WINTER SERVICE ORGANIZATION MEANT TO ENSURE ROAD TRAFFIC ON PUBLIC HIGHWAYS IN ROMANIA

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General data: From the geographic point of view, Romania lies at the crossing point of 45^0 parallel (northern hemisphere) and 23^0 meridian eastern longitude. Its location in the central – southern part of the continent is pointed out ba the three geographic components of the European significance: a Carpathian, Danubian and Pontic country. Consequently, Romania has mild-continental climate, caracterized in winter by very low temperatures that can go down to or exceed -30^0C.

Taking into account the meteorologic phenomena that can influence road traffic (glazed frost, snowfall, blizzard), we can underline the fact that, for 4 – 5 months a year, highways have to meet the demands corresponding to winter viability.

In Romania, the network of public highways is administered as follows:

- Highways and national roads – the Ministry of Transportation and Public Works through the National Administration of Roads (AND);
- Local highways – Local Councils – through specialized units and services;

Though the responsibility of ensuring the traffic in winter is shared in agreement with the classification of road network, winter service has been organized according to the same provisions and instructions issued by MTLP.

1. Technical Provisions and Instructions for Organizing and Implementing Winter Traffic Services

The duties allocated to public roads administrations for controlling and preventing the effects of meteorologic phenomena in winter have been established through unitary technical instructions, specific for each organization level (local, regional, national).

The technical instructions contain the following main chapters aimed at setting up a unified way of action:

1.1. Terminology and definitions regarding weather phenomena.

1.2. Duties and deadlines to fulfil the objectives of preparing the program for ensuring the traffic in winter.

1.3. Obligation of road administration units concerning the guidanceand coordination of intervention operations; co-operation among these units.

1.4. Stages and concrete procedures in working out operation programs for preventing and controlling weather phenomena.

1.5. Technologies, materials and equipments used in interventions.

1.6. Information systems among road administration units to be used according to each hierarchical level as well as between the respective road units and those who use them.

1.7. Viability levels that have to be ensured in relation to the technical categories of the roads (traffic values) especially important objectives etc.

1.8. Level of supply of equipments, machinery, human and material resources, differentiated in relation to the level of viability that is to be ensured.

1.9. The bodies that are in charge with road administration and police units have to co-operate so that the fittest decisions should be taken for the highway traffic to go on.

1.10. The proper steps to be taken in order to protect the highways that can be affected by frost – thaw phenomena.

All technical provisions and instructions are periodically up-dated and in agreement with the modifications coming up in the whole system of ensuring the traffic in winter (new technologies and materials, information means, increased exigencies).

2. Getting the Highway System Ready for Winter

In Romania, the highway system amounts to 72,726 km of which 14,350 km national roads and 58,376 km local roads. Town and city streets haven't been included here.

For winter, the whole highway system is divided into four levels of viability, (I – IV) depending on the intervention duration necessary for getting back to normal situation and on quality indicators that have to be ensured. The IVth level highroads are used only in special situations.

For each level of viability we have to ensure the necessary supply of tools, equipments, materials and qualified workers, according to the requirements of the prescribed quality. This aspect is ensured according to existing norms.

If we take into account the particular characteristics in Romania, getting the highways system ready for winter implies the following main actions:

2.1. To clear away the obstacles that can bring about snowed up roads as a consequence of severe blizzards (sometimes wind speed can be higher that 100 – 120 km/h).

2.2. To create conditions for water to flow down at bridges, foot bridges, etc.

2.3. To execute the work for repairing the lining (wholes, fissures, ditches, etc.) in order to insulate the main frame of the road. The action of chemical fondants can favour the process of decay of the lining.

2.4. To prepare the signalling means specific for winter.

2.5. To set up defense panels against snowing up as a consequence after blizzards. For the conditions existing in Romania, this system has proved to be highly efficient as it completely prevents snow blockage and leads to important fuel savings both for intervention equipment and for users.

3. Preparation of Resources Necessary to Ensure the Traffic on Public Highways

Preparation operations generally begin immediately after a campaign is over. The operations for ensuring the traffic in winter have been commercialized only to a small extent (about 20% in Romania). Therefore, such operations have been executed under State supervision by road units, through maintenance centres.

Such maintenance centres are organized both on national and on local highways, each of these centres supervising 40 – 80 km, according to the level of difficulty (viability level) of the allocated road fragment.

