APPENDIX D

Summary of Comments Made by Respondents in the Margins of the Survey
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Item 3.  How many different snowplow vehicles did you typically drive during the current (98-99) winter season?
  • I am the mechanic; I drive them all.

Item 6.  What was the approximate length of your primary route this current (98-99) winter season (not including deadheading)?
  • 12 miles deadhead.
  • One route: 36 miles, second route: 40 miles.
  • 4-lane highway (2 people)
  • Also, if needed, I will ice blade more.
  • Each way (2 people).
  • Not counting lane miles through town.
  • Rural commuter lanes.
  • Secondary roads.

Item 8.  Thinking about your snowplow operations during the current (98-99) winter season:  a. What was your average driving time?  b. What was your maximum driving time?
  • Item a – average driving time.  Per 8-hour shift.
  • Item b – maximum driving time.
    • Per 12-hour shift (2 people)
    • Worked 2 or 3 16-hour shifts.

Item 9.  Thinking about your snowplow operations during the current (98-99) winter season:  a. What was your average driving speed while plowing?  b. What was your minimum driving speed while plowing?  c. What was your maximum driving speed while plowing?
  • Drove 15 mph because highway is so rough that any speed faster would bust plow up faster.
  • Item a – average driving speed.  Don’t know.
  • Item c – maximum driving speed.  Freezing rain.

Item 10.  During the current (98-99) winter season, what percentage of time, on average did you use each of these plows or systems?
  • All of the circled items were on the truck.  Conditions dictated their use.
  • When I plowed with front plow, I always used the wing.
  • Item d – front-mounted snowblower. 2%.
  • Item i – salt-brine sprayer.
    • Pre-wet.
    • This system does not work on my plow.
    • We use salt-brine with our material spreader.
Item 12. *As part of your snowplow operations, do you ever backplow?*
- Why? Are you looking for an accident?
  - No: Only when I am so tired I forget to pick up my plow.
  - Yes:
    - Number of times:
      - About one percent of time.
      - Unknown number of times.
      - After every storm. (3 people)
      - In clean-up.
      - Sometimes through storm.
      - Infrequently.
      - Very few
    - Where:
      - To clean bridges. (5 people)
      - To clean intersections.
      - To clean ramps.
      - To clean shelter areas.
      - At railroad crossing.
      - At every crossover. (2 people)
      - Spreading dumped sand.
      - Turn-around.

Item 13. *What type of mirrors are in the snowplow vehicle you drove most frequently this current (98-99) winter season?*
- Item b – left-mounted, small convex mirror. Not small but large.
- Item d – right-mounted, small convex mirror. Not small but large.
- Item e – right front fender mirror. Convex (3 people).
- Item f – left front fender mirror.
  - Convex (3 people).
  - Seems to use the wing plow mirror for the left wing fender mirror.
- Item g – wing plow mirror. n/a.
- Item h – front-mounted plow mirror: Don’t know.

Item 14. *During the current winter season, did the side windows of your snowplow vehicle ice up and reduce your visibility?*
- No:
  - Have fan mounted between windshield and door.
  - Use frost shields
  - We had two very mild winters.
- Yes:
  - Every storm
  - Depends on type of storm and temperature.
  - Get out and clean them.
  - Fog up
  - Also left windshield (2 people)
  - Mainly right side
Item 15. *What visual displays and indicators are in the snowplow vehicle you drove most frequently this current winter season?*

- Item 1 – material rate control. Dial
- Item 2 – material spread width
  - Dial
  - Speed
  - Control
- Item 9 – heated rearview mirror. Left only.
- Item 11 – two-way radio channel scan.
  - Scan optional
  - State
- Item 12 – cellular phone status.
  - My personal one (7 people)
  - Construction (?), talking (?)
  - In lunch pail
- Item 13 – other.
  - Raven control lights too bright, causing glare in cab.

