



## **Post-Storm Meetings: A Survey of State and Local Practice**

*Prepared for*  
**Clear Roads Pooled Fund Study**

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### **Request for Report**

Post-storm evaluation is an evolving aspect of most winter maintenance programs. Most post-storm evaluations involve data collection during the storm event and subsequent analysis of that data with the goal of adjusting and improving winter maintenance operations. Members of the Clear Roads winter maintenance pooled fund study are reviewing the importance of one element of post-storm evaluation: post-storm meetings. These meetings may be local, regional or statewide, and may include plow operators, supervisors, and regional or statewide management. As the lead state for the Clear Roads pooled fund, Wisconsin DOT asked us to document the state of the practice for post-storm meetings and identify the benefits of these meetings in improving practice and employee morale.

### **Summary**

We conducted two brief surveys—one of AASHTO Research Advisory Committee members and a second of members of the SNOW-ICE listserv—consisting of the following questions:

1. Does your agency hold meetings to conduct post-storm assessment of winter maintenance operations?
2. If so, what are the benefits of these meetings?
3. Have you changed your practices as a result of post-storm meetings?
4. Do post-storm meetings improve morale among winter maintenance operations staff?

Sixteen state DOTs, three cities, an airport and the New York State Thruway Authority responded to the surveys, with one state DOT responding to both surveys. (See **Survey Results**.) Sample documents provided by survey respondents are included in **Appendices A and B**.

Key findings from the surveys include:

- Most of the agencies (**86 percent**) **conduct some form of post-storm meeting**, either after major storms or after most storm events. Only one agency indicated that they held no post-storm meetings; two other agencies mentioned informal discussions after a major storm event. Many agencies hold meetings at the local garage level, as well as district and statewide meetings. Formalized post-storm assessments are fairly new to some agencies; for example, the city of Lake Forest, Ill., implemented pre- and post-storm review programs last year, and Minnesota DOT recently institutionalized post-storm meetings as a best practice.
- Almost half of the agencies (**43 percent**) **conduct post-storm meetings after most storms**. Iowa, Maine, Minnesota and New Jersey are among the state DOTs that hold meetings after most storm events.

- Of those responding to the question about the benefits of holding post-storm meetings, **all agencies found the meetings helpful**. Commonly cited benefits include the opportunity to identify and correct problems, assess new treatments and techniques and encourage better communication.
- Most of the agencies (**86 percent**) **have changed practices as a result of post-storm meetings**. Not surprisingly, improved communication was frequently mentioned as a change in practice resulting from post-storm activities. Several agencies cited equipment modifications, changes in treatment practices and other operating improvements resulting from post-storm meetings. Missouri DOT began using the National Incident Management System to manage major winter storms after a post-storm assessment of operations following a major snowstorm in December 2006. New Jersey DOT updates its Winter Maintenance Guide to reflect operational changes from its post-storm meetings. Improvements in anti-icing operations resulted from last winter's post-storm assessments conducted by Maryland DOT.
- Slightly more than half of the agencies (**57 percent**) **felt that post-storm meetings improve morale**. Agencies reported that post-storm meetings encouraged team building and improved communication within the agency. Several agencies said results were mixed, with the success of such meetings often dependent on the staff at a specific garage. Still others were uncertain how post-storm meetings affected morale. A number of agencies cautioned that post-storm meetings must be carefully managed to minimize potential negative effects on operators and ensure that the meetings do not devolve into gripe sessions.

## Survey Results

### **Arkansas**

Contact: Tony Sullivan, State Maintenance Engineer, Arkansas State Highway and Transportation Department, (501) 569-2231, [Tony.Sullivan@arkansashighways.com](mailto:Tony.Sullivan@arkansashighways.com).

1. We do not conduct post-storm meetings to assess our winter maintenance operations.

### **Colorado**

Contact: Phillip Anderle, (970) 350-2100, [Phillip.Anderle@DOT.STATE.CO.US](mailto:Phillip.Anderle@DOT.STATE.CO.US).

1. CDOT has held statewide meetings after major storms, like the blizzards we have had the last couple of years. We also conduct more localized debriefings in unit areas after the storms. We also hold spring debriefings on our MDSS program.
2. No response.
3. Yes, we communicate better across region boundaries now and we are moving toward more consistency in winter operations and practices.
4. I can't say that this is the case yet, as with most change, people by nature are resistant, but I think that the employees have noticed some improvement, unfortunately they also realize they don't get the overtime that they used to and this is a point of contention.

