

PERSONNEL TRAINING - WINTER ACTIVITIES

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1. Abstract

Total cost of winter maintenance on national roads in Norway amounts to 850 mill. NOK. This is about 35 % of the budget for maintenance and operation. Being such a large part of the total activity, it was chosen to start with training programs on this topic. In order to exercise the responsibility of being the road authority, it is important to secure skills at all levels.

An important measure to achieve a good result, both with respect to improved quality and economy, is to provide sufficient training programs. The most common way of training has traditionally been done on the job. The quality of this type of training is very much dependant on the individual supervisor, and may be good, or not so good. Training programs have been made in recent years for most parts of winter maintenance and operations based on the following assumptions:

- Large need for systematic training
- Need for courses on all topics relating to winter activities
- Different needs for different groups of personnel

The Norwegian Public Roads Administration has for some time worked out courses for different parts of winter maintenance. We have so far provided courses relating to:

- Snow Ploughing
- Salting/Sanding of Winter Roads

These courses can be taken as a full package, or parts can be taken out and “tailor-made” for different groups of personnel. A lot of effort has been put into getting teachers who both master the educational and technical skills.

Interactive programs are also being developed to get a more flexible system for personnel training. This is quite new, so there is so far little experience. But we hope for good results in combination with regular courses.

We strongly believe that good education of personnel will give good return on the resources we invest in this. Also the quality of the work done will be improved, and our customers will be more satisfied.

Traditionally winter maintenance has been carried out by in-house work force. During the reorganisation of NPRA in 1995 it was decided that an increasing part of maintenance are to be carried out by private contractors. This is a challenge to all stakeholders in the road maintenance field, both the owner side and the contractor side.

Personnel training will become more and more important in the labour market in the years to come. This is clearly recognised by the Norwegian Public Roads Administration (NPRA). We need people with great skill and knowledge in an increasingly competitive market.

2. Introduction

For geographical reasons Norway is a winter country. Several roads in the mountains are closed during the winter. Looking at the map you will see that Norway is as far north as Northern Canada and Northern part of Siberia. But we also have the advantage of the mild water of the Gulf Stream. All this in combination gives us large variations in climate. Coastal areas in the south may have a relatively mild climate with small amounts of snow, while some areas in the mountains are quite cold with large amounts of snow.

But all things add up to the fact that we need to be able to handle a great variation of challenges due to changing weather conditions.

The road network in Norway consists of three levels:

Type of Road	Length	Length of salted roads
• National roads	26.800 km	6.500 km
• County roads	27.200 km	
• Municipal roads	37.500 km	

NPRA is responsible for the national and county roads. These roads also carry the largest part of the traffic load.

3. Purpose

The purpose of carrying out winter maintenance is to obtain the described performance standards relating to the weather conditions. This means that we have to:

- Do the right things
- Do it in the right way
- Optimum utilisation of the resources

The courses are meant to give:

- A total overview over what winter maintenance is about
- Introduction of basic conditions
- Give an overview of accessible resources, tasks, routines and auxiliary services
- Make the employees feel as apart of the organisation
- Make each one feel secure and that they take the right decisions based on available information

If we succeed in this, we will also raise the motivation among our employees and keep it high. So far these training programs have been developed for personnel belonging to the NPRA. It is up to owner side to describe requirements concerning qualifications of private contractors. The contractor part of NPRA has been responsible for developing these courses.

4. Training System Principles

For many years training has mostly been done on the job. But with more complex equipment, heavier traffic and more technical devices this is no longer good enough.

Five years ago we made a preliminary study to find out how we should organise our training programme within the field of maintenance and operations. This study suggested that it would be favourable to work out several courses. The following topics were suggested:

- Organising
- Decision Making Systems
- Quality Management/Reporting
- Climatic and Road Weather Information Systems
- Preparedness
- Maintenance of Vehicles and Machinery
- Snow Ploughing
- Other Snow Clearing Methods
- Salting
- Sanding
- Snow Clearing in Mountain Areas

However, things often take more time than expected. Two years ago a conventional course was worked out for Snow Ploughing, and the two topics Salting and Sanding were combined into one course. It also takes time to promote these things throughout the organisation so that all levels are aware of the existence of the courses.

Each of these two courses is quite comprehensive, and will last for one full week. However, it is so designed that parts can be taken out and designed for a special case, or for a special group.

