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Roads and quality of life

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CONTENT

SUMMARY

In Cuba the road planning and construction strategy is established by the Ministry of Transport, through the National Road Centre. The same one is based on the National Road Scheme, a document elaborated in 1980.

Because in Cuba the traffic levels are very low, the roads are not perceived by the population like a nuisance source. Nevertheless, with the increasing of the environmental culture the levels of noise and atmospheric pollution and other impacts caused by an obsolete vehicular park are evaluated in a sensitive manner.

For being the development of the road infrastructure so linked to the tourism development, linked to ecologically sensitive areas, there is a social and state concern to achieve the compatibility of the tourism development with the conservation and protection of the environment.

Until present time the Environmental Impact Assessments have assumed the consideration of the environment in road projects. Without abandoning the continuity and improvement of this tool, we have evolved toward Road Environmental Design, incorporating the environmental issues to the process of analysis of solutions and conception of the own project and toward a change in the strategies of road planning, for which national standards and regulations have been established.

An environmental strategy for the Civil Engineering Career has been also developed with the purpose that those graduates can identify the main activities of environmental incidence and to propose preventive and mitigation measures of the man-made environmental impacts.

For the study of the road projects multidisciplinary teams are conformed and able to analyse, besides the technical factors of the road design, other elements like the environmental impact and protection, the balanced development of the territory and the coherence of the projects in urban areas.

1. Priorities for the road construction

Cuba has a road network that presently reaches 68 347.6 Km. Keeping in mind that the surface of the country is of 110 922 Km2, the road density is 0.62 Km/Km2.

The road infrastructure development plans at the present time are fundamentally associated to the development of the tourism, which constitutes the most dynamic sector in the growth of the investments.

In 1998, the Ministry of the Tourism established in its programs the quick growth of the investments related to the beaches. This development, added to the nautical and sport port activities, is located mainly in coastal areas in natural zones of the country's north keys.

In these areas, due to the scenic value of their landscapes, their beautiful and extensive beaches, the good state of conservation of their ecosystems and the high endemism in the terrestrial and marine diversity, it is necessary to achieve compatibility of the tourism development, and therefore of the road development, with the protection of the environment.

In correspondence with this policy, Cuba is also signing member of the Agreement for the creation of the area of Sustainable Tourism in the Caribbean, subscribed in Santo Domingo in 1999.

In the last years, then, the constructive effort has gone to roads related to the tourism, such as the enlargement of the Matanzas-Varadero highway, the lengthening of the South Varadero highway, the repair of the Vía Blanca and the embankment-stone road construction (roads over the sea that connect the firm territory of the island with some of the main keys and islands of the Cuban archipelago).

Recently the international prize “Puente de Alcántara” was granted to the work Pedraplén (embankment-stone road over the sea) Caibarién-Cayo Santamaría, in Villa Clara province, a legitimate pride for our country.

The development of infrastructures linked to the agricultural and industrial development, and to improve the quality of the population's life - although the same one is in dependence of the financial resources availability, has not been left.

The road infrastructure development in the first years of the Revolution was conducted in good measure to improve the quality of the population's life. This is the case of the road development in the mountainous regions and the Ciénaga de Zapata (Plan Turquino-Manatí) where the secular isolation of the communities of these areas was eliminated, facilitating the access to the education, the health, the communications, electricity, drinking water, etc.

Another priority of the Cuban State is the conservation of its road network in its struggle to offer an appropriate quality of service for its users, which is translated in safety, comfort and economy.

The National Road Centre works in the improvement of the Road Conservation Management System in order to optimize the efficiency of the use of the available financial resources.

2. Planning and evaluation of the road construction

The road construction and planning strategy is established in Cuba by the Ministry of Transport, through the National Road Centre. The same one is based on the National Road Scheme, document elaborated in 1980, and which is revised regularly every 5 years, or when some sensitive change takes place in the economy of the country.

Due to the current economic situation of Cuba in these moments the National Road Scheme is being subjected to analysis and up to date.

The steps for the approval of a new work or project are showed in Annex.

Among the organizations that take part in the decision making on the works to be executed are: Institute of Physical Planning, Ministry of Science, Technology and Environment, Ministry of Economy and Planning, Civil Defense, and others in function of the project to deal.

3. Road development impact on the human activities

In the year 2001 the growth of the activities of the tourist sector was of 3.1% with regard to the previous year, it supported in a road infrastructure created for that purpose, where the contribution of the road to the development of these activities is exposed.

Also the agricultural production (cane of sugar, citric, rice, cattle, etc) is other of the human activities that has been benefited by the country's road development.

Because in Cuba the traffic levels are very low, the roads are not perceived by the population like nuisance source (congestion, noise, etc.).

Nevertheless, with the increment of the environmental culture the levels of noise and atmospheric pollution caused by an obsolete vehicular park are valued in a sensible manner, and they are also evaluated in a quantitative manner in the Environmental Impact Assessments.

For being the development of the road infrastructure so linked to the tourism development, linked to ecologically sensitive areas, there is a social and state concern to achieve the compatibility of the tourism development with the environmental conservation and protection.

4. Politicizes on the roads and on the Sustainable Development

In Cuba the sustainable development is understood as a process where the economic, scientific, technological, fiscal, trade, energy, agriculture, industry, preparation of the country for the defense development policies, and others, are linked to the demands of the environmental protection and to the sustainable use of the natural resources, in a frame of justice and social equity.

The Ministry of Science, Technology and Environment (CITMA), is the Cuban environmental policy's rector.

In Cuba, according to the Law 81 concerning the environment, promulgated on July 11, 1997, it is obligatory to submit to Environmental Impact Assessment, among others, the following works related with the transport:

- Railroads
- Roads
- Highways
- Airports
- Ports.