### **Illinois (City of Lake Forest)**

Contact: Michael Silvestri, (847) 615-4230, [silvestm@cityoflakeforest.com](mailto:silvestm@cityoflakeforest.com).

1. Our agency implemented pre- and post-storm review programs last year.
2. The post-storm meetings are handled by a superintendent and have proven beneficial in assessing the achievement of established expectations and to review all elements of the program. This ensures accountability and improvements to our operational service levels.
3. No response.
4. All information both pre and post have been vital in educating, achieving buy-in and opening up communication lines within the organization.

#### Additional comments:

Our pre-storm meetings are attended by operating supervisors, superintendents and the Director. The Snow Commander is in charge of the meeting. Purpose is to outline personnel, equipment, and vehicle and material requirements for the upcoming storm. In addition, it allows operating supervisors a voice in identifying projected impacts on service levels due to the use of their personnel for snow operations. This information allows the Director to be on top of operations so that he can handle questions from the City Manager, City Council and residents.

## **Iowa**

Contact: Dennis Burkheimer, Iowa DOT Winter Operations Administrator, (515) 239-1355, [dennis.burkheimer@dot.iowa.gov](mailto:dennis.burkheimer@dot.iowa.gov).

1. Yes. These are held at the garage and District levels periodically throughout the winter season. (See [Appendix A](#) for a sample document used in post-storm reviews.)
2. These meetings help identify problem areas or areas that might need additional attention in future storms. It gives supervisors and staff the opportunity to critique their operations. Problems that can't be resolved at the garage level are often moved to the District level for resolution and those that are more statewide problems are moved up the ladder for resolution. Each garage is likely to view post-storm meetings a little differently which will determine the value of the meetings to that garage.
3. I'm sure some practices have been changed based on post-storm feedback but it would be hard to quantify. We are always looking for ways to improve our winter operations and feedback through post-storm meetings can be helpful to understand problems.
4. Every garage is likely to have a different feeling about the impact of post-storm meetings on morale. Some operators might appreciate the opportunity to provide feedback on their operations while others might use the time as a gripe session. Each garage will be a little different based on the personalities of the staff at that shop, the supervisor and the issues. Some post-storm meetings are formal while others are very informal and the size of the garage will also impact the type of post-storm meeting that is held. A shop with 35 employees may not have one formal meeting to discuss issues but may break into smaller groups. A shop with 8-10 operators may make it easier to manage discussions.

## **Kentucky**

Contact: Steve Farmer, Transportation Engineering Branch Manager—Project Delivery and Preservation, [steve.farmer@ky.gov](mailto:steve.farmer@ky.gov).

1. We do not have a formal process for post-storm meetings or a formal assessment process. We do get together after major storm events and discuss what went right or what could we have done better.
2. We have received some benefit from these post-storm meetings, but have been unable to quantify any benefits.
3. We hopefully have learned from mistakes but nothing jumps out at this time.
4. It does seem that morale improves by allowing our people to commiserate with others who face the same hurdles. It helps them to know that they are not alone in their problems. We can also recognize the personnel for their hard work.

## **Kentucky**

Contact: P. David Cornett, Assistant Director/Roadside Manager, Division of Maintenance, (502) 564-4556, [davidp.cornett@ky.gov](mailto:davidp.cornett@ky.gov).

1. In Kentucky, we do not normally have post-storm meetings after routine storms. However, we do have post-storm meetings after significant storms with major impacts, especially if we have not performed very well. The last major event of this caliber was in December of 2003 on the I-24 corridor in both Kentucky and Tennessee.
2. No response.
3. We have not normally altered our practices after a post-storm meeting; it is more of a fact-finding session to evaluate the processes and procedures that were utilized during a major storm to address the many issues that arose.
4. Not applicable. The crews are not normally included in the meetings.

## **Maine**

Contact: Brian Burne, MaineDOT Highway Maintenance Engineer, (207) 624-3571, [Brian.Burne@maine.gov](mailto:Brian.Burne@maine.gov).