These two courses are specially designed for the people who actually are driving the snow-ploughing trucks and who are spreading the salt and the sand. First it is a general part which is common for both courses (1 day), and then a two day session for snow ploughing and also a two day session for spreading of salt and sand. Here is a list of the main parts:

General part

- Purpose
- Policy
- Organising and liability
- Quality assurance
- Laws and regulations
- Contracts and long range planning
- Practical problem solving

Snow Ploughing

- Performance Standards
- Decision making
- Implementation
- Evaluation of result
- Laws and regulations concerning machinery and equipment
- Personal safety
- Snowploughs – different types
- Components of Snowploughs
- Installation
- Adjustments and maintenance
- Hydraulic and electronic parts
- Storage
- Instruction book
- Practical and theoretical tests

Spreading of salt and sand

- Performance Standards
- Decision making
- Implementation
- Evaluation of result
- Laws and regulations concerning machinery and equipment
- Personal safety
- Spreaders – different types
- Components of Spreaders
- Installation
- Adjustments and maintenance
- Hydraulic and electronic parts
- Storage
- Instruction book
- Practical and theoretical tests

Going through the list you will see that the two parts for snow ploughing, and for spreading of salt and sand are structured in exactly the same way. This is of course on purpose. Recognition is important. It is mainly the same drivers doing both types of work.

To engage the participants, there are used different educational methods such as ordinary lessons, demonstrations, discussions, teamwork for solving problems and practical tests. Videos, slides and pictures are also used to show equipment and situations. The educational method will change depending on the participants. This type of personnel is not used to theoretical education over several days. It is important to take this into account to be successful.

The participants will get their own documentation from the course for repeating and checking information.

5. Interactive Training

The program mentioned above has been successful to some extent. But it requires a lot of resources. Many people have to be taken out of work at the same time, and different people need training on different tasks. Of course it is possible to take out parts of the course for a special group, and this is also done. But this program cannot be used without an instructor.

We therefore wanted to utilize the fact that most of our employees have access to a PC. Based on our previous training program we transformed most of it into an interactive training program. We have tested it out on our target groups. So far it is very promising. The costs of developing programs like this are not prohibitive. Another important feature with the interactive programs is that you can show short video clips. This makes it easier to show many practical details, both concerning equipment and weather conditions.

But still we regard the course with an instructor as a must for each driver. But the interactive program is a good supplement for refreshing your knowledge before and during the winter season. The structure of this course is based on actual problem solving. In order to make progress you have to be able to solve the problems. You are allowed to make as many retries as you need in order to get correct answers. When you start the program you register by your name or a code. In this way you can start at a later stage where you left off.

The basic principle in interactive training is the interaction between the student and the program. The student gets immediate response on the tests. For instance the student is tested on which parts the different types of snow ploughs consists, and how they are put together. In this case the different parts are spread around, and he will have to put it together in their right position.

Another practical case is to decide what to do when snow ploughing is needed. At least two important decisions have to be made. First he will have to choose what type of snowplough is the correct one to use under the prevailing conditions. Given the type of snow fall with respect to intensity, wind, temperature, expected length of snow fall, traffic intensity he will have to make a decision at what time will be the best to start in order to fulfil the requirements in the maintenance standard.

Norway being a country with variations in weather, most of the personnel are responsible to decide for themselves when is the right time to start ploughing or spreading of sand or salt. It is therefore a must that each driver has good knowledge about all aspects of winter maintenance. The other alternative will be that the drivers are called out from a central unit. But this will only work in areas with small variations in winter conditions.

The interactive course ends with a final examination with questions from the entire program, and a diploma as proof of completion of the course.

6. Other Courses

One advantage with interactive programs is that you can easily put together parts from different courses. We already have a program for Personal safety in connection with roadwork. This is a course required for all personnel being out on the road, and is also required for road workers as well as anyone doing work or inspection on the road. Features from this program can be used together with for instance the snowploughing program.

The next course we will prepare will be Winter maintenance in mountainous areas. This is a task requiring special skills, and is important in many counties.

7. Costs and Benefits for Training

It is important to focus on doing the right things at the right time. Cost for the operator may be small if winter maintenance is not carried out at the right time. But the cost for the society as a whole is overwhelming when traffic stops or is seriously obstructed by mistakes done by the operator.

A good system for training will always pay.