ISWP Standards Working Group

November 10, 2015 Meeting Recap

The ISWP Standards Working Group met by conference call on Tuesday, November 10, 2015 from 12:00 p.m. to 1:30 p.m. U.S. Eastern Time. This document provides objectives, action items and a recap.

Objectives

1. Discuss the progress with subgroups on design guidelines, casters, rolling resistance, corrosion and whole chair testing.

Action Items

1. Address comments from the group on test designs and design guidelines document.

Discussion

1. Rolling resistance group updates
    a. The group has prototyped a setup to gage initial friction that would be experienced in the test.
    b. On the test setup, the bearings were offset to counter for torque on one side of the carriage.
    c. Mark: Are we testing tires or wheels? We are testing friction issues due to bearings, tires and spokes.
    d. Finish prototyping by December 2015, anticipating initial problems with prototype.
    e. Fabrication issues noted by JP on red parts shown in drawings
    f. Ideas:
        i. JP suggested telescoping tubes with angles, instead of square tubes.
        ii. Don suggests doing a wedge clamp for fine adjustments
        iii. Ben - Check camber plate design on suspensions
        iv. JP: Four square inserts in the tube and slide an axle with four bolts or projections for locking
    g. To discuss motor selection with caster testing group
    h. To send drawings of hinge bolt and discuss design issues with JP

2. Caster testing group updates
    a. Issues noted by Ben on design considerations
        i. Use a gear motor
        ii. Employ a jog button for minor rotations of turntable
        iii. Design Considerations: https://drive.google.com/file/d/0B3o-KpFV8x-8VWJ0cFhweTlyeUk/view?usp=sharing
    b. Don noted that the caster will traverse over multiple transitions which is not suggested
        i. The CAD drawing of the design shows many surfaces and slats together which is to indicate that the design has the capability.
        ii. The test will begin with 1-2 slats that the caster will be tested with initially.
    c. Analysis of torques induced on caster assembly was performed with three chairs (WWRR, GRIT three wheeler, lightweight chair). Three different scenarios were considered for the test – 1) Caster assembly suspended with lever arm (L=23 in.) on new caster test 2) Caster suspended on the new caster test with the pivoting about the axle of the respective wheelchair (as if the chair is placed on the caster test) 3) Chair is tested on Double Drum test.
        i. The DDT scenario had a significant variation in the torques induced on the three casters; also, compared to scenario 2.
        ii. The WWRR and lightweight chair caster experienced low torques in scenario 1 compared to scenario 2 due to height differences between points of lever arm suspension in the two scenarios.
        iii. Anand – calculate height for which torques induced are same as we need to have casters subjected to same torques as they would be on actual chair. Make changes in design accordingly.
        iv. Analysis results: https://drive.google.com/file/d/0B3o-KpFV8x-8YjZBdlFVYmx4ZGM/view?usp=sharing
    d. Shaft design: https://drive.google.com/file/d/0B3o-KpFV8x-8ODhrazBDb3E3Yms/view?usp=sharing
    e. Speed and Torque calculations: https://drive.google.com/file/d/0B3o-KpFV8x-8Yjl4RlBPdlZfZFU/view?usp=sharing

   f. Minimum torque required to roll over the slat: https://drive.google.com/file/d/0B3o-KpFV8x-8Mk1scElfaHdqVzg/view?usp=sharing
   g. Motor and controller selection for the test is in process.

3. Design Guidelines Updates
   a. Design guidelines structure for the wheelchair frame section was discussed.
   b. Dan noted including moisture in environmental aspects (Seat upholstery material wears badly) and JP mentioned including same in Serviceability to address the fix for such issues.
   c. Mark welcomed the group to suggest recommendations on the format and content of the guidelines and take on sections for adding content.
   d. JP to draft testing section, Dan to work on user-related parts, and Matt would help too.
   e. Sketches for wheelchair parts can be done locally at Pitt to include in the guidelines, Mark to note down which parts need sketching and communicate to Pitt group.
   f. Anand to send anatomy drawings to Mark
   g. Copyrighted material, if used, should be requested for our publication from the owner.

4. Corrosion testing update
   a. The Pitt group needs to get a quote of all the electrical and mechanical installation requirements for installing the salt fog chamber.
   b. Accordingly, quotes will be processed.

5. Whole chair testing update
   a. Don would like to see drawings of concept design for the whole chair test from the group members.
   b. Determining cost for the test setup is required.
   c. Matt/MIT student to update the group on whole chair testing.

6. Funding in the next round has been approved for the group.

7. The group is targeting February to develop and build the test designs and get external reviews on the design guidelines document. The salt fog chamber is expected to be procured before February as well.

Subgroups (for reference)

- Design Guidelines: Mark Sullivan (interim lead), Daniel Martin, Jon Pearlman, Norman Reese, Chris Rushman, Eric Wunderlich

- Casters: Anand Mhatre (lead), Matt McCambridge, Jon Pearlman, Norman Reese, Don Schoendorfer

- Corrosion: Matt McCambridge, Don Schoendorfer

- Rolling Resistance: Matt McCambridge (lead), Jon Pearlman

Participants

✓ Daniel Martin, Shonaquip
Matt McCambridge: DEKA (formerly with Whirlwind)
✓ Norman Reese, LeTourneau University
✓ Caleb Elder, LeTourneau University
Karen Rispin, LeTourneau University
✓ Mark Sullivan, Convaid, Ride Designs and Polus Center (WG Chair)
✓ Don Schoendorfer, Free Wheelchair Mission
Karl-Erik Westman, Handicap International
✓ Eric Wunderlich, LDS Church
Chris Rushman, Motivation
Dave Mahilo, Invacare
Dr. Rory Cooper, University of Pittsburgh
✓ Anand Mhatre, University of Pittsburgh
✓ Dr. Jonathan Pearlman, University of Pittsburgh
✓ Nancy Augustine, University of Pittsburgh
✓ Ben Gebrosky, University of Pittsburgh

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