

MAPPING ENVIRONMENTAL ISSUES. A COMPARISON BETWEEN FRENCH AND ROMANIAN HIGHWAY PROJECT

Nemeș Valentin*, Capony Adrien**

*University of Oradea, Faculty of Geography, Tourism and Sport, 1 Universității, Oradea, Romania, e-mail: nemes_vali@yahoo.com

**Laboratoire Centrale des Ponts et Chaussées-Nantes, France, e-mail: adrien.capony@gmail.com

Abstract

The objective of this paper is to identify more clearly the linkages between environment and infrastructure projects, and also to help highlight the regions where a combination of these two issues poses a potentially worrying situation, needing attention and action. There is a need to use visualization tools such as maps, charts or graphs to complement analyses provided by other scientific instruments. These can also be of help to better understand the geographical context and interconnectivity, and ultimately help societies to deal with priority issues. The paper also encourages building capacities in Romania to detect early indications of potential conflict and to integrate environmental management into environmental conflict prevention and building policies and activities following the French model. This study will apply an inventory of fauna and flora of the site, and the issues inherent in the natural environment of the site. The findings of this study are used to develop practical measures at the completion of the project. Some of the measures are to establish a working methodology for companies which must be respectful with the environment. The second part concerns the implementation of specific works in environmental conservation (land of rivers, wildlife crossings ...).

In principle, environmental consideration is an established principle and integrated in the process of highway construction. However, the regulation is implemented at national level. The work will consist in taking two European countries and compare the respective achievements in this field.

In this article, the issue is to highlight the Romanian and French legislation on environmental protection as part of a major road project. It will then be possible to compare the similarities and differences in environmental constraints. In a second step, the work is to compare techniques and accuracy for the realization of the impact study. Finally, this comparison will establish the similarities and differences in the requirements listed in the highway project environmental study impact.

Key words: highway project, environmental planning, environmental protection, environmental impact study.

INTRODUCTION

The construction of major road infrastructure represents a necessity for the economic and social development of a state. All the European countries tend to have a quality road network for its higher attractiveness. However, the environmental impact of such a project is significant. Faced with these two observations, a compromise was established. The highway constructions are realized by implementing environmental conservation measures more restrictive. Beforehand, an environmental impact study is set up to identify the initial state of the environment traversed by the highway.

Expectations and conventions around “mapping” differ tremendously across different domains of knowledge and practice (Caquard et al., 2011). Cartography is a form of communication and can be seen as a form of spatial language for describing locations, discussing places and interpreting two-dimensional arrangements of features (Monmonnier, 1993). Even bad maps communicate and the question of what a good map is, according to cartographic conventions, is to ask how well it communicates with its users (Foote and Crum, 2001). Important in all fields of mapmaking, is to consider the message to be conveyed and the users to be reached (Bartels and van Beurden, 1998). The need of mapping correctly of highway environmental issues is primordial. The construction of highways can have a substantial impact on the degradation and loss of natural ecosystems, especially in less developed areas. Perhaps more importantly, the fragmentation of habitats caused by highway development is often severe (Frey and Hexem 1985). Transportation routes can be described as “disturbance corridors” that disrupt the natural, more homogeneous landscape (Barrett and Bohlen 1991). In forested environments, these disturbances can cause (1) dramatic physical disruption to the continuous vegetative community; (2) disruption to the structure and function of habitat; and (3) impacts to resident wildlife, which must negotiate, tolerate, and cope with the habitat barriers. In addition, disturbance corridors created by forest fragmentation alter the natural mix of habitats and species by providing conditions suitable for early successional plants and animals. They replace forest trees with grasses and shrubs, eliminating nesting habitat for forest-interior species (U.S. Environmental Protection Agency, 1994).

The two highway projects taken in account in this paper (figure 1) and analyzed through the environmental impact are the section between Orăştie and Sibiu (Romania) is carried out on a length of 95 kilometers and the segment of the A89 highway developed on 20 kilometers between Balbigny and Violay (France).