1. MaineDOT crews will hold both pre-storm and post-storm meetings. Like WYDOT, these are not required by policy, but it is part of our annual training and a best practice. As also mentioned by others, the post-storm debriefings are not viewed as critical for the smaller, more routine events, but for the larger events or those that presented unique challenges, it offers a method to understand which strategies were most effective or not worth repeating.
2. Other benefits include providing an opportunity to identify problems that need to be addressed with either the routes or equipment, coordinating storm clean-up efforts, or identifying where staffing splits or backup support may or may not have been sufficient. In cases where we are evaluating new equipment or chemicals, the post-storm debriefing also provides an opportunity to make an assessment of those items as well.
3. Post-storm meetings have helped us refine equipment modifications for salt placement and identify whether or not pretreating was effective under various conditions.

4. We believe that post-storm meetings do have a positive influence on morale because they allow the crew members to weigh in on the strategies and identify issues to be addressed (unless, as Pat Kennedy mentioned, they are allowed to deteriorate into a gripe session).

### **Maryland**

Contact: Marc Lipnick, Quality Assurance Team Leader, Office of Maintenance, (410) 582-5566, [mlipnick@sha.state.md.us](mailto:mlipnick@sha.state.md.us).

1. The Maryland State Highway Administration (SHA) has seven engineering districts and 28 maintenance shops. Many of the shops and districts hold post-storm assessments whenever they have a significant storm. SHA has a statewide assessment of winter operations after major storms or whenever its response was viewed as lacking in any area. The assessment usually occurs at the monthly Statewide Maintenance Quality Council meeting. The council attendees are district and central office maintenance managers.
2. Post-assessment meetings at the statewide level have been productive. This is particularly true when action items are identified and followed up. In these cases, we have been able to quantify improvements in our operations.
3. Post-assessment meetings this past winter led to improvements in our anti-icing operations. The improvements are spilling over into the upcoming winter when we will be geared up for anti-icing operations throughout the state.
4. Post-storm assessments appear to help the morale at maintenance shops. At the statewide level, assessments have helped the morale of districts that have struggled from time to time with their response to winter storms. It's encouraging for a district to know their peers support them and will help them get through any problems they are experiencing. The post-storm discussions are documented and shared with maintenance shop managers across the state and senior SHA managers. Some of the discussions lead to written reports with action plans and follow-up.

### **Minnesota**

Contact: Gabe Guevara, Maintenance Operations Engineer, (651) 366-3556, [Gabriel.Guevara@dot.state.mn.us](mailto:Gabriel.Guevara@dot.state.mn.us).

1. Yes; but this procedure was institutionalized as a best practice fairly recently and we do not have much history on its impact (but we are certainly positive about it...); we use post-storm maps depicting regain times, material usage, etc., to guide the discussion at the meetings. (See [Appendix B](#) for sample documents used by Minnesota winter maintenance operations staff conducting post-storm reviews.)
2. There appears to be better accountability of operators at the shops, we seem to be moving in the direction of more standardized procedures (consistent approaches), and the post-storm meetings serve as a learning and "motivational" tool. We have not yet been able to quantify those benefits; and this will not be simple since the post-storm meetings are just one of a series of measures concurrently adopted to increase the efficiency of our Snow and Ice operations.
3. Yes; comparing the regain times (a performance measure we use) across similar roadway segments under similar/same climatological conditions allows us to determine which operator employed the most cost-effective approach.
4. These meetings need to be managed effectively in order to minimize any potential negative effects on the operators and to make them a valuable tool in the eyes of the superintendents and maintenance engineers conducting the meetings.

### **Missouri**

Contact: Tim Jackson, Maintenance Liaison Engineer, (573) 526-1884, [timothy.jackson@modot.mo.gov](mailto:timothy.jackson@modot.mo.gov).

1. We do not hold post-storm assessments on a routine basis. Assessments will be done after major storms or if an area had some obvious problems. No documentation to provide.
2. Identify strengths and weaknesses of our operations and share best practices to overcome those weaknesses. We have not been able to quantify those benefits.
3. On a statewide basis, we started using the National Incident Management System to manage major winter storms after a post-storm assessment of our operations following a major snowstorm in December 2006.
4. Unknown.