Item 16. *Of the visual displays and indicators listed in question #15 above, which one (if any) do you consider the most annoying during snowplow operations?*

- None are annoying; very useful tools.
- Item 1 – material rate control.
  - Noisy
  - Beeper on constantly
- Item 2 – material spread width. Noisy
- Item 5 – under-body plow pressure. Not enough.
- Item 7 – air temperature.
  - Noisy
  - Not clear or accurate
- Item 11 – two-way radio channel scan.
  - But the most important
  - Can hear other shops talking all the time (2)
  - Static
- Item 12 – cellular phone status. Foreman calls to visit while I’m busy

Item 17. *What alarms are in the snowplow vehicle you drove most frequently this current winter season?*

- None are annoying
- Item b – hydraulic oil pressure. Hydraulic oil level (not pressure)
- Item d – material spreader ‘off’. Material rate (not on/off)
- Item e – box ‘up’.
  - Wish I had a box ‘up’ indicator (2 people)
- Item f – other. High-beam indicator (visual); back-up indicator (auditory).
Item 18. Of the alarms listed in question #17 above, which one (if any) do you consider the most annoying during snowplow operations?
- I feel all are a necessary.
- I had no trouble with alarms this year.
- Auditory raven alarm.
- Dickey John Sanders.
- All (yet only #1 and #b3 is checked)
- Not having a light when hydraulic is low
- Item b1 – hydraulic oil pressure. Noisy hydraulics.
- Item f – other. High-beam indicator.

Item 19. In the snowplow operations you performed during the current winter season, how much would you say each of these weather conditions reduced your ability to see in front of your snowplow vehicle?
- Every event is different. Bad question.
- Wet snow, dry snow, wind speed, what way is the wind coming from: it all matters.
- Semi-tractor trailer rigs make it impossible to see when they speed pass, driving in groups! Can't see a thing!
- Nighttime: Never nighttime, but 02:00 - 06:00 plowing.
- Item d & h – daytime and nighttime without snowfall or driving snow. All depends on wind direction.

Item 20. In the snowplow operations you performed during the current winter season, how much would you say each of these wind conditions reduced your ability to see in front of your snowplow vehicle?
- All: Above ratings are for light blowing snow. Wet snow is not a problem.
- Wet snow, dry snow, wind speed, what way is the wind coming from: it all matters.
- Poor question. It seems to be talking about a 4-lane highway. Some of us only plow 2-lane roadways. We were not sure how to answer it.
- Item c – plowing the left lane with crosswind from the left. Problem if using left wing plow.
- Item e – plowing the right lane with crosswind from the right. The wind is a big hazard for both us and traffic.

Item 21. Considering the road types where you performed snowplow operations during the current winter season, how much would you say each of these driving situations reduced your ability to see in front of your snowplow vehicle?
- All. Light blowing snow.
- Damn halogen lights!
- Day or night?
- Primarily at night.
- Wet snow, dry snow, wind speed, what way is the wind coming from: it all matters.
- Item b – meeting trucks or buses. On 4-lane road it is not a problem.
- Item e – open fields on side of roadway. With wind.
Item 23. *Based on your experience, how much would you say each of these plow configurations generates blowing snow and reduces your ability to see in front of your snowplow vehicle?*

- (Did not answer any). These questions all pertain to type of snow fall and wind (direction and speed) conditions. (7 people)
- If you are winging a North/South road and the wind is blowing straight out of the West and the snow is like powder it makes it very difficult.
- Under crosswind blowing conditions.
- Visibility depends also on traffic disturbance and not on what kind of plow you are using.
- In the last 2 years, we have only had two small snowstorms of 1 foot or more.
- Item a – front-mounted one-way plow. With a funnel barrel plow very little comes out front.
- Item b – front-mounted reversible plow.
  - Depends on the manufacturer
  - Flex plow
  - Poly plow
- Item c – front-mounted V-plow.
  - Never use it. (2 people)
  - Not used this year. (2 people)
- Item d – front-mounted snowblower.
  - Not used.
- Item f – small left wing plow.
  - Don’t have one.
- Item g – large left wing plow.
  - Don’t have one.
- Item i – large right wing plow.
  - Don’t have one.

Item 24. *Is there a front-mounted plow type or model that, because of its design, generates more blowing snow and reduces your ability to see in front of your vehicle more than others?*

- No, it depends on direction of travel and wind direction.
- A plow that is too low, snow comes up over hood (can’t see).
- Do not know; never used other than R.H. plow
- Item a – type.
  - Checked only, no type indicated.
  - Plastic reversible plows produce the least amount of blowing snow.
  - Two-way plows produce more blowback than a one-way plow.
- Item b – manufacturer. Minnesota (made by convicts).
- Item d – height of plow.
  - 48 inches top of curl, 7 inches lowest point in front.
  - 48 inches or more.
  - Too short (3 people)
  - Some of the older plows that were short (we don’t use them anymore)
  - Small ones; snow comes over the snowplow. (2 people)
  - Changes manually
• Checked only, no height indicated.
• item e – curvature of plow.
  • Batwing
  • Small barrel
  • Large – not curved enough
  • Large – tip backs too easy
  • Large Wausau – visibility reduced the higher the snow discharge (see drawing).
  • Flatter curve
  • Bad top curve (see drawing)
  • High straight edge before curve (see drawing)
  • If tilted back too far (see drawing)
  • Plow with no barrel to it; straight up and down.
  • Checked only, no curvature indicated.

