DEPARTMENT OF TRANSPORTATION

Maintenance Operations Research Procedures Manual

Office of Maintenance

For more information contact any of the following:

Mindy Heinkel
Maintenance Research Program Administrator
651-366-3585

Tom Peters
Research and Training Engineer
651-366-3578

Sue Lodahl
Assistant State Maintenance Engineer
651-366-3549

Table of Contents

Introduction

This manual has been developed to document the administrative process for the Maintenance Research funding program. It will provide assistance to those wishing to pursue operational research opportunities as well as assist those responsible for program administration.

Mission

Serving as a catalyst of collaboration and innovation for the State of Minnesota's Department of Transportation.

Goals

The goal of the Maintenance Operations Research program is to identify, develop and implement the most effective maintenance procedures, materials and equipment throughout the State of Minnesota.

The success of this program is a direct result of field involvement. Many of the best ideas and implemented projects have come from various dedicated District operations staff throughout the state. They offer real life solutions to many of the challenges that is faced in the area of maintenance.

Objectives

Maintain an active and viable applied research effort that involves all MnDOT Maintenance areas.

To take a proactive look at projects that take preventive action instead of being a reactionary process.

Guiding Principles

- Seeking out new technologies not now in general use.
- Seeking out technologies in use within other existing entities.
- The primary drive for ideas to research should come from the field.
- Technologies evaluated by measureable benefits versus fiscal responsibility.
- Using research funds where appropriate.
- Pursuing statewide implementation for successful products and processes.
- Share effective practices throughout all of the districts

Program Overview

The Maintenance Operations Research unit encourages and funds applied research and assists in developing innovations. It promotes operational or "applied" research and encourages the development of ideas and methods that improves transportation and promotes collaboration between statewide maintenance districts. The program's primary research effort is to take a proactive look at projects that take a preventive action instead of being reactive.

Office of Maintenance Research Program Unit Responsibilities

- Provide budget authority approval for projects.
- Coordinate and facilitate the implementation of research findings so that results are transferred to the customer in an effective, efficient and timely method
- Provide guidance to the sponsor regarding the proposal format and research guidelines
- Provide guidance to prepare written work plans for research project
- Write award letters and provide districts with funding resources and guidance

- Promote knowledge transfer through maintenance website, biennial reports, vendor meetings, conferences and reports, gather lessons learned failures and successes of the projects.
- Present the project results and recommendation to Area Maintenance Engineers and to Operations Management Group
- Oversee and assure projects are completed in a timely manner
- Solicit and provide ideas for potential research projects
- Support the district during the life of the project
- Stay informed on the status, interim results and possible problems during the conduct of research
- Provide guidance in the preparation of final reports
- Actively participate in the field testing by taking notes, photos and videos
- Assist in the implementation process of successful research projects
- Market the program
- Prepare maintenance bulletins
- Attending expos and conferences
- Meet vendors and set up product demos

Maintenance Operations Research Fund (MOR)

The Maintenance Operations Research (MOR) program is a unique statewide collaboration focused on identifying and applying real-world solutions to highway maintenance operations.

Managed by the MnDOT Office of Maintenance, the program funds the testing and evaluation of innovative products and practices that have the potential to significantly improve the efficiency and safety of MnDOT maintenance activities. Research areas include:

- Bridge and Structures Inspection and Maintenance
- Road and Roadside Maintenance
- Snow and Ice
- Traffic Operations and Maintenance

“On the road” research is our focus but at times we will support laboratory research

MOR Funding

The MOR Fund is to fund and assist any innovations relating to field maintenance operations up to $15,000.00. Funding varies each fiscal year for maintenance research activities. Activities that are eligible for partial or full research funding include the development of new or more effective maintenance procedures, materials and equipment.

Office of Maintenance MOR Selection Committee

Members are from the Office of Maintenance Research Department.

- Districts are encouraged to create an individual research committee. ***See Appendix***.

District MOR Committee Member Responsibilities

The chairperson is responsible for:

- Scheduling the meetings as well as any logistics involved
- Creating meeting agenda

- Run the meetings - keeping committee on agenda schedule
- Tracking District ideas and approved projects

The general members are responsible for:

- Attending meetings diligently
- Actively engage in committee business
- Garner ideas from other areas to bring to the committee
- Be an advocate for the committee
- Each member should treat others and their ideas or comments with respect.