### **Montana**

Contact: Justun Juelfs, Roadside and Winter Maintenance Specialist, (406) 444-7604, [jjuelfs@mt.gov](mailto:jjuelfs@mt.gov).

1. MDT doesn't currently conduct formal post-storm assessments for winter maintenance operations. With that said, our operators are constantly sharing information with each other informally. They discuss topics like

equipment success/failures, adequate application rates, storm related accidents and infrastructure repair needs as well as weather forecasting accuracy.

2. Although we've not specifically quantified informal post-storm crew chatter, it's certainly considered important.
3. MDT's winter maintenance program has evolved over the years and strives to find balance with safety, cost-effectiveness and environmental stewardship. Equipment improvements, material selection and forecasting accuracy have all played their role, but with that said the most important part of the equation is the intelligent operator.
4. No response.

#### **New Jersey**

Contact: David Bowlby, (609) 530-2815, [David.Bowlby@dot.state.nj.us](mailto:David.Bowlby@dot.state.nj.us).

1. Yes, we hold post-storm meetings; no documentation to provide.
2. The ability to make changes as needed rather than waiting for post-winter meetings. The benefits are intrinsic/intangible for the most part. However, we have been able to definitely identify the fact that our meetings have resulted in smarter salt usage based on storm conditions and good snow fighting decision making practices.
3. Yes. We have a Winter Maintenance Guide that we continually update to reflect the changes we make along the way to improve our operation.
4. I would hope so. Seeing changes made to better the operation would surely show that there is great concern to make it the best possible and should hopefully make the staff feel like their management does care about them and their input.

#### **New Jersey (City of Hamilton)**

Contact: Richard M. Balgowan, Director of Public Works, (609) 890-3567, [rbalgowan@hamiltonnj.com](mailto:rbalgowan@hamiltonnj.com).

1. In my many years with the NJDOT, and most recently with the Township of Hamilton, I can't recall not holding both pre-storm strategy meetings and post-storm assessment meetings for most forecast storms or events. I think both types of meetings are extremely valuable.
2. Regarding post-storm meetings, the benefits are that you can look in detail at how you managed the storm or event and the relevant outcomes. If you are collecting data (e.g., time it took to mobilize or demobilize, equipment breakdowns, citizen complaints, plowing and spreading times, chemical application rates, response times to incidents, etc.) during a storm or event, you have the ability to prepare reports that can be used at the post-storm meeting. Hamilton Township uses a comprehensive management information system and geographical information system to collect data and prepare reports, etc. Post-storm assessment meetings allow you to evaluate how you dealt with the storm or event from the beginning to the end. It can be used to identify things that were done well and things that need improvement. It can help determine solutions to fixing things that didn't go right.
3. Often, the outcome of post-storm assessment meetings can result in procedure changes. For example, if it was determined that one crew was taking longer than the standard (ours is 90 minutes) to spread salt on their assigned road sections, a decision would be made to either take some lane miles of road from that crew and assign to another crew or give the crew some additional equipment and labor. That's just one example.
4. Another very important reason for pre-storm strategy meetings and post-storm assessment meetings is that they facilitate team building. They are important to the four major managerial functions of leading, organizing, planning and controlling. I consider them a critical component of any good Winter Operations Management Plan.

#### **New York**

Contact: Lou Cardinale, Highway Maintenance Supervisor 2, [lcardinale@dot.state.ny.us](mailto:lcardinale@dot.state.ny.us).

1. I hold after-storm meetings usually after large storms with each shift (we operate 2 shifts). The meetings are informal and I do not have documentation.
2. The meetings usually bring out such things as equipment problems, difficult areas such as illegally parked vehicles, plowing obstacles, what went right or wrong. Again, I do not have documentation.
3. Post-storm meetings have helped the operation especially by bringing up issues that we can resolve before the next event. Also we have begun to use salt brine and we find out how it did in the beginning of the storm.
4. Morale among employees is improved because they can give input and bring up issues that can usually be easily resolved.

### **New York (NYS Thruway Authority)**

Contact: Michael J. Loftus, Assistant Superintendent of Thruway Maintenance, NYS Thruway Authority 200, (518) 436-2948, [michael.loftus@thruway.state.ny.us](mailto:michael.loftus@thruway.state.ny.us).

