Results of a study on Environmental Practices and Regulations

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ABSTRACT: Growing interest in the environment in today's society has led to increasing focus on environmental issues. This also applies to the road sector. By its very nature, this sector involves appreciable loading on the environment, so there is every reason to take active measures to achieve more environmentally appropriate operations. Appreciable gains can be made, environmentally as well as economically.
The major environmental loading from the road sector originates principally from the exhaust gases and emissions from road traffic, although road building, rebuilding and maintenance of the road network also can cause significant environmental impact in certain cases. This paper is a part of the ROADEX II project.

KEY WORDS: Environment, guideline, nature, roadex

1 NATIONAL CONDITIONS

1.1 Environmental Codes

Provisions for environmental impact descriptions, plans and programmes are made in a number of laws, ordinances, decisions and standards. These are usually very general and do not provide guidelines as how the assessment should be carried out. As a result, different authorities apply these regulations in widely varying ways.

In Sweden this includes the "consideration rules" during construction work, which among other things clearly say that the burden of proof that adequate consideration has been shown rests with every player. It also states that the caution principle applies, and that it always is the polluter who pays for damage that may arise

Moreover, the different Road Authorities have their own environmental policies.

1.2 Impact descriptions

To enable these policies to be implemented purely and practically in the operations, all countries demand that some type of environmental assessment should be done. The purpose of this assessment is to shed light on the effects of those measures that may have significant consequences for the environment, natural resources and society

This normally shall include a description of the road project, alternative solutions, existing environmental qualities, land utilization and traffic conditions, impacts of an action not being taken, expected environmental effects of the action, and measures aimed at minimizing the damage caused by the project. Differing emphasis is placed on different parts of the above, depending on the stage in the construction process to which the environmental impact description relates.

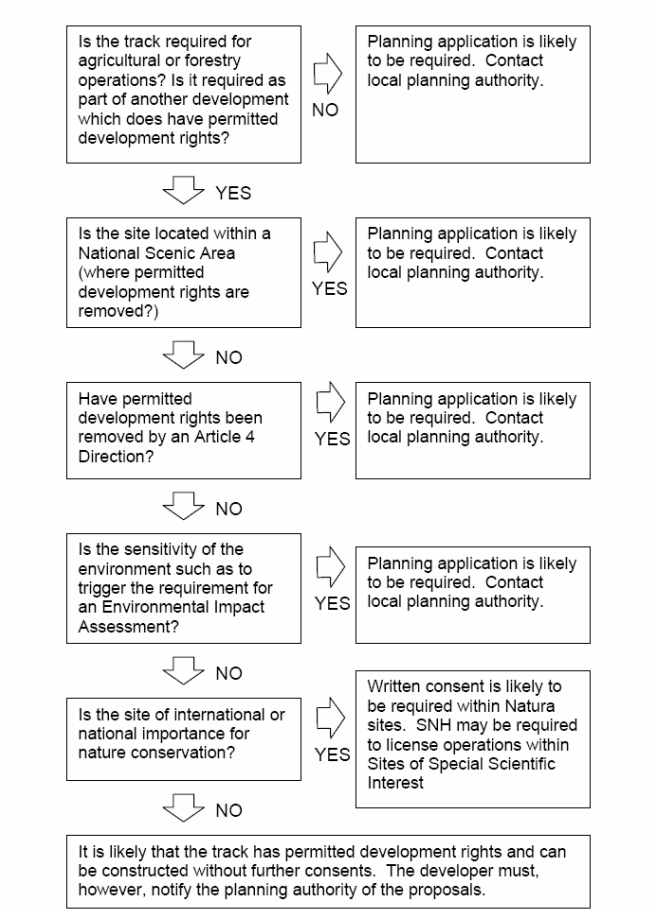

Figure 1: Flow chart for making environmental planning decisions. Scottish Natural Heritage 2004

The necessity for an assessment depends on several factors, such as the size of the road site, location of the road, type of nature etc. The flow chart in figure 1 may give an idea how this is determined in the case of a small road or a track, and modified should be possible to use in all countries:

1.3 Low volume roads

It may be difficult to meet all these requirements in every situation, but the direction is clear. However, assessments must also be made here from economic, social and other perspectives. The budget framework is often fairly tight, particularly on a road network carrying low traffic

intensity, which is usually the case in the Northern Periphery, and there is therefore fairly limited scope for additional measures.