Item 25. In your opinion, what three methods help you the most to maintain your lane position while plowing in poor forward visibility?

(Did not answer any). Not applicable in metro area.
Depends on if it is your first pass or after your first pass.
Item b – feeling the rumbling strips on the shoulder.
  • Edge rut (?)
  • Feeling the shoulder-rumbling strips.
Item c – feeling the slope of the shoulder. Feeling with the wing.
Item d – evaluating distance from milepost delineators. All signs (5 people).
Item f – evaluating distance from grass line. When visible.
Item g – evaluating distance from centerline. Only when you can find the center line.
Item j – looking ahead to evaluate distance from shoulder line. Trees and other landmarks.
Other:
  • Center and edge line (priority #1 & #3) (2 people).
  • Evaluate distances between signs or pole on both sides of road and stay in the middle (priority #1)
  • Look in rear view mirror for white fog line (priority #1)

Item 27. As part of your snowplow operations this current winter season, did you intentionally cross into the other lane?

No: Crowded centerline.
Yes:
  • To plow the centerline.
  • Late night.
  • When needed, with no traffic, nighttime work.

Item 28. When you intentionally crossed into either the oncoming or passing lane, how far did you typically move into the other lane during average-visibility conditions?

When plowing with plow and wing down, I try to go to the centerline. On the return trip, you try to take centerline out. This gives oncoming traffic a partly plowed shoulder to move over into.
To clean up centerline after storm (4 people).
• Clean all of roadway (2 people)
• Gang plow to clear whole road.
• Item 28a – oncoming lane of a two-lane road.
  • To clean centerline only.
  • As far as I could go.
  • As many as traffic allowed.
  • City is underlined (3 people).
  • Rural is underlined (11 people).
• Item 28b – passing lane of a two-lane road.
  • If I had another plow behind me.
  • When there is no traffic (2 people).
  • Divided highway is underlined.
  • Divided interstate is underlined.

Item 29. *When you intentionally crossed into either the oncoming or passing lane, how far did you typically move into the other lane during low-visibility conditions?*

  • Item 29 alone
  • Not done during low visibility (2 people).
  • Full lane and shoulder.
  • Item 29a – oncoming lane of a two-lane road.
    • City is underlined
    • Rural is underlined (6 people).
    • Centerline.
    • Don’t know
    • Not on purpose (2 people).
  • Item 29b – passing lane of a four-lane road.
    • 12’ on divided interstate.
    • Divided highway is underlined.
    • Divided interstate is underlined.

Item 30. *As part of your snowplow operations this current winter season, did you unintentionally cross into the oncoming lane?*

  • Dumb question.
  • With poor visibility, you are lucky to stay on the road.
  • Yes:
    • How is someone to keep track of this; sometimes I have enough trying to miss traffic wanting both lanes.
    • Many times; sometimes you do not have an idea (2 people).

Item 31. *In the worst snowstorm this current winter season, how often and for how long did you completely lose sight of the roadway and shoulders in front of your snowplow vehicle?*

  • Not applicable in metro area.
  • Easy winter; lot of ice.
  • Never kept track. You drive until you can see yellow line in mirror or as close to centerline that you think is where you are plowing.
  • Item a – number of times.
    • Don’t know (2 people).
    • Item b – longest duration.
• Don’t know (4 people).
• In the worst storm this winter, I traveled 20 miles on just feeling the road.
• Seems like forever.
• Item c – average duration.
• Don’t know (3 people).
  • You’re too intense to keep time.

Item 32. *During the current winter season, did you ever have to stop because you could no longer determine your lane position?*
  • Loss position but did not stop.
  • No:
    • Not this season, but have in the past.
    • Do not stop on interstate; might get hit from behind (2 people).
    • Slowed way down, almost stopped (5 people)
    • Just keep plowing, rambling on (2 people)
    • Kept my fingers crossed.
  • Yes:
    • Number of times is unknown (3 people).
    • Also could not see other traffic.

Item 33. *During the current winter season, how many times did you have a ‘close’ call where you nearly ran off the entire road onto the soft shoulder?*
  • Quite a few times (2 people).

