



Airport Sweeper Broom Wafer Replacement

Prepared by: Corey Nygaard, Airport Manager

Approved by: Corey Nygaard, Airport Manager

Signature:  Practice No: 7.1.3

Effective: December 19, 2019 Replaces: September 18, 2018

Purpose

The main purpose of this safe work practice is to ensure the protection of staff from injury while performing work changing the broom wafers for the airport runway sweepers.

This work procedure plan is designed to ensure compliance with the *Saskatchewan Employment Act* and Part XIV of the *Occupational Health and Safety Regulations, 1996*.

Scope

This practice applies to all employees of the City of Prince Albert performing work changing wafers on the airport sweeper(s). The wafers are to be replaced when they are worn to ½ the original outside diameter (approx. 6" or 15.2cm of bristle remaining)

Note: failure to follow this work producer plan can result in discipline up to and including termination.

Required Equipment & PPE:

- CSA Safety Boots and hard hat
- Fall Protection as required
- Leather gloves
- Long sleeves
- Overhead Work Control Zone
- Barricade / Signs (Overhead Work Hazard)

Hazards

1. Items falling from mezzanine or during work process.
2. Falls from height
3. Failure of hoist or rigging equipment
4. Using incorrect equipment
5. Pinch points
6. Sharp Objects

Work Procedure:

Note: Follow the Airport Mezzanine Fall Protection Plan where required during this procedure.

1. Place Overhead Work Hazard Sign on South door and in Bay 1.
2. Raise broom head. (at broom head remote controls)
3. Place broom dollies under the broom flanges.
4. Remove 6 of 8 bolts on each end of the broom leaving 2 top bolts fastened. (3/4" wrench).
5. Lower broom onto dollies. (at broom head remote controls)
6. Remove remaining 2 bolts. The broom head may need to be moved up and down to allow bolt removal.
7. With the broom on the dollies, lift the broom head up fully.
8. Roll broom on dolly to the hoist area in Bay 1
9. Install certified rigging device (Appendix B) to the flange not removed.
10. Ensure all workers in the area are wearing hard hats.
11. Hook rigging device to hoist.
12. Jack other end of the broom and remove flange. Place cardboard under this end of the broom core and install tag-line 1/8 the way up the broom.
13. Hoist slowly until the broom is vertical letting the open ends slide on the cardboard. Use tag-line to control swing.
14. When the wafers start to fall to the bottom of the core hoist the broom to the full height of the hoist to allow the wafers to fall off.
15. If wafer(s) hang up on the broom core wrap a rope around the broom, about 10-20 wafers up from the bottom and pull down. Continue as required until all wafers have been removed.
16. Separate wafer and spacers. Dispose of used wafers and damaged spacers for metal recycling.
17. String spacers on a rated lifting sling ready to be hoisted to mezzanine.
18. Attach a tag line to the broom core.
19. Lower the broom core onto one dolly, guide the core down with the tag-line until horizontal and place the other dolly at the rigged end of the core.
20. Turn the core around so that the end without a flange is under the hoist ready to lift.
21. Remove certified rigging device and place on other end of broom core.
22. Attach rigging device to hoist.
23. Install the steel stand to the end with the flange. Place cardboard under the steel stand edge.
24. Attach hoist to rigging device and reattach the tag-line near the steel stand.
25. Hoist slowly until the broom core is vertical letting the steel stand end slide on the cardboard. Use tag-line to control swing.
26. Remove cardboard and set the core down on the floor with the steel stand supporting the core vertically. Ensure the core is sufficiently far enough away from the mezzanine to allow the new wafers to be installed.
27. Remove rigging device.
28. Reload the broom core with wafers and spacers as per the Manufactures instructions. Appendix A

- a. Installation patterns for each sweeper and wafer manufacturer may vary, consult the manufactures manual/ installation instructions for each unit and or wafer manufacturer.
 - b. Start with 2 spacers
 - c. Then 1or 2 wafers each ¼ turn (manufacturer “painted” marks the heavy point of each wafer)
 - d. Then 1 spacer
 - e. Then 1 or 2 wafers each ¼ turn
 - f. Repeat until core is full (approximately 90-135 wafers & 94 spacers)
 - g. Put on extra wafer(s) then end with double spacer to be approximately 1” above the core.
 - h. Compress the wafers by placing the broom flange on and wrench down with long bolts until flush.
 - i. Replace long compression bolts with broom flange bolts
29. With a fully bolted flange apply the rigging device.
 30. Hook rigging device to hoist and lift full height
 31. Connect chain to metal stand and to the loader bucket
 32. Simultaneously raise loader bucket and reverse and lower hoist until vertical. A spotter is needed to coordinate loader and hoist operators. Do not side load the hoist hook during this procedure.
 33. Lower onto dolly
 34. Remove metal stand
 35. Push broom back to sweeper. Ensure the end that the flange was removed is on the drives side of the sweeper. Note that arrows on the flange indicate direction of rotation.
 36. Lower the broom head (at broom head remote controls) to line up the bolt hole of the broom flange. Bolt into place.
 37. The broom head may need to be adjusted up and down to align bolts. Manually turning the broom as required to access bolt holes.
 38. Adjust broom height cranks to the top.
 39. At a level location, start the sweeper to adjust sweeping pattern as per manufacture instructions.
 - a. broom pattern must not exceed 3” (8cm) for winter operation or 2” (5cm) for summer operations
 - b. pattern to be set at full RPM's
 - c. do not operate cranks when broom is rotating
 40. If excessive vibration is noticed, unload broom core and reload.