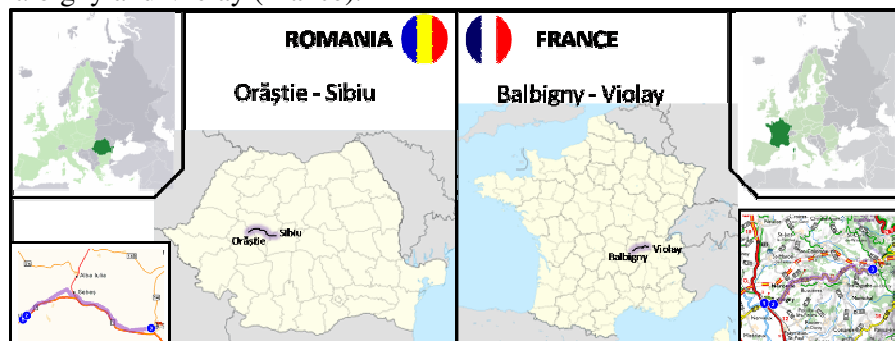


Fig. 1. Geographical localization of the Orăştie-Sibiu and Balbigny-Violay highway projects

MATERIAL AND METHOD

The present study start from the premise of an imperative need of environmental impact studies, more respectful to the environment. Starting from the current situation of the two countries the experimented France and the beginner Romania in this field, the working method used is the comparative analysis. Going from the analysis of the legislative framework in both countries with regard to environmental issues of major infrastructure projects, and then the analysis of relevant documents related to the construction of major road infrastructure and coverage in these the environmental issues. In the first phase it was highlighted the similarities on the one hand and differences on the other hand, then was draw a guideline to follow with respect to the environment which can be applied.

RESULTS AND DISSCUSIONS

Awareness in the 1970s of the need to limit the damage to nature took the form of laws requiring reducing noise and pollution, and mitigating the impacts of large projects. To do this, "Environmental Impact Studies" (EIA) became mandatory prior to the implementation of interventions.

The scope of the impact was often reinforced by:

- procedures for consultation or public debate (consensus conference), taking into account the objectives of sustainable development;
- new approaches and tools for assessment and mapping (GIS) of ecological, environmental, heritage and landscape;
- new approaches to evaluation of the sensitivities of the territories studied.

Generally, in France the Environmental Impact Studies can be sketched around the four key-words and the relationships and interrelationships between three modes of compensation for environmental impacts, as required or permitted to be offset continued to impact studies (figure 2).

The attention in the French case is drawn to a number of regulations concerning environmental protection, including: - noise, water, nature protection, air, waste, Classified Installations for Environmental Protection.

In the Romanian case the legislation concerning the environmental impact study is even more consistent, but in great part of them are not stipulated limits or different kind of measures which must be taken before, during and after the implementation of project.

Noise sources and protection

In the case of Romanian highway project Orăștie-Sibiu in terms of specific road traffic noise assessment was used the French methodology

included in “Guide du Bruit des Transports Terrestres. Previsions des niveaux sonores.”

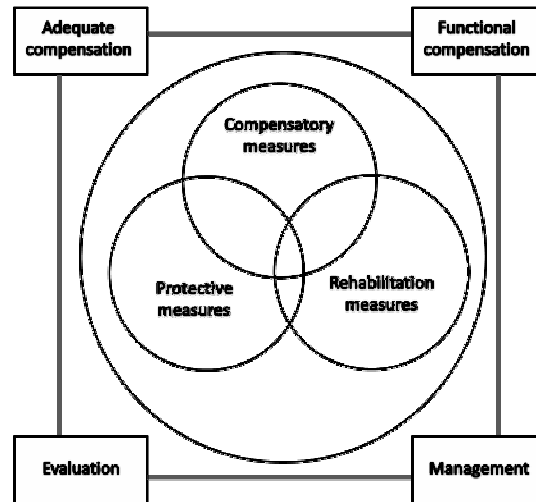


Fig. 2. Diagram showing key-words and the relationships and interrelationships between three modes of compensation for environmental impacts

To assess the noise level it was used the following relationship according to the Manual mentioned above:

$$Leq=20+10*\log(Vu+E*Vg)+20*\log V-12*\log(d+lc/3)$$

Where: □ Vu and Vg: flow schedules of heavy and light vehicles;

□ E: acoustic equivalent factor of Vu and Vg. They appreciated the E = 5;

□ d: distance from the platform edge in meters;

□ lc: platform road width in meters.