Item 35. *Have you or someone you know ever ran off the road because of low visibility during snowplow operations?*
  • No. Not during the 1998-1998 season.
  • Yes.
    • Lots of time.
    • ‘Someone you know’ underlined (4 people).

Item 37. *In your opinion, what are the three most important safety concerns with regards to operating a snowplow vehicle?*
  • Item c & f go together.
  • All of the above are important (3 people).
  • A good rule of thumb: if you can’t see them, they probably can’t see you.
  • Item b – ability to be seen by a vehicle approaching from the front
    • Or from the back.
  • Item f – ability to slow down traveling public
    • Stop road rage, angry drivers
    • Large trucks are the worst.
  • Item g – risk of being hit by another vehicle
    • Head-on collisions.
  • Item h – amount of blowing snow generated by vehicle and plow configuration
    • Plow configuration is underlined
  • Item i – amount of driving snow generated by inadequate or insufficient number of snow fences
    • Crossed out ‘generated by inadequate or insufficient number of snow fences’
• Don’t need snow fence; wind always come from the other direction.
• Item j – other.
  • Passing truck doing 70+ mph.

Item 38. *If technology existed which could tell your lane position, would you find it useful?*
  • No:
    • If visibility is that bad, you shouldn’t be on the road (2 people).
    • Electrical components around salt and chloride can fail.
    • Leave it in the original box! I don’t care for lane position equipment because it doesn’t tell you if a vehicle is stopped in front of your truck!
    • We have enough other things to keep your eyes on. We don’t need more devices to watch.
    • You’d have to take your eyes off the road to see it. Safety first. All this technology is a bunch of bullshit. Leave it alone.
  • Maybe:
    • Only if traveling public had it.
    • Depends on weather.
    • Depends on what kind of system.
    • For the cost, I would say no!!
    • It couldn’t be an alarm. It would drive you crazy, because in heavy snows, you drive around a lot.
    • Yes and no. You would be watching it more than the road.
    • The winters here haven’t been too bad lately, but if we have another ‘good’ winter, it would be nice to have.
  • Yes:
    • But it is only mechanical, so not to be totally trusted. Each plow driver needs to be alert and knows where they are on the road at all times.
    • Always helpful!
    • It does.
    • Sometimes not often.

Item 39. *On which section of the road, would lane position information be most beneficial?*
  • Provide all of them: shoulder line, centerline and center of lane information.
    • We would know where we are.
    • So we don’t hit someone.
    • Provide all of it for two-lane roads.
  • Item 1 – shoulder line.
    • First priority (2 people)
    • For two-lane roads.
  • Item 2 – centerline
    • Second priority (2 people)
    • Let operators use their built-in instead.
    • Beeper would be better than radar screen

Item 40. *If there were a device that was able to detect obstacles in front of your vehicle while in motion, would you find it useful?*
  • No:
    • Too late.
• Should not be driving in whiteout conditions. It is not safe for anyone to be driving on the road.
• We have enough other things to keep our eyes on. We don’t need more devices to watch.
• When sanding, plowing, winging, trying to see the road, watching traffic behind you, while swinging out around mail boxes, stalled cards, with your wing, I don’t think operators have time to be looking at screens in the cab of the truck.
• Just keep in mind. There are a lot of times you are driving on the shoulder to plow and wing the snow back as far as you can. I have a 12’ wing.

• Maybe:
  • What distance would it work from?
• Yes:
  • Definitely needed!
  • Always help to know ahead of time.
  • If far enough detection.
  • Not often just when needed in whiteouts.

Item 44. **Computer use:**
  a. *Do you use a computer at work on a regular basis?*
  b. *Do you use a computer at home on a regular basis?*

  • Item a – Yes:
    • Sometimes.
    • For timesheets only (2 people)
  • Item a – No:
    • Do not have time.
  • Item b – Yes:
    • Sometimes (3 people)
  • Item b – No:
    • Do not make enough money to afford one.
    • Sometimes (4 people)

Item 45 & 46. **Do you wear eyeglasses or contacts?**

  • Yes:
    • For reading (5 people)
    • Sometimes (3 people)

Item 47. **Do you wear sunglasses during daytime snowplow operations?**

  • Yes:
    • After a storm, when suns breaking through.
    • Always (3 people).
    • And ski goggles.
    • Transitions
    • Depending on the sun (3 people).
    • Some times; depending on the situation (14 people)
    • Depending on the glare (4 people)
    • Lenses are photo-gray (21 people)
    • Lenses are polarized.