1. On a very local level, individual garages will hold post-storm reviews or discussions on an as-needed basis to address issues or problems that occur. On a more central basis, we will generally hold post-storm meetings for large events that cover big geographic areas or for events that produce major amounts of snow or for events that result in significant disruptions in traffic or service.
2. The major benefits of these meetings are to 1) provide assurance that we followed our practices and 2) see if there are opportunities for improvement. We try to avoid making them blame pointing sessions.
3. In some instances we have, but the changes have been more related to localized practices rather than systemwide policies.
4. Depending on the reason for the meetings they may or may not. The more localized garage meetings can provide some immediate feedback to the operators and can address concerns they might have. This could serve to help morale.

### **North Carolina (City of Charlotte)**

Contact: Ken Martin, Deputy Superintendent, CDOT/Street Maintenance, (704) 432-3141, [kmartin@ci.charlotte.nc.us](mailto:kmartin@ci.charlotte.nc.us).

1. CDOT does hold post-storm assessment meetings after every snow and ice event. Some ask does Charlotte, NC, actually get snow? Well, in 2004 we had 18 inches here and that was a big event. Nevertheless, we do have icing and snow events whereby we have to do a lot of the same things others do to remove the snow and ice. We meet with our own personnel to evaluate our services and with other city agencies (police communications, fire communications, NCDOT, city communications, solid waste, equipment management, and others) to talk about our services, partnerships and communication throughout the storm.
2. No response.
3. Yes, we have changed the way we communicate with each other and always make sure we have open lines of communication. We talk about things we did well and things we did not do well.
4. Absolutely, communications always improves processes and giving verbal praise to partners helps in raising morale. Street Maintenance Divisions cannot be successful without the assistance of other agencies in times of weather events.

### **North Dakota**

Contact: Larry Gangl, Dickinson District Engineer, [lgangl@nd.gov](mailto:lgangl@nd.gov).

1. Yes.
2. Employee training, good overview for management, excellent way to review operations.
3. Yes, not all the time, but changes have been made due to issues that surfaced in these meetings.
4. Yes, it is an excellent communication tool.

### **Oregon**

Contact: Luci Moore, (503) 986-3005, [Lucinda.M.MOORE@odot.state.or.us](mailto:Lucinda.M.MOORE@odot.state.or.us).

1. For really bad storms, we sometimes do a post-storm review meeting to see what operations we could improve. This has been at the crew level and the statewide leadership level.
2. Benefits have usually been in improved communications and coordination among crews and more attention to what materials and equipment we may need on hand or to replace.
3. We have increased deicer storage capacity and have updated some very old snow blowers based on issues of past storms for example. There is no set format or documents for these meetings.
4. Also, since we survived one of our worst winters in a long time, we had a lot of post-winter thank you meetings with our crews. Our Department Director, Transportation Commission [members] and some state legislators attended. This seemed to help crew morale.

### **Utah**

Contact: Lynn Bernhard, (801) 964-4597, [lynnbernhard@utah.gov](mailto:lynnbernhard@utah.gov).

1. UDOT does not have a policy to hold formal post-storm meetings. There are ad hoc meetings held after major storms where something has gone wrong in some regions.
2. Supervisors and managers have a chance to discuss problems and how to correct them.
3. We have made adjustments in plow routes and call-out response protocol for consistency.
4. They appear to.

## **Washington**

Contact: Monty Mills, WSDOT Maintenance and Operations Branch Manager, (360) 705-7803,  
[MillsM@wsdot.wa.gov](mailto:MillsM@wsdot.wa.gov).

1. Yes, WSDOT does hold post-storm meetings for storms of major significance. These meetings may be held on an area, regional or statewide basis dependent upon the severity and widespread nature of the storm. When the Regional and HQ Emergency Operations Centers are activated for the most severe storms, we have debriefings to discuss how well we worked within the agency and with other agencies. An After Action Report is published by the Emergency Management Office when an incident of extreme or statewide significance occurs.
2. The benefits of these meetings are the ability to identify opportunities for improvement in internal and external communications, operational efficiencies, material performance, equipment issues and personnel concerns. Meetings may be held separately at a variety of levels so that all employees have an opportunity to weigh in on their concerns. It is not usually practical to have all levels at one meeting because management focus is different than operator focus in terms of storm response issues. Issues of concern on the operator or supervisor level can be elevated for response when management input is necessary.
3. Operational improvements have been identified at these meetings which have resulted in better cooperation and communication between regions on large scale events, proactive movement of resources to areas of critical need, interaction with other agencies, identification and remedy of resource shortcomings, and improvements to operational methods, application rates and equipment modifications.
4. Any time you give staff the opportunity to be involved in the decision making process you should see a corresponding increase in morale and a greater sense of inclusion. As has been noted by others in these responses, if ideas and comments are dismissed or not taken seriously, you risk alienation of the staff, and less participation in these types of meetings. Of course not all ideas are good ones, so there is a need to listen and respond appropriately to suggestions that are not workable, without being condescending.