According to the survey for Orăștie -Sibiu motorway the noise pollution generated by road traffic in localities near the highway will be more than 60 dB(A) (AM, 2009).

The European Directive 2002/49/EC on the assessment and management of environmental noise defines a common approach to all member states of the European Union to avoid, prevent or reduce primarily the harmful effects of exposure to noise in the environment.

The European Directive 2002/49/EC does not define a quantified target. Its implementation in the French Environment Code sets limit values (by type of source), consistent with the definition of black spots noise (Roulier, 1999) of the national network provided by the circular of 25 May 2004 on the sound of land transport infrastructure(for the highway the limit is 68 dB(A). For cons, the French implementing legislation set no goal. These can be set individually by each authority. For treatment of areas exposed to noise exceeding the limits along the national road, reduction

targets are those of the policy of reduction of black spots noise (PPBE, 2006). They apply in strict compliance with the anticipation principle.

Water pollution and protection

The proposed route for the section Orastie-Sibiu is located between the mountain chain of Meridional Carpathians in the south and river Mures in the north. Drainage direction is toward the river Mures. In the analyzed document are specified measures to prevent and protect water resources, groundwater, water from the surface of the road, rainwater collection and drainage in both operational processes and in the executive. The work area situated between Balbigny and Viollay is part of the hydrologic unit of the Loire. 8 streams intercepted by the proposed A89 have been identified. In the French document, in terms of groundwater is made a clear distinction between water bodies quartered in different hydrogeological structures like aquifers from crystalline and volcanic rocks, aquifers from sedimentary terrains of the middle Viséen and aquifers from alluvial grounds.

Nature protection

Along the highway sector Orastie - Sibiu, respectively near the km 16 + 000, at a distance of 3.5 km is situated Pajistile lui Suciului and at the junction with Lancram km 27 + 455 the highway route passes about 1 km from site Natura 2000 site of community importance ROSC 0211 - Rapa Rosie.

In terms of biodiversity along the highway sector projects have been identified two species of community interest, namely *Bombina orientalis* and *Vipera ursinii rakosiensis*. Their impact will take place such during the execution when are previewed works like deforestation and during operation when will constitute a barrier separating their feeding habitat in particular.

The route crosses two natural regions, the plain of the Forez and the Monts du Lyonnais. The first has a very open landscape shaped by numerous rivers, tributaries of the Loire. The second offers a very hilly landscape and closed, especially in bottom of valleys where the woods are quite dense.

Along the Loire section of A89 many environmentally sensitive areas have been identified with protected elements of flora like *Ranunculus sceleratus*, *Orchis laxiflora* and *Anacamptis laxiflora* and fauna like *Triturus cristatus*, *Lissotriton helveticus*, *Bombina orientalis*, *Alytes obstetricans*, *Rana dalmatina*, *Rana temporaria*, *Rana clamitans*, *Salamandra atra*.

If in the Romanian document was reminded only two species which fall under the European directives in terms of their protection, in the French one there are carefully analyzed not only the mammals and herpetofauna but also the chiropteras and insects.

