



ISWP Standards Working Group March 13, 2019 Meeting Recap

The ISWP Standards Working Group met by conference call on Wednesday, March 13, 2019 from 12:00 p.m. to 1:30 p.m. U.S. Eastern Time. This document provides a recap. Link to call recording: <https://iswp.adobeconnect.com/pvkpfylzr15/>.

Next call: Wednesday, June 12, 2019, 12:00 p.m. U.S. Eastern Time/16:00 UTC.

Discussion:

1. **ISWP Update:** ISWP received a new 18-month agreement with USAID to continue to support wheelchair service standards (e.g., assessments, credential) as well as testing and development of product standards. A new initiative will be to develop online training materials for performing standards. Anand, Joe and a student who will be joining the staff will capture text and videos of how to perform ISO testing and any other testing Pitt has done which is not ISO approved yet. The materials will be available on a website wiki so that others can contribute.

Caster testing standards were submitted to ISO for review. Pitt received feedback today from ANSI-RESNA committee, which is mostly editorial. There is overarching discussion to have with committee at national and international level to clarify who can perform the testing. Pitt developed a custom test rig, which is similar to other standard caster testing for more industrial testing (e.g., chairs and carts). Pitt team needs to clarify that not only our group, but also other test labs worldwide can do the testing. The ISO committee has approved development of caster standard as a new work item.

2. **Free Wheelchair Mission (FWM) Update:** Free Wheelchair Mission (FWM) will be making a presentation on the whole chair track initial testing and validation at ISS. FWM conducted fieldwork in Baja, California with six middle-aged users in more of an urban environment to collect acceleration and strain data. Calibration was done using a wheelchair rolling over a thick plywood. The team now is looking at destruction of the frame and bearings and considering changes to frame to eliminate fractures. They are seeing few problems with casters or tires, and they are seeing the benefit of having a soft caster compared to the rigid caster being used currently. The soft caster has run 100's of hours on test track without problem and improves performance by factor of 10. Changing the caster will require changes to mold to accommodate.

FWM also plans to correlate strain to predictions of longevity in various type of terrains. Fractures typically happen at welds; hard to do strain analysis there.

Don indicated that Free Wheelchair Mission has learned so much from the test track that the team would not have known or been able to collect in the field.

3. **LeTourneau Update:** None.
4. **Rolling Resistance:** The LeTourneau team had challenges with its rolling resistance equipment due to friction in the rail system. Pitt used an air bearing in its equipment to eliminate friction. After considerable testing, the Pitt team is confident there is no noise in the system; the team has been running trial after trial reliably.

To date, four different tires were tested under three different conditions of toe with expected results comparing pneumatic to solid inserts; i.e., solid tires are less susceptible to toe than pneumatic ones. Pneumatic tire deforms then catches up. As toe increases, so does rolling resistance. This coincides with Norm's fieldwork on high frequency of toe in and toe out. The Pitt team is brainstorming how to replicate in field.

The Pitt team is adapting Anand's work to test rolling resistance on casters. Also starting to test other surfaces for casters and rear wheels.

Presentation: <https://drive.google.com/open?id=1QTq29KJh65XiisKuVQW7zpk6lEYDhl>

5. **Caster Testing:** The Pitt team started testing bushings versus bearings and testing soft casters. Based on early data, bushings last as long as bearings; Pitt team plans to test more to confirm. The team also plans to do more impact testing on the turntable so will have a curb of 5-centimeter height.

Anand reported on data collected on U.S. caster failures and reported by VGM technicians, who developed software to help facilitate insurance reimbursement for replacement parts. Data is showing higher-risk failures in tilt and space manual chairs. Among power chairs, Group 3 and Group 4 have more high-risk failures, possibly related to high use of chairs outdoors. Active manual wheelchairs have half as much high-risk failures as active wheelchairs. High-risk failures increase with groups among power wheelchairs. Conclusion: Design and selection need to be informed by testing. Testing is important both in U.S. and worldwide.

Presentation: <https://drive.google.com/open?id=1-eALB1OiAl9jLxB6lx-xrgPYzbFYCtNs>

6. **Pediatric Wheelchair:** Keoke King and partners have been working for the past year on a pediatric wheelchair, now in its third prototype. They want to create a very transportable pediatric chair with clinical support features children need (e.g., tilt and recline, elevated leg rests, and ability to attach a third wheel easily). The seat removes from base, which enables different types of seating and use. The chair can be reclined-- leg rests up and titled, almost to a lying posture. The biggest risk they have encountered is durability; the prototype chair has a

number of plastic parts currently, so it can be translated to local factory easily in small batch sizes and high quality.

The group recognizes that it is a complex seating product, so more adjustments and provider skills are needed. Keoke's team will provide videos about how adjustments need to be done, which are as important as the product itself. The group hopes to make it commercially viable in the next couple of years.

Jon suggested having Pitt test casters and corrosion and have FWM run on its test track. This will help the group to learn more about plastic and other wear components.

Keoke's team is planning to do three-week trial in Colombia in late April-early May to identify usability issues. Once design is updated, they will start double drum testing. Once factory prototypes are available, they will do field trials and will with Humanity & Inclusion and others. They hope to start mass production in August-September. Keoke invites, LDS, FWM and others to try in the field.

Don would like to collaborate with individuals who have gone through Intermediate training and collaborate with organizations to do referrals (e.g., Motivation). Don feels Free Wheelchair Mission's expertise is in basic wheelchairs so needs support for intermediate seating. If a collaboration is not possible, FWM will need to determine how to provide intermediate wheelchairs. FWM does have partners who fit intermediate level chairs.

7. **LDS New Product Line:** Eric Wunderlich reported that LDS is starting field evaluations of new products in a number of countries in April and is doing field trials on a trike attachment now, as well as working on pediatric products. He will send casters and rear wheels to Pitt for testing soon.

Participants

- Bonnie Gonzalez, Free Wheelchair Mission
- Daniel Martin, Shonaquip
- Matt McCambridge
- Mark Sullivan, Convaid
- Norman Reese, LeTourneau University
- Chris Rushman, Motivation
- ✓ Don Schoendorfer, Free Wheelchair Mission
- Scott Walters, Mobility Worldwide
- ✓ Keoke King, Participant Assistive Products
- ✓ Eric Wunderlich, LDS Charities
- Ben Gebrosky, University of Pittsburgh
- ✓ Mendel Marcus, University of Pittsburgh
- ✓ Anand Mhatre, University of Pittsburgh

- ✓ Joe Ott, University of Pittsburgh
- ✓ Jonathan Pearlman, University of Pittsburgh
- ✓ Nancy Augustine, University of Pittsburgh

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