MOR Meetings

The Office of Maintenance MOR committee meets on a monthly basis or as needed.

At a minimum, District MOR Meetings should be held every other month.

MOR Process

Submissions - A project proposal form must be filled out completely in order to be considered for funding approval. *See Appendix.*

What to include: All quotes, brochures, pictures and communication must be attached to the proposal.

- Material proposals should include the MSDS
- Equipment proposals should include the spec sheet

    - ***Note on Vendors*** - if they are not a current vendor with the state - work with them to become a state approved vendor. Have the vendor go to the website to learn about vendor registration and online registration. https://mn.gov/admin/business/vendor-info/

MOR Selection Criteria

- For the MOR Projects, the Office of Maintenance Operations Research staff, follow a set of criteria to ensure that research proposal submissions meet the goals and purpose of the Maintenance Operations Research program.
    - Projects submitted for funding consideration are evaluated based on the following criteria:
        - Availability of funding and matching resources
        - Expected benefits or return on investment
        - Potential for improving safety in the field
        - Opportunity for statewide implementation
        - Innovation

New Technology, Research and Equipment Committee (NTREC)

The New Technology, Research and Equipment Committee (NTREC) is a sub-committee of the Minnesota Department of Transportation's Operations Management Group (OMG).

NTREC Funding

The NTREC Fund is to fund and assist any innovations relating to field maintenance operations above $15,000.00. Funding varies each fiscal year for maintenance research activities. Activities that are eligible

for partial or full research funding include the development of new or more effective maintenance procedures, materials and equipment.

NTREC Selection Committee

NTREC functions are under the supervision, leadership and guidance of the Maintenance Research and Training Engineer. The NTREC committee is comprised of various individuals representing a variety of maintenance operations.

- The Chairperson is the Maintenance Operations Research Program Administrator (voting member)
- The Co-chair is the Maintenance Operations Research Engineer (voting member)
- Superintendent (voting member)
- Liaison from OMG (AME)
- Office of Maintenance
  - Work Zone Safety (voting member)
  - Training (voting member)
- Bridge (voting member)
- Traffic (voting member)
- Safety (voting member)
- Fleet (voting member)
- Materials Lab (voting member)
- District Research Committee Chairs (voting members)

The NTREC Committee general members are responsible for:

- Reviewing and voting on NTREC projects.
- Each member should treat others and their ideas or comments with respect.
- Note: If a member is unable to attend the fall meeting, they should send an alternate. There is one vote per district.

NTREC Meetings

The NTREC Committee meets twice a year and at the fall meeting, presentations are made for project review and selection. Each District and Technical Specialty office is allowed one vote. The NTREC committee uses a grading sheet to assign points based on the selection criteria. *See Appendix.*

NTREC Process

Submissions - A project proposal form must be filled out completely in order to be considered for funding approval. *See Appendix.*

What to include: All quotes, brochures, pictures and communication must be attached to the proposal.

- Material proposals should include the Material Safety Data Sheet
- Equipment proposals should include the spec sheet

  - ***Note on Vendors*** - if they are not a current vendor with the state - work with them to become a state approved vendor. Have the vendor go to the website to learn about vendor registration and online registration. https://mn.gov/admin/business/vendor-info/

The project originator is required to present or demonstrate their project at the fall meeting in order for their project to be evaluated for potential award.

NTREC Selection Criteria

- For the NTREC Projects, the committee uses a grading sheet and a voting process on the following criteria:
  - Funding and Matching Resources (20 points)
  - Potential Return / Benefits (20 points)
  - Safety (15 points)
  - Potential Implementation (15 points)
  - Innovation (15 points)
  - Products and Services (15 points)

MOR / NTREC Approval Process

Once a project is approved for funding through the MOR/ NTREC programs an approval letter is sent to the project champion from the Office of Maintenance.

The approval letter will include a funding string and an amount approved for the project. If additional funding is needed, district funds will be used.

The procurement must occur in accordance with all state laws, rules, and procedures. The procurement must also be performed by a Certified ALP Buyer.