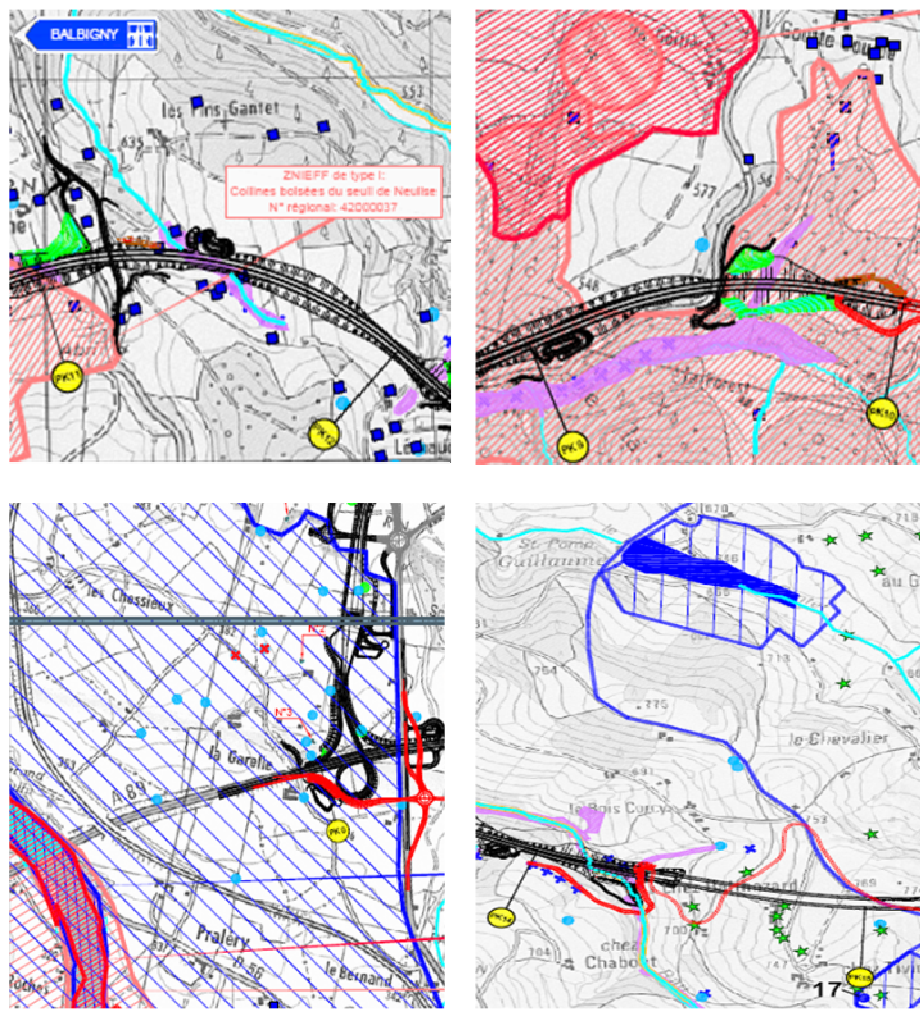


Fig. 3. Aspects of sensitive areas are crossed by the highway Balbigny-Violay (source: TOARCC, 2009)

Air protection

Both documents describe the specific climatic conditions of the area, mentioning in the two documents in a consensus the impact of traffic on air pollutant emissions during the execution and operation processes, proposed measures to be taken to reduce the impact are of a technical nature.

Waste management

Waste management specific of the studied road during operation should represent a major concern of the holder. Waste disposal is an activity that must be included in the Plan of Operation and Maintenance. The

storage of materials, inert waste, oils and fuels outside the areas authorized by the contractor and provided for this purpose will be prohibited.

Starting from the premise in which all factors were analyzed environmental in the case of Orastie-Sibiu motorway section, it is likely that cartographic representations do not correspond to reality. The difference arises in the case of the French motorway sector Bobigny-Violay, where detailed the analysis go to and cartographic representations is constituted as database such for shaping the current situation as well as dynamics in time for highlighting environmental elements.

CONCLUSIONS

The two case situations under analysis shows similarities to the level of approach. Even if they are considered the same environmental factors, differentiation occurs in the attention given to these.

Thus, if noise pollution from the highway sector in Romania are set only maximum limits, in the case of French are highlighted areas with different limits depending on the neighborliness (sensitive areas, farms, human settlements) correlated with nearby landforms that are designed to diminish or to the contrary to increase the sound level.

In the analysis of the impact on water, air, soil and waste management studies are similar there are small differences in principle given the different characteristics of the two areas studied.

In the analysis of the impact on water, air, soil as well as waste management studies are similar with small differences given in principle by different characteristics of the two areas studied.

Major differences appear when are compared the approach related to biodiversity, respectively the ecosystems. If in the French case is done detailed analysis on species of national and community interest and also their breeding and feeding habitats, while in the Romanian case are only remembered the community interest species.

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