The setting of the Environmental Impact Assessment has allowed the realization of specific analysis that has facilitated the knowledge of the environmental repercussions in the transport works.

The Environmental Impact Assessment, just as it is defined in the Resolution 77 promulgated in 1999 by the Ministry of Science, Technology and Environment (CITMA), is a systematic process of multidisciplinary study and evaluation to identify, predict, manage, evaluate and inform of the effects on the environment of a work or project that includes detailed information on the monitoring system and the measures that should be considered to avoid or to diminish at the minimum the negative effects or to enhance the positive ones as it proceeds.

The process of Environmental Impact Assessments includes:

- Application of environmental license.
- Environmental impact assess in the cases that it proceeds.
- Assessment done by the Ministry of Science, Technology and Environment.

The Environmental Impact Assessments are carried out once concluded the Project Design.

Without abandoning the continuity and improvement of this tool, it has been evolved toward an Environmental Design of Highways that incorporates the environmental questions to the process of analysis of solutions and conception of the own project and toward a change in the strategies of road planning and in the transport policies.

At the present time the protection of the environment is a priority of the main Ministries related with the new transport work construction Projects:

- The Ministry of Transport (MITRANS), that rules the roads in Cuba, establishes in its strategy to integrate the environmental factor from the beginning of the road project planning.

- The Ministry of the Construction (MICONS), regulates in its policy a special attention to the constructions in fragile ecosystems, mainly in tourist poles in keys and coastal areas, using constructive systems and organization of the works that imply the smallest possible impact in the environment.

- The Ministry of Superior Education (MES), specifies that the environmental education should be one of the objectives of the professional's pattern for all the branches of the knowledge.

To carry out these strategies the Ministry of the Construction recently introduced two national regulations:

❖ The RC 8006: “Procedure for the environmental analysis of alternatives”

How incorporating the environmental issues to the process of road design is determined and the methodology for the analysis of constructive alternatives is established, keeping in mind the environmental impacts that each one of them will cause on the different factors of the environment.

This procedure should be applied to all the projects, independently on the category of the road and the factors that will be involved in the process will depend on the environment at issue.

The environmental analysis of alternatives involves the necessity to know the initial environmental quality of the receiving means, to foresee the alterations that can be caused, and to evaluate the final environmental quality once included the project, being able to value the importance of the impact like the difference of the initial and final environmental quality.

The foresights of the environmental impacts carried out at the level of Preliminary design allow the analysis of alternatives to minimize the alterations from this stage. Layout alternatives are analysed with the purpose of avoiding areas of high natural value or areas of high risk. Profile layout alternatives can minimize the impacts on the geomorphology, the noise or the landscape. The impacts on the socio-economic means can involve new alternatives and the inclusion in those ones of the mitigation measures of the not wanted impacts that should be economically valued in the project.

The methodology established in Cuba for the environmental analysis of road alternatives is based on the use of environmental impact indicators in the road design, as it follows:

1. Establishment of the environmental characteristics of the area to be intervened, making use of environmental indexes.

2. Location on the topographical plan of the different georeferenced proposed alternative area.

3. Determination for each alternative of the input data for the impact foresight models.

4. Valuation of the impacts that each one of the alternatives will cause on the different factors of the mean making use of indicators according to procedure established in each case.

5. Compatibility of the environmental, economic criteria.

6. Selection of the definitive alternative.

7. Making of the detail and basic Engineering of the Design.

- The RC 8007: “Design of roads in areas ecologically sensitive”

  Establishes the strategy of road planning for areas ecologically sensitive and the parameters of road geometric design on the base of the reception aptitude of the territory. The geometric design conceptually changes its criteria with regard to the conventional design. It is guided to fix in advance the environmental indicators in acceptable values for the territory and starting from these to calculate the traffic parameters needed for the geometric design of the road network.

  The design criteria are:

  1. Noise levels to sides of the road under an established level that will be in function of the fragility of the ecosystem on which will be carried out the performance.

  2. Atmospheric pollution levels under values established in function of the fragility of the ecosystem.

  3. Design speed in function of achieving the best adaptation to the relief and landscape characteristics.

  4. Flora and fauna indicators.

  A special categorization of the road network is established for these areas and the main geometric characteristics of the road network are proposed according to the established categorization.

In the career of Civil Engineering, which is imparted in Cuba with an unique Plan established by the Career National Commission, an environmental strategy has been conceived with the purpose of those graduates can identify the activities of main environmental incidence and the factors of the mean potentially impacted by these activities, in order to consequently value the environmental impacts that cause the structural and road works, and to propose mitigation and preventive measures of the man-made environmental impacts.

For this purpose an interdisciplinary approach is applied, taking advantage of the specific content of each discipline, in a manner that the results of one be useful for strengthening other, facilitating the multi- and interdisciplinary analysis. Concerning to every year of the Civil Engineering career the environmental conceptions are linked to the essential objectives of the year, facilitating the incorporation of the environmental aspect to the course projects from first year, as well as to the diploma works.

5. Technical group for the study of a road project

For the study of the road projects multidisciplinary teams are conformed and able to analyse, besides the technical factors of the road design, other elements like the environmental impact and protection, the balanced development of the territory and the coherence of the projects in urban areas.

The members of the multidisciplinary groups that carry out the Environmental Impact Assessment should be accredited before the Ministry of Science, Technology and Environment.

The main specialities of the professionals that integrate these multidisciplinary teams are, among others:

Layout	Urbanism
Surveying	Territorial planning
Geotechnic	Physical planning.
Hydrology and hydraulics	Biology
Structures	Sociology
Traffic	Atmospheric pollution
Landscaping	Noise
	Meteorology

ANNEX: STEPS FOR A NEW PROJECT APPROVAL