Normally when working with an existing low volume road, only minor environmental problems should arise. Usually all work is done inside the existing road, and work that has to been done outside the road (such as ditches, depositing of material etc.) can easily be managed in an environmental acceptable way.

1.4 Protected nature

It is important when planning and managing roadwork to know about protected nature areas. There are certain restrictions on what measures can be taken, and it is necessary to find out about these restrictions in advance.

National parks and nature reserves are found in all of the ROADEX member countries. There are a great variety of parks and reserves because each nation has developed its own approach to suit its own needs. But most have the following common features:

they identify areas of land or sea - sometimes extensive areas - which are of the very highest value to the nation for their scenery, wildlife, cultural heritage value;

they provide means to safeguard the special qualities of these areas for the long term; and

they provide opportunities for the public to enjoy these areas.

Regarding protected areas, all countries have several levels of protection. All countries have the legal right to impose very strict regulations, such as prohibited entry, but at the same time maintain the option to allow unrestricted public access.

Natura 2000 is a network of the most valuable natural habitats of the European Union. Areas are to be found in every member country, with the purpose of ending the extinction of species and biotopes. There are about 3500 areas in Sweden, 140 in Scotland (but many more are planned) and about 1800 in Finland. As Natura 2000 is a European Union network, Norway is not a part of it.

2 ADVICE AND RECOMMENDATIONS ON SITE

This part is aimed at providing recommendations on how the work on site can be adapted to environmental requirements. Recommendations are given for various types of problem, such as waste, oil spillage, noise, etc.

2.1 Waste

Waste is defined as “any substance or object which the holder discards, intends to discard, or is required to discard”. Note that this may include unexpected objects, such as excavated soil that will not be used.

For natural reasons, there is always surplus material in road building work. This may be of different types, such as packaging material, residual material and dangerous waste.

The principal conclusion is that it pays to reduce the waste quantities. Most countries now levy a charge on waste that goes to the landfill, which also applies to the countries participating in the project. In addition to the landfill charges, the costs of the landfill area are often also included. Much costs can be avoided if the waste is managed correctly right from the start.

The amount of waste can be reduced in several ways. The amount of waste material can naturally be reduced, i.e. by putting everything that is transported to use on the work site. This can seldom be fully achieved, but a target in this direction is a good point of departure.

A sensible handling of material often enables all residual materials to be put to use in one way or another. If the quality of such material is too poor to use in the road structure, it can usually be employed as backfill material, e.g. to level out steep slopes.

2.2 Noise and vibrations

Noise is defined as sound that is undesirable to the listener. The disturbance caused by sound and vibrations depends on their extent and intensity, and on the sensitivity of the persons affected.

Vibrations may cause damage to buildings and sensitive equipment. Noise and vibrations can also affect the surrounding fauna. Moreover, vibrations can cause damage to geological and archaeological objects.

Noise and vibrations are not normally a major problem in the Northern Periphery. Since the region is generally sparsely populated and the roads predominantly run through uninhabited or lightly populated areas, the risk of disturbances is relatively limited.

However, some work must inevitably be done in communities and the like. Greater consideration must then be taken when the work is being done, as noise disturbances and vibrations may cause irritation and also more serious reactions.

Work should then be done somewhat differently. A simple but fairly effective measure is to notify the persons affected that work is about to start, by delivering information leaflets through letterboxes and by posting notices on notice boards, and maybe also by information meeting. If people are notified, their acceptance of the disturbance is usually higher.

A general piece of advice that applies to both noise and vibrations, and also exhaust gases, is to use modern equipment wherever possible. Such equipment normally has better noise and vibration attenuation than older machines.

2.3 Dust and exhaust gases

Dust is an almost inevitable consequence of roadwork. Gravel contains a certain amount of fine material, and if the material is dry, a fairly heavy dust cloud can be raised. This dust can disturb both the population and the environment in the surroundings. Since various machines are used, exhaust gases are also inevitable. In high concentrations, these exhaust gases may also pose a health hazard.

As mentioned earlier, since the region is fairly sparsely populated, dust from “clean” materials seldom represents a serious problem, even though it should not be ignored. However, it should be borne in mind that if the dust is spread to watercourses and lakes, it may cause cloudiness of the water. Greater care should therefore be taken in such cases, and also in communities and in cultivated areas and the like. But no major problems should arise if certain basic rules are observed. A great deal can be achieved by protecting (covering) loose materials and sweeping away any clay and similar materials before they have dried and could be blown away.