MOR / NTREC Project Evaluation

All MOR / NTREC projects are required to submit a final Assessment at the end of the evaluation period. *See Appendix.*

Implementation Fund

Each fiscal year, there may be additional funds available to distribute statewide. The Implementation Fund is in place to apply projects resulting from MOR research into work practices and ensure that the results of successful Maintenance Research projects are implemented into the field operations within Mn/DOT maintenance and to optimize the return on investment. This funding when available is managed by the Office of Maintenance Research Committee.

Appendix (all actual forms follow this page)

A. Process Flow

MOR_NTREC Flow Process.pdf

B. NTREC Selection Criteria

NTREC Selection Criteria.pdf

C. Proposal Form - example - properly filled out

MOR Research Proposal SAMPLE.pc

D. Waiver - vendor / no promise to purchase additional

Waiver SAMPLE.pdf

E. Award Letter - example

MOR Approval Memo SAMPLE.pdf

F. Project Evaluation - example - properly filled out

MOR Research Project Assessment S

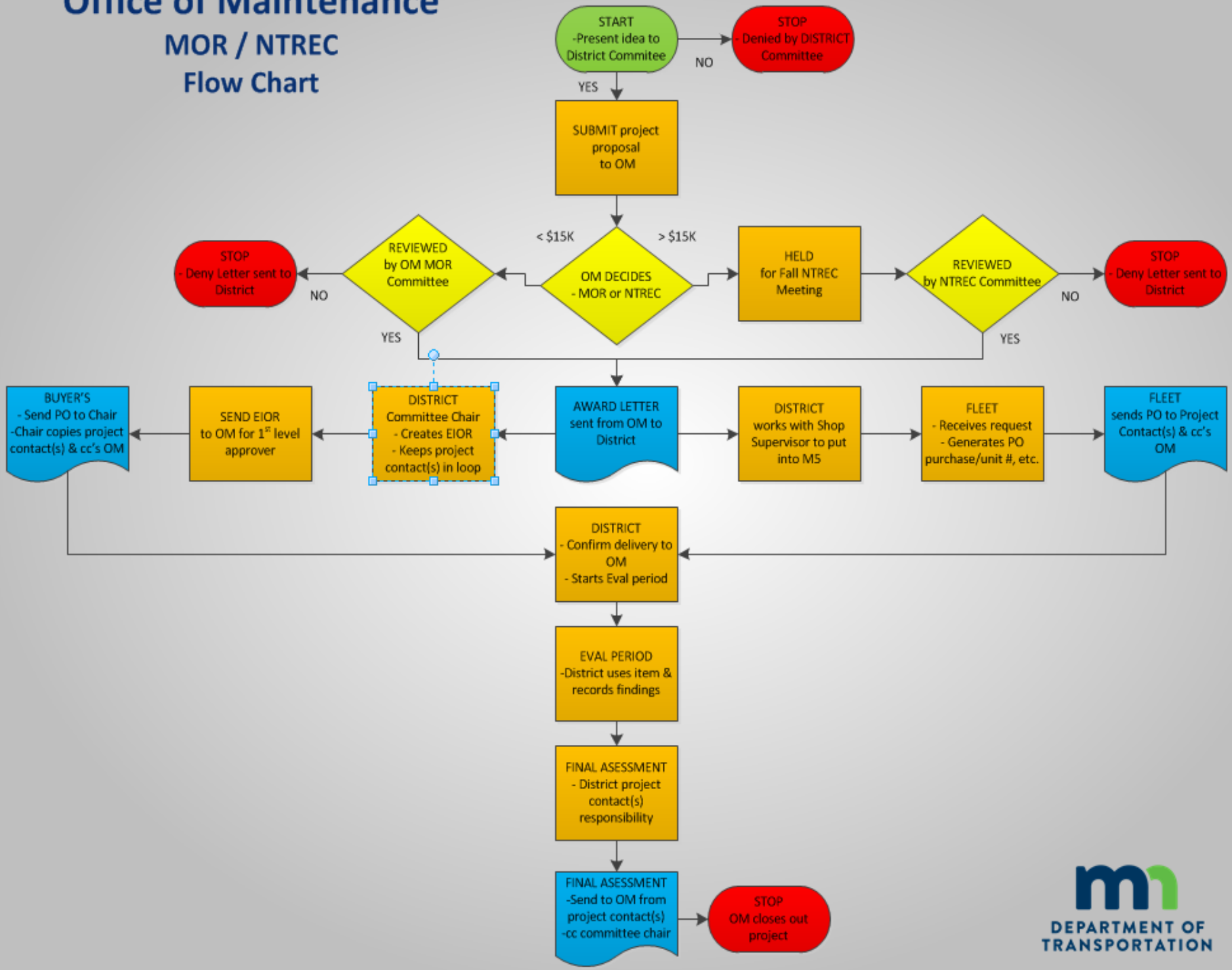
G. Sample Committee Structure

Sample Committee Structure.pdf

Office of Maintenance

MOR / NTREC

Flow Chart



DEPARTMENT OF TRANSPORTATION

NTREC Selection Criteria

- For the NTREC Projects, the committee uses a grading sheet and a voting process on the following criteria:

Funding and Matching Resources (20 points)

Does the proposal have matching contributions and available resources? (Labor, equipment and material)

- District cash match (10 points)
  - More than 20% - 10
  - Between 10% and 20% - 8
  - Between 5% and 10% - 7
  - Between 1% and 5% - 5
  - Other contributions (10 points)
    - Labor - 5
    - Equipment and / or Material 5

Potential Return / Benefits (20 points)

- Reduce staff resources - 10
- Reduce costs - 5
- Reduce time/ efficiency - 5

Safety (15 points)

- Public and Employee safety - 10
- Environmental impacts - 5

Potential Implementation (15 points)

- Statewide implementation - 15
  - Multi-area implementation -10
  - Limited to one area - 5

Innovation (15 points)

Is the proposal research, specifically applied research or innovative in doing business?

- Is it new to MnDOT - 5
- Similar products with additional improvements - 5
- Is it made in house - 5

Products and Services (15 points)

- Snow and Ice - 10
- HSOP (Pavements, Bridges) - 5
- Other Projects - 5

MOR/NTREC Research Project Proposal - SAMPLE