Inspection Checklist:

This inspection checklist may be used to aid staff in ensuring that thorough inspections are completed.

- Rigging device(s) is free of cracks, rust or damage and rated for anticipated loads
- Hoist inspection:
 - Hooks/safety catch
 - Chain
 - Power cord
 - Trolley
 - Mono rail and stops
- Dolly inspection, rolls freely and is free of cracks, rust or damage
- Guardrails are tight and of adequate strength to protect workers from falls
- Fall protection equipment as required by the Airport Mezzanine Fall Protection

Plan

Persons trained to work under this safe work practice:

99-INSTR02



UNITED
ROTARY BRUSH CORPORATION

REV. DATE 8.07

INSTALLATION INSTRUCTIONS
10.75" x 36" RUNWAY SWEEPER FLAT WAFER SECTIONS

PLEASE FOLLOW ALL OF THE STEPS OF THE INSTALLATION INSTRUCTIONS!

- 1) **CHECK YOUR CORE**...for any specification variances. Core O.D. must be 10.75" + .04-.125. for United Rotary Brush Wafer Sections. Check the outside diameter along the entire core length. All drive bars should be inspected for indentations or excessive wear.
- 2) **STAND CORE UPRIGHT**...with support for safety, when installing wafer sections. Flatten or straighten end plates and secure one in place on the bottom of core.
- 3) **BEGIN INSTALLING**...the wafers on the core, positioning the drive pins of each wafer section between the drives on the core. Install a new spacer between every consecutive wafer section. Always install NEW, UNUSED SPACERS to maintain tolerances.
- 4) **BUILD A BALANCED BROOM**...Upon installing WAFERS, locate the black mark on the inside of the wafer ring (wafers have been pre-balanced and this indicates the "heavy" point of the wafer). Install the next wafer on the core, rotating the position of the black mark 90-degrees for every consecutive wafer section. If installing POLY/WIRE MIXED sets, install one poly wafer with a spacer, between each wire wafer, following the same 90-degree pattern. Poly Wafers should be the first and last wafers installed.
- 5) **COMPRESS THE BROOM**...by mounting one spacer, and if possible, an additional wafer beyond the end of core. Compress them down onto the core by tightening the end-plate and bolts to the core end resulting in a tightly compressed installation.
- 6) **REINSTALL CORE**...on the sweeper. To lower and move a refilled core, attach supports directly to the metal sweeper core. Do not apply force, pressure or lift to any part of the wafer or filament during the core installation onto the sweeper.
- 7) **ADJUST SWEEPING PATTERN**...as this is the main determinant of broom life. Remember, a broom sweeps with the tips of the filament, not the sides. DO NOT MOPI. In extreme conditions, it is recommended that operators slow vehicle speed and increase the broom RPM in order to sweep effectively. DO NOT INCREASE DOWN PRESSURE TO THE BROOM.
- 8) **REPLACE WORN WAFERS**...when wafers reach one half of the original outside diameter.

All United Rotary Brush Corporation's Runway Sweeper Wafer Sections are guaranteed for quality material and workmanship. This warranty is void upon improper installation, use or installation on worn or undersized sweeper cores where the outside diameter is smaller than 10.625" for 36" sections. If you have any questions or need assistance please contact us.

800-851-5108 U.S.A.

www.united-rotary.com

800-463-6292 Canada



BROOM IS NOW READY FOR INSTALLATION ON SWEEPER

Check if the brush and core assembly has been installed on sweeper broom head according to the following procedure:
It is essential that the brush and core assembly be perfectly centered with the driving flanges.

CHAIN REDUCTION CASINGS ON MECHANICAL UNITS

1. The chain reduction casings, located at each end of the broom, provide the drive for the drive for the broom brush.
2. In each chain reduction casing there is an idler sprocket wheel mounted on a trunion eccentric for chain adjustment.

BRUSH

1. The brush consists of a broom core with four longitudinal keys, used to lock in place the brush rings.
2. It also has removable drive plates at each end to facilitate installation of new brush rings.
3. There are 90 steel brush rings mounted on the core and each ring is equipped with continuous wires.
4. The steel brush wires are mounted on a solid ring and 94 spacers are used between each ring. Factory mounting is with steel spacers.
5. The life of the brush is highly dependant on the care and precision with which the operator adjusts the pattern width of the brush.

1318 Principale
St-Vulstien-de-Milton (Qc)

6. The life of the brush will also vary between summer and winter operations, and whether the brush has been used exclusively on concrete or black top.