3.1. Preparation of maintenance centres.

On the basis of the revisions done at each maintenance centre, maintenance programs are worked out in order to remedy some defects or to equip these centres with what they need (power, water, accommodation rooms, garages for machinery, deposits for non-skidding materials, chemical fondants, etc.).

3.2. Preparation of equipments and machinery.

As soon as winter campaign is over, all equipments and machinery exclusively used to this purpose are checked. According to what is found then, we draw up programs for revising and repairing the equipments so that they could work again the following season when they are needed.

The technical condition of these equipments is analysed so that the ones that are out of order, or the damaged parts, could be replaced. As soon as these tools or equipments have been repaired, they are kept in garages especially allocated to this aim till the following campaign.

3.3. Ensurance of intervention material for getting glazed frost under control.

The main materials used in operations for preventing and controlling glazed frost are:

- river or quarry sand
- sodic chloride (solid or solution)
- calcic chloride (solution)

Taking into account the fact that temperatures go down very much in winter, the supplying process starts, as a rule, by the 15^{th} of September, when their stock has to be of about 70% (for sand, at least).

In order to store these materials, maintenance centres are endowed with especially equipped deposits (for sand and salt), as well as with glass fibre reservoirs for salt solutions.

Romania is known to have large stocks of sodic chloride (the 6^{th} place in the world) and the extracting process is hydromechanized quite often.

As a result of this form of extraction, the sodic chloride has a very high concentration (28-30%), which allows storing and using it without any other additional operations for preparing it.

In many areas of the country, there are sources, natural water springs, whose concentration in sodic, calcic, magnesium salts goes up to 20-22%. Their usage is advisable only to control block frost, when exterior temperatures go down to -5^0 -8^0C.

4. Organization and Effective Coordination of Operations for Making Winter Service Work.

On the basis of the same instructions, at each organizational level (local, regional, national), the members of the personnel in charge draw up operation plans containing the following important objectives:

4.1. The length of road portions allocated to each maintenance centre.

4.2. Teams of equipments and machinery placed at the disposal of each maintenance centre. These teams are agreed upon according to the level of viability that has to be ensured and the length of road portions on which the intervention is to be ensured. Their approximate number is:

- snow cutters 1 (40 – 80km)
- blades fitted out on lorries or tractors 1 (15 – 20 km)
- loader 1 – 2
- loader for chemical fondants 1 (20 – 30 km)
- tractor with tyres – loaded 1 (20 – 40 km)

In areas with varied relief (big declivities), maintenance centres are equipped with heavy machinery to be used for unblocking the traffic and allowing the machinery to work for clering away the road.

4.3. Teams of workers – for each field and shift corresponding to each intervention level (1-2-3 shifts for 24h).

4.4. Material stocks that have to be supplied for each maintenance centre.

4.5. The way of co-operation among the adjacent mainenance centres so that intervention time could be diminished.

4.6. The system used for informing and transmitting data from maintenance centres, section, regional direction, central administration. As a rule, the information is transmitted on radio – telephone and it is written down in the documents existing at each organizational level.

Local radio and TV stations take over the information of general interest and make it known in their programs, such as news bulletins. Successful interventions may rely on the way in which such information moves about between technical accomplishers and those in charge with taking decisions.

4.7. Drawing up contracts for the machinery and equipments which have to become the property of maintenance centres. Such equipments are either permanently at the disposal of centres or are distributed when needed.

4.8. Staff training.

This action includes all the members of the staff that are involved in winter operations. The whole staff get familiar with technologies that are to be applied, ways of handling equipments, information system, etc.

C O N C L U S I O N S

5.1. Given the instantaneous character with which meteorological phenomena are produced, their effects cannot be completely prevented. This is the reason for which the indicators of quality levels are affected.

5.2. Taking into account the real conditions existing in Romania, the costs for ensuring winter traffic vary between 15% and 20% of the total financial resources allocated for current maintenance and repairs.

5.3. Correct organization and functioning of winter services can lead to important savings both for road administration units and for users. Costs can be reduced to half.

5.4. The co-operation of road administration units, police units and local authority is indispensable.

5.5. During blizzard (wind blowing over 70 km/h) it is recommended that traffic should be closed, considering the very reduced effect at crossroads, except special situations.

5.6. The National dministration of Roads coodrinates and supervises the going on of the whole process for ensuring road traffic in winter.

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