Program: ☑ **MOR** ($15,000 or less) OR ☐ **NTREC** ($15,001 or more)

Project title: Sander Stand

Project contact (name, phone number and email): Frank Johnson

Proposing district: Metro **Truck station:** Arden Hills

Product/project delivery address:

1900 West County Road I, Arden Hills, MN 55126

Submission date: 1/3/2018

Funding Requested

Number of units and/or amount of material to be purchased and tested:

10 Units

Total cost: $ 13,860.00 **Amount requested:** $ 13,860.00

District hard match:

Vendor and/or Product Information

Product name: Best Sander Stand

Make/model # (if applicable): RD4400

Vendor name: Best Metal Services **Email:** djohnson@bestmetalserices

Phone number: (763) 111-2222 **Website:** www.bestmetalservices.com

Brief product description and purpose:

Replacement sander stands for old units

Product web page: https://www.RD4400/

Research Need

1. What is the problem you hope to address with this project? Provide brief background.

   The sander stands that we are currently using are outdated and have been retrofitted so many times that they are unsafe to use.

2. In which primary Products and Services category does this project fall? Please select **one** sub-item from the appropriate category listed below.

MnDOT Products and Services – Operations and Maintenance				
1) Bridges and Structures Inspection and Maintenance	**2) Road and Roadside Maintenance**	**3) Snow and Ice**	**4) Traffic Operations and Maintenance**	**5) Other**
Please choose one item.	Please choose one item.	3) Snow and Ice (no subcategor	Please choose one item.	5) Replace this text with an "

3. Does this project have the potential for statewide and/or district-wide implementation?

   ☑ Statewide ☐ District-wide

   If yes, please explain: As sander stands age and are in need of retrofitting, it becomes imperative to safety that we replace our current sander stands.

Test Approach

4. Describe the test approach.

   The sander stands will be evaluated by the operators that use them.

5. Who will perform the evaluation? (name, email and phone number)

   Danny Johnson daniel.johnson@state.mn.us 651-444-5555

6. What are the anticipated benefits/savings of implementing this project? Please describe based on the Product or Service selected in #2 (category/sub-item).

   ☑ Saves Costs (labor, equipment, materials) — Will require less time and equipment to remove and install. Easier to operate and roll around the shop. Takes away the current need to use a skid loader to hold the sander.

