km range at 11 km/hr., which was needed to get up steep pedestrian ramps in Guatemala. The attachment has disc brakes and an estimated cost of $300. Because of the battery weight, it could travel up steep inclines while maintaining stability.

From the group, there were alot of questions, suggestions and interest expressed about these projects. For the power wheelchair project, there was discussion about the controller, programming the interface, and ISO standards for joysticks and brakes. For the Buzz drive device, there was also a lot of interest and mention of ISO efforts underway to develop a

test method for attachments by ISO because the attachments stress the wheelchair. Last, it was suggested that an open source controller project might be a good university project.

6. **Group updates:**

- **Don Schoendorfer:** They are working with a new factory in India to make their wheelchairs, and have been using their test track to compare wheelchair performance to determine if they meet their standards. They continue working through supply chain issues.
- **Keoke King:** Their pediatric chair has passed ISO test and mass production has started with the first chairs expected by August. The response has been good, and they will have a new website and start marketing in a few weeks. It's been a 4 year + journey.
- **Chris Rushman:** Continuing supply chain issues in China. They finally became a UNICEF supplier for a few of their wheelchairs. They are currently working on a few sports products.
- **Elia Bernabeau:** They are working on solutions for wheeled mobility in sandy environments. They recently completed testing/data collection on four wheelchair models.
- **Jim Watson:** They are continuing to conduct a range of wheelchair tests. In next few months, they are looking into evaluating a lower severity crash test to encompass a wider range of accidents as a future project. ISO 7176-19 is a very severe, 20G crash test.

Next Call: Wednesday September 7, 2022, 12:00 p.m. U.S. Eastern Standard Time/17:00 GMT.

	Bonnie Gonzalez, Free Wheelchair Mission	✓	Lily Aguayo, Participant Assistive Products
	Ben Judge, GRIT		Carlos Galvan Duque, Universidad Iberoamericana
✓	Keoke King, Participant Assistive Products	✓	Isabel Bolívar, Universidad Iberoamericana
✓	Dean Mubaiwa, ShonaquipSE		Marjelle Scheffers, BambooAbility
	Shona McDonald, ShonaquipSE	✓	Anand Mhatre
	Matt McCambridge	✓	Jon Pearlman
✓	Norman Reese, LeTourneau University		Nancy Augustine
✓	Chris Rushman, Motivation	✓	Holly Wilson-Jene
✓	Don Schoendorfer, Free Wheelchair Mission	✓	Stephanie Vasquez
	Scott Walters, Mobility Worldwide		Keyner Gonzalez, UEIA University
	Eric Wunderlich, Latter-day Saint Charities		Carlos Alberto Costa, Universidade de Caxias do Sul
✓	Jack Fried	✓	Elia Bernabeu Mira
✓	Bob Appleyard	✓	Jim Watson, CIC
	Laura Ramirez		Mariana Castro Medina

Prepared by: ISWP Pitt Team