PNEUMATIC CASTER WHEEL

1. Two 6.00 x 9 - 10 ply rating pneumatic caster wheels support the broom.
2. They provide positive support of the sweeper brush and absorb most of the shocks when bumps or an unusually uneven road surface is encountered.
3. The caster wheels swivel through 360°.

BROOM LIFTING CYLINDERS

The broom lifting cylinders have built-in crank operated adjustable stopper.

MAINTENANCE & SERVICING FOR BROOM

The following instructions cover the complete disassembly of the broom.

BROOM DRIVE CHAIN ADJUSTMENT ON MECHANICAL SWEEPER

1. Remove the visiting door.
2. Check chain total movement and if in excess of 1-1/2" (38 mm), adjustment is required.
3. To adjust proceed as follows:
4. Loosen up the four nuts
5. By means of an adjustable wrench, turn the eccentric plate arrangement in either direction until proper adjustment is obtained.
6. Tighten up the four nuts number

30

☎ (450) 549-2411
☎ (450) 549-2414

Appendix B



March 6, 2019
2018-199

City of Prince Albert
1084 Central Avenue
Prince Albert, SK
S6V 7P3

Attention: Corey Nygaard

Re: City of Prince Albert
Airport Lifting Lug Load Rating
Prince Albert, SK

At your request we have reviewed the capacity of a lifting device used for suspending the barrel for a machine used to clean the runways at the airport. The device is a one purpose item that is to be used solely for the purpose that it was designed and fabricated.

This letter summarizes the safe working load rating of the lifting device.

We have also prepared a stamped drawing of the device that should be kept for your records.

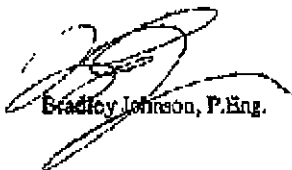
The device is constructed from L51x51x6.4 steel angle with stiffeners as indicated. The lifting lug is comprised of a bent rod that is fastened with nuts.

We have calculated that the device has a safe working load of 1000 kg (2200 lbs) with a safety factor of 5 to account for shock and dropped loading. The lifting lug should be built in strict conformance to the drawing, and should be clearly labeled with the maximum safe working load.

Please contact us should you require any additional information.

Regards,

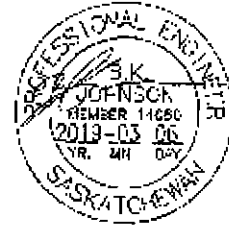
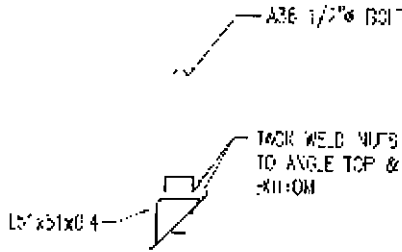
PRAKASH CONSULTING LTD.



Bradley Johnson, P.Eng.

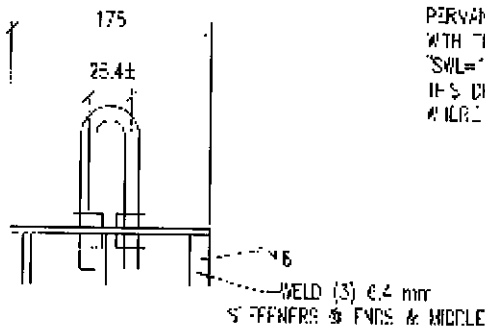


#4, 210 - 15th Street East, Prince Albert, SK S6V 1G2 ~ Phone: (306) 922-2101, Fax: (306) 763-0212
www.prakasheng.ca



REGISTRY OF PROFESSIONAL ENGINEERS &
 SURVEYORS OF SASKATCHEWAN
 CERTIFICATE OF AUTHORIZATION
 PRAKASH CONSULTING LTD.
 MARKET CROSS
 PRINCIPAL IN CHARGE HOLD BY:
 DESIGNER: CIVIL ENG. REG. NO. 1158
 CIVIL 1158
 11/2/2019

1 END VIEW
S1 1/5



PERMANENTLY MARK / ETCH THE DEVICE
 WITH THE FOLLOWING INFORMATION:
 "SWL=1000kg (2200 lbs)"
 THIS DRAWING MUST BE KEPT ON RECORD
 WHILE THE DEVICE IS TO BE USED.

2 SIDE VIEW
S1 1/5

PRAKASH

PRAKASH CONSULTING LTD
 3100 21ST AVE. W. BRIDGEVIEW

#4-210 18TH STREET EAST
 PRINCE ALBERT, SK S4Y 1G2
 T 306 922 2101 F 306 789 0212

PROJECT NAME :
 CITY OF PRINCE ALBERT AIRPORT
 LIFTING DEVICE FOR SWEEPER BARREL

DRAWING NAME :
 DRAWING AND WEIGHT RATINGS

DATE :
 MARCH 2019

PROJ. NO. :
 2018-09

DRAWN BY :
 JV

DWG. NO. :
 S1