   ☐ Improves Quality

   ☑ Improves Safety — With this stand there is less chance of someone having the sander fall on them. Reduces the chance of the sander falling or dropping on the ground.

7. How will this impact the Product or Service selected in #2 (category/sub-item)?

The impact is the improved process of putting on and taking off the sanders. Improved processes brings efficiency to our snow and ice season.

8. Over how many months will you evaluate this product (6, 12 or 18 months)?

☐ 6 months ☑ 12 months ☐ 18 months

Anticipated start date: 2/1/2018

Anticipated end date: 2/1/2019

Proposal Submission

Area Maintenance Engineer Support: Please proceed with the above research project.

Note: *A final report (including product photos) must be submitted for all projects that receive funding. Refer to the MOR/NTREC Research Report Project Report form for details.*

Signature: This must be signed by the Area Maintenance Engineer

Date: 1/3/2018

Submit this completed and signed form to:

Mindy Heinkel
Maintenance Research Program
Administrator
mindy.heinkel@state.mn.us
651-366-3585

SAMPLE

Research Waiver

To: Vendors involved with Mn/DOT Maintenance Operations Research Projects

From: District Metro.

Subject: Research Waiver for Sander Stand.

Thank you for your interest in participating in a Mn/DOT Maintenance Operations Research project. To insure understanding of all participants involved, this letter is to inform vendors of Mn/DOT's intentions at the end of the project.

1. Mn/DOT reserves the right to decide if the project, upon its findings, is suitable for Mn/DOT use.
2. By conducting the research project, Mn/DOT does not imply any further purchase or implementation of any kind.
3. Mn/DOT reserves the right to report findings of the research projects in reports and other means whether written or verbal.
4. Mn/DOT assumes no responsibility for repercussions of reports on projects whether direct or indirect to vendors involved or participating in Maintenance Operations Research Unit projects.
5. The use of this product is for research purposes and does not imply endorsement from Mn/DOT.

Please feel free to contact Mn/DOT Maintenance Operations Research if you have any questions or comments.

I have read and understand this Research Waiver, (two signatures required)

Company: Best Metal Service Date: 1/3/18 Representative Signature _____

Company : Best Metal Service Date: 1/3/18 Officer Signature _____

MOR/NTREC Research Project Assessment-SAMPLE

DEPA
TRAN

MOR	NTREC
☑	☐

Project Name: Sander Stand

Date: 2/1/19

Project Information

District(s): Metro

Truck station(s): Arden Hills

Project contact (name, phone and email): Frank Johnson, 651-444-555,

Funding

Number of units and/or amount of material purchased and tested:

10 Sander Stands

Total cost: $ 13,860.00 **Amount requested:** $ 13,860.00

District hard match:

Vendor and/or Product Information

Product name: Best Sander Stand

Make/model # (if applicable): RD4400

Vendor name: Best Metal Services **Email:** djohnson@bestmetalservice

Phone number: (763) 111-2222 **Website:** www.bestmetalservices.com

Product web page: https://www.RD4400/

Joe Smith
Fleet Buyer

Additional Information

1. Did you solve the problem you hoped to address with this project? Please explain.

Yes, the improved process of removing and mounting sanders to the trucks saved time and eliminated the use of other equipment.

2. In which primary Products and Services category does this project fall? Please select **one** sub-item from the appropriate category listed below.

MnDOT Products and Services – Operations and Maintenance				
1) Bridges and Structures Inspection and Maintenance	**2) Road and Roadside Maintenance**	**3) Snow and Ice**	**4) Traffic Operations and Maintenance**	**5) Other**
Please choose one item.	Please choose one item.	3) Snow and Ice (no subcategor	Please choose one item.	5) Replace this text with an "

3. What were the benefits/savings of implementing this project? Please describe based on the Product and Service selected in #2 (category/sub-item).

☑ Saved Costs (labor, equipment, materials)	The improved process of removing and mounting saved time that can be used efficiently within our snow and ice season.
☐ Improved Quality	
☑ Improved Safety	The improved process is a much safer way to remove and mount sanders on out trucks.