## **Washington, D.C. (Dulles International Airport)**

Pat Kennedy, Transportation Specialist, FHWA Road Weather Management Team, (202) 366-9498,  
[Pat.Kennedy@DOT.GOV](mailto:Pat.Kennedy@DOT.GOV).

**NOTE:** In my previous life, I helped manage the maintenance end of snow removal operations at Washington Dulles International Airport. I'd like to provide responses to a few of your questions:

1. Going into the first winter season in the management position that included managing snow removal operations, I started the practice of holding post-event debriefings after each "Full Recall" event. (Full Recall meant that we had implemented a full-scale snow removal operation of approximately 200 in-house employees as well as additional contractual support.) Attendees at these meetings included team leaders from an assortment of teams associated with the snow removal operation (airfield and nonairfield snow removal teams, equipment maintenance, contract oversight and the warehouse staff who also provided some of the meals during such events). The purpose of these meetings was to review the success and/or shortfalls of the operation and discuss the ways we could improve our response.
2. Simply put, the benefit of these meetings was that it provided a very effective forum for identifying and discussing a whole range of issues that once addressed, ultimately resulted in dramatic improvement to our overall response to winter storm events.
3. Yes, as a direct result of these meetings, we made numerous changes to our snow removal plan and operations.
4. Absolutely! This, in addition to the actual operational improvements, was one of the biggest benefits of these meetings. By bringing in the folks who were actually out there doing the work, and providing them an opportunity to air their thoughts, concerns, grievances, suggestions, etc., and most importantly, addressing them, it really helped foster a sense of TEAM amongst a group of individuals who during the course of their regular day-to-day duties, didn't normally work together as a team.

Additional comments:

1. I don't believe that holding post-event meetings will add much value unless the person holding them has a sincere desire to use them as a potential tool for improving operations. In other words, if such meetings are held, and issues, concerns and suggestions aren't addressed and/or implemented (at least the ones that make sense and/or can be) then the participants won't feel very motivated by attending them.
2. One cautionary note: Over a period of time, as the major issues, concerns and suggestions are addressed, taken care of or implemented, post-event meetings can start to devolve into, for lack of a better term, "bitch sessions."

I guess how quickly this occurs depends on how many major issues might exist within an operation but once reached, the value of holding such meetings will need to be reevaluated.

### **Wyoming**

Contact: Ken Shultz, State Maintenance Engineer, (307) 777-4458, [ken.shultz@dot.state.wy.us](mailto:ken.shultz@dot.state.wy.us).

1. We hold post-storm assessments after major events. This is not by policy, but is definitely a best practice. As many of the others have stated, this is not done after “routine” storms. We determine which actions were beneficial and which actions, if any, appear to have been detrimental to our efforts. We also discuss actions that we might have taken that may have helped us to improve the situation. These discussions are held at various levels through our organization.
2. No response.
3. Some changes in our operations have resulted from these discussions.
4. In some cases, morale improves. In others, it does not.

## **Post Storm Review**

**Purpose:** The purpose of the winter post storm review is to allow garage personnel the opportunity to discuss ways to improve snow removal operations in their area. Some problem areas identified through this review process may be handled at the garage level while others may need to move to the next level while others may need to be resolved at a statewide level.

**When:** The discussion should take place within 2-4 days of a winter storm to make sure issues are fresh in everyone's mind. A one or two hour limit should be designated for these sessions.