Figure 2: Spreading fly ash from the forest industry on road BD694, Vitåfors, Sweden.

If alternative materials are used for road construction, such as ash and the like, it is important to prevent these products from being blown away. These materials may contain substances that, if correctly treated, cause no problems, but may give rise to unknown impacts if allowed to spread in an uncontrolled manner.

Figure 2 clearly illustrates how dry fly ash can behave when spread in a road object. In such a case, it may advisable to use humidified materials.

2.4 Ground contamination

The Northern Periphery is a "clean" region. The risk of finding previously polluted soil is not particularly great, although it is conceivable. There are a number of warning signals here, such as oily water, smell of sulphur, rubbish found in the soil.

Specialist competence must be retained if polluted soil is found. These specialists must know how the material should be treated, disposed of, etc.

There are also good reasons for avoiding new pollution. Pollution is the result of poor resource management, and can also give rise to high cleanup costs.

2.5 Natural environment

The greatest possible effort should be made to protect the surrounding natural environment, which includes everything from individual animals and plants to rocks and the landscape and the natural processes that affect them all.

So why should we conserve nature? Animals and plants are vital to quality of life and healthy surroundings. If care is taken, there will generally be fewer protests against a project. A contractor also has legal responsibility for damage that may occur and the consequential costs.

The main sources of problems that arise, with regard to protecting nature, are identification of species or areas within the project before or during the construction process

For known "problems", care should be taken mainly to ensure that all parties involved are aware of them, their type and location. If there are special directives for how they should be dealt with, this must also be made known.

Another important measure is to actually protect the objects physically. An ordinary fence may sometimes be sufficient, whereas clearer protection must be provided for other objects. Also the time of the year may be important for various animal species.

2.6 Water and wetlands

By its very nature, a road affects the flow of water. The road structure itself acts as a barrier and involves the need to dig ditches along the road and drainage ditches as well.

2.6.1 Ditches

When work is being done on the reconstruction of an existing road, as is often the case, some ditches and other surface water drainage structures are already present. This means that primary impact has already occurred, and minor changes to ditches are a normal, usually uncontroversial measure.

Sooner or later, ditch water must be drained away from the road. This is no problem if the road runs on an embankment, although it may be a problem if the road runs for long distances in a cut and through marshland.

It is often difficult to drain the water away from the road in marshland. Marshes are often relatively flat, and the water therefore remains in the area. A drainage ditch may therefore have to be fairly long and the machines used to excavate it may have an undesirable impact on the terrain. In addition, there are limitations to the amount of work that may be done in the area (protected wetlands). If possible, the water should therefore mainly be drained along the road to existing streams.

2.6.3 Culverts

In order to facilitate water flow through a road, it is necessary to have culverts in the road. For obvious reasons they must be as wide as the water flow demands. But it is also necessary to keep the environment in mind. First of all a road can act as a barrier for the wildlife, especially fish, frogs etc.

If the culvert is the passage for a brook, the depth of the water in the culvert must be sufficient for fish to be able to swim. It must also be ensured that the water in the culvert is level with the surface of the brook, that is, no extra “waterfall” at the end of the culvert.

To avoid clouding of the water downstream from a culvert, a silt trap can be constructed. If the material in the ditches is silty, some erosion will occur, especially before the vegetation has stabilized the material. To prevent the water from disturbing this material and becoming clouded by it and then depositing it in an undesirable place, a hole can be made at the intake side of the culvert. Some of the silt will be deposit here, with the result of less clouding and so on.

2.7 Summarizing comments

It will be noted that a great deal must be kept in mind in these scenarios and that, if all of these procedures are followed, there will not be any resources left for the actual road building.

In actual fact, money can be saved through these measures. Sensibly organized routines and correctly used resources will lead to less material being needed. The risk of unpleasant surprises, such as an unplanned extra cleaning of the work site and legal action due to environmental

damage, will be reduced. Machinery and equipment will function more efficiently, and this ultimately saves money.

A good relationship with the people affected by the roadwork is crucial. If the persons affected by the roadwork are notified that work is about to start, their acceptance of the disturbance is usually higher.

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