4. Does this project have the potential for statewide and/or district-wide implementation?

☑ Statewide ☐ District-wide

If yes, please explain: Because of the vast differences in the age and condition of the sanders across the state, there is a basic safety need for an improved process of removing

5. How would you rate the vendor's level of support during this project? 5
   (Scale = 1 to 5, worst to best)

   Please explain: Best Metal Service was very easy to work with. Even though we sent them drawings and pictures of what we wanted, they took the time to come out to

6. Please share with us any other information or comments related to this project.
   (i.e. your experience, lessons learned, suggestions, etc.)

There was a bit of trouble getting ready for this project. With a tailgate sander , the sander needed to have a stainless steel block welded onto it. With the variety of sanders and trucks, there will be bit of difference

7. Support documents - Please attach to your email, any of the following items that provide further details about the project.
   - Pictures
   - Videos
   - Operators questionnaires/surveys
   - Feds approval letter
   - Other

Assessment Submission

Area Maintenance Engineer Support: I have reviewed and approve this research project assessment.

Signature: This must be signed by the Area Maintenance Engineer

Date: 2/1/2019

Submit this completed and signed form, including all supporting documents, to:

Mindy Heinkel
Maintenance Research Program Administrator
Mail Stop 722
mindy.heinkel@state.mn.us
651-366-3585

For questions or other information, contact Mindy Heinkel or Tom Peters at 651-366-3578.

SAMPLE COMMITTEE STRUCTURE

MISSION

Your committee will need to have a mission. The mission is the "why" or the purpose of the committee. *See example mission statement below:*

The mission of the committee is to seek out new (or maybe just different) methods, supplies, practices, and equipment that will allow_____to move its operations into the future. The committee will be an ever vigilant presence watching out for that next great idea coming over the horizon or that long forgotten practice that could prove innovative to the district. The committee will be the district's direct connection to MNDOT's Office of Maintenance Research and Training.

GOALS

Your committee will need to select the goals of the committee. Goals are what it is you are trying to accomplish. *See the example goals listed below:*

The goals of the District Research Committee are to (1) sustain or improve the district's level of service to the citizens of Minnesota that reside in the confines of_____, as well as any who may travel through the same, (2) inject new concepts and technologies into the district's operations to enhance efficiency, safety, and environmental stewardship, (3) to attain the previously stated goals via diligent preliminary research, frank and honest discussion, and real-world field testing that is measurable and will provide empirical data upon which an evaluation, and possible implementation can be based.

SUGGESTED GUIDING PRINCIPLES

1) Seeking out new technologies not now in general use.
2) Seeking out technologies in use within other existing entities.
3) The primary drive for ideas to research should come from the field.
4) Technologies evaluated by benefits versus fiscal responsibility.
5) Using research funds where appropriate.
6) Pursuing fleet wide implementation for successful products and processes.
7) Share effective practices throughout all of the districts.

SUGGESTED MEMBERSHIP

1) Each maintenance subarea will have two members on the committee, and bridge and sign will be represented as well. Subarea supervisors will rotate through.
2) It is highly suggested that you include TG's or TGS's.
3) The Maintenance Superintendent and Operations Support Coordinator will be permanent members.
4) The Office of Maintenance Research and Training will be represented.
5) The committee will be led by a chair and a co-chairperson.

6) Members and chairs will be rotated on a two year interval if possible (January rotate).

SUGGESTED MEMBER DUTIES

1) **Chair and co-chair:**
   - o Schedule meetings and deal with all meeting logistics.
   - o Send out requests for and create meeting agenda.
   - o Run meeting- keeping committee on agenda schedule.
   - o Send out minutes for approval.
   - o Send out approved minutes to committee. o See that minutes are published on the web. o Co-chair to lead in chair's absence.

2) **General members:**
   - o Attend meetings diligently
   - o Actively engage in committee business.
   - o Garner ideas from the subarea to bring to committee.
   - o Share information from committee meetings with subarea.
   - o Be an advocate for the committee.

Seek out interested personal for membership replacement

SUGGESTED MEMBER ETHICS

1) Treat others and their ideas-comments with respect.
2) Approach your membership rotation with dedication and professionalism.
3) Strive to solicit ideas from your constituency.
4) Dedicate to getting committee thoughts and decisions out to subarea.
5) Accept and carry out committee tasks.

SUGGESTED MEETING TIMEFRAME

Meetings will be held on a monthly or bi-monthly basis and will be rotated around the district in order to balance travel time between the subareas.