**Where:** Breakroom or other suitable location

**Who:** All garage employees at each garage should participate in the post storm review

**How:** Following the questions in this document will provide a structure for the discussions. Any items identified in the discussion that can not be handled at the garage level should be forwarded to the next appropriate level. Short summary reports (oral or written) from Supervisors on post storm reviews conducted at their garages may be required on a periodic basis. Any issues that arise from discussions with supervisors that appear to be statewide issues should then be discussed at management meetings.

**Documents:** Daily reports, weather forecasts or other internal documents (spreadsheets, databases, etc.) used by the garage to record snow removal operations should be used to help supplement the garage discussions.

**Discussion Questions- The following questions will help guide the discussion of the group:**

1. Weather forecast (Review weather forecast provided by contracted services)
  - a. Was the start time forecast reasonably accurate?
  - b. Was the type of precipitation forecast accurate?
  - c. Pavement temperature and wind forecast accurate?
  - d. Did the forecast discussion help in planning for this event?
  - e. What weather information is missing that would have made the storm planning easier?
2. Did we respond to the storm in a timely matter?
3. Staffing (review Daily Report or other record)
  - a. Was enough staff available for the storm?
  - b. Was staff called at the right time?
  - c. Any improvements needed in our call-out system?
  - d. Were crews on the road at right time?
  - e. Was adequate rest provided during the storm?
  - f. Were crews released at the right time?
4. How much material was used during the event by route (review Supervisor Daily report or other garage reports)?
  - a. Salt
  - b. Salt Brine
  - c. Abrasives
  - d. Calcium Chloride
5. Did the deicing chemicals selected work well for this event?
6. Were application rates adequate for this event?
7. Were there any material handling issues during this event?
  - a. Any endloader problems
  - b. Any material clumping or freezing problems in trucks
  - c. Any delays with loading operations and describe possible cause
  - d. Any storage facility problems (salt clumped, lights not working, door not functioning properly, etc.)
8. Identify any equipment problems experienced during the event or any breakdowns that occurred
  - a. Plows or carbide blades
  - b. Engine/Transmission
  - c. Brakes
  - d. Hydraulics
  - e. Dump Body

- f. Spreader/auger
  - g. Lighting system
  - h. Cab and controls
9. Would any preventive maintenance measures have eliminated the equipment problems?
  10. Any equipment expected to be out of service for an extended period? How will the out of service equipment be replaced or routes modified to allow for the down vehicle?
  11. Describe any locations along your route that were troublesome for the following reasons?
    - a. Blowing and drifting
    - b. Melt and refreeze issues
    - c. Sheltered area, cold spots
    - d. Multiple accidents or multiple vehicle accidents
    - e. Icing or hard pack
  12. Did we return the roads to normal or provide wheel paths in good time (review daily report)?
  13. What could we have done differently that might have returned the roads to normal faster?
  14. Any road closures?
  15. Did we coordinate operations well with neighboring garages?
  16. Did we communicate and coordinate well with law enforcement in the area?
  17. What can we do next time to improve our services to the public?
  18. What were our successes in this event and why were they successful? (good luck or good planning)
  19. What was not successful in this event and why? (bad luck or bad planning?, weather, equipment breakdown, etc.)
  20. Knowing what we know now, what would we have done differently in this event?

# MN/DOT BEST PRACTICE POST STORM TRUCK STATION REVIEW

**Target:** 85% of the time districts will conduct post-storm meetings within 48-96 hours after the snow and ice event (for all events).

**Objective:** Districts will document operational changes that are adopted at the post storm meetings and the operational improvements will be shared with other districts by management with possibility of statewide implementation.

## Please Respond To The Following:

<b>Location/Truck Station:</b>	<b>Event Start Date:</b> <b>Event End Date:</b>	<b>Precipitation:</b> (what and how much)
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**1. Evaluate operations during storm:**

(Examples, but not limited to: chemical performance, equipment reliability, MDSS accuracy, traffic flow, critical/non-critical adjustments, etc.)

**2. Evaluate route performance (comparisons within sub-area):**

**3. Evaluate what did not work, ideas for improvement:**

**4. What could be changed to improve operations (solutions):**

**Comments:**

# Metro Truck Station Snow & Ice Critique Meeting

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Date of Storm:

What were the weather conditions:  
(Temperature[air & pavement], Wind)

What worked well:

What didn't work well:

What was the chemical application rate used:

What could or should we do differently:

# District One Post Storm Meetings

Date:

Sub-Area:

Truck Station:

Date of Storm:

What were the Weather Conditions?

Temperature:      Air:      Pavement:

Wind:      Direction:      Speed:

How close was the weather forecast to actual conditions? (RWIS / MDSS / Other)

What roads were anti-iced prior to the storm?

Which chemicals were used for anti-icing?

What worked well?

What didn't work well?

Which chemicals were applied?

Application rate/s?

What could, or should we do differently?

Do you have any other ideas or comments?

## Safety Items

Are / Were there any NEW Route Hazards or concerns?

Were there any significant Traffic Hazards concerns?

Solutions / Remedies?

**General Comments:**

Employee

Name	<input type="text"/>	Employee ID	<input type="text"/>
Date	<input type="text"/>	Sub-Area	<input type="text"/>
Truck Station	<input type="text"/>	Supervisor	<input type="text"/>

Event Date

From:  To:

Any Safety Issues?

Equipment Issues?

Route Number	Weather Conditions	Wind Conditions	Wind Direction	Temp Range	Was Route Anti-Iced?	If So, What Chemicals?	What Materials Used?	What Rate Per Lane Mile?	What Worked?	What Did Not Work?	What Could/Should Be Done Differently?
<i>ex: TP6A0522</i>	<i>ex: Hvy Snow w/ Blowing</i>	<i>ex: 15-20MPH</i>	<i>ex: NW - W</i>	<i>ex: 20-15</i>	<i>ex: YES</i>	<i>ex: Brine</i>	<i>ex: Salt</i>	<i>ex: 200</i>	<i>ex: Anti-Icing</i>	<i>ex: N/A</i>	<i>ex: N/A</i>

Notes and Remarks

Truck Station

Date  Sub-Area   
 Truck Station  Supervisor

Event Date

From:  To:

Any Safety Issues?

Equipment Issues?

Route Number	Weather Conditions	Wind Conditions	Wind Direction	Temp Range	Was Route Anti-Iced?	If So, What Chemicals?	What Materials Used?	What Rate Per Lane Mile?	What Worked?	What Did Not Work?	What Could/ Should Be Done Differently?
<i>ex: TP6A0522</i>	<i>ex: Hvy Snow w/ Blowing</i>	<i>ex: 15-20MPH</i>	<i>ex: NW - W</i>	<i>ex: 20-15</i>	<i>ex: YES</i>	<i>ex: Brine</i>	<i>ex: Salt</i>	<i>ex: 200</i>	<i>ex: Anti-Icing</i>	<i>ex: N/A</i>	<i>ex: N/A</i>

Notes and Remarks

# District 8

## Post Storm Critique Meetings

Truck Station \_\_\_\_\_

- Date of Storm
- What were the weather conditions?  
Temperature (air & pavement) wind?
- What worked well?
- What didn't work well?
- What was the chemical application rate used?
- What could, or should we do differently?



## Owatonna Sub Area Post Storm Critique Meetings



**Truck Station:** \_\_\_\_\_ **Date of Storm:** \_\_\_\_\_

**What were the weather conditions?**

**Temperature:**

**Air:** \_\_\_\_\_ **Pavement:** \_\_\_\_\_

**Wind:**

**What worked well?**

**What didn't work well?**

**What was the chemical application used/**

**What could, or should we do differently?**

\_\_\_\_\_ Sub-Area  
**Post Storm Meetings  
Critique**

**Attendees:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Date of Meeting:** \_\_\_\_\_ **Truck Station:**  
\_\_\_\_\_

**Date of Storm:** \_\_\_\_\_ **What were the Weather Conditions?**  
\_\_\_\_\_

**Temperatures** Air: High \_\_\_\_ Low \_\_\_\_ Pavement: High \_\_\_\_ Low \_\_\_\_

**Wind** Direction: \_\_\_\_\_ Speed: High \_\_\_\_ Low \_\_\_\_

Were the roads anti-iced prior to the storm? Yes \_\_\_\_\_ No \_\_\_\_\_

Which chemicals were used for anti-icing? \_\_\_\_\_

What worked well?

What didn't work well?

Which chemicals were applied and at what rate?

What could, or should we do differently?

Any safety issues?

Any equipment issues?

Do you have any other ideas or comments?  
\_\_\_\_\_