Use of wood in constructions and equipments to the terrestrial trails of Fernando de Noronha Marine National Park – Brazil

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ABSTRACT

The archipelago "Fernando de Noronha" has an exceptional tourist and recreational vocation due to the beauty of the landscapes, beaches and seas all around. This has attracted intensive visitation leading to a strong impact in the natural and built environment. Infrastructure projects were developed for trails, especially looking for the execution and farther maintenance for a not specialized technician, starting from the methodology ROS - Recreational Opportunities Spectrum, associated to specific methodologies of project and representation. Among the main projects, stand out the support constructions - from 9 m² to 60 m² - divided in categories according to the complexity level, besides bridges for pedestrians, stairways and signs. It was adopted wood as the basic raw material and an architectural language coherent with the island environment, looking for repetition of the typology of some structural elements, creating identity with the local environment.

INTRODUCTION

To design to a place like the Marine National Park of Fernando de Noronha is a challenge for an architect. The archipelago is considered a paradise and any intervention in its structure, must observe the environmental requirements established for the Park. It demands appropriate technology for the available local labor and a design that allows the appropriate understanding for the users.

The main objectives of this project were to design and build rest areas, snack bars, sanitariums, vigilance station, centers of information, bridges, signs and trails maintenance in the Marine National Park of Fernando de Noronha, Brazil.

The team of specialists that prepared the technical project "Recreational Use Planning of the Marine National Park of Fernando de Noronha" (agreement IBAMA/WWF[4]) had about 20 professionals[5], being five for the infrastructure projects and signing. This allowed a wide exchange of information among the specialists of the involved areas. The projects were developed seeking to assist the local particularities so much under users point of view and administrators, as of the environmental criteria. The architecture team considered the creation of elements that could be repeated in differentiated situations, looking for the unification of the adopted solutions and the creation of an own identity for the interventions proposed for the Park.

CHARACTERISTICS OF THE ARCHIPELAGO

The Archipelago of Fernando de Noronha is globally known by its beautiful landscapes where the border of the sea with the rocks forms an unequaled composition in the terrestrial and marine environment, attracting more than 25.000 people every year.

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[4] IBAMA - Brazilian Institute of Environment and Natural Renewable Resources; WWF - World Wildlife Fund.

[5] The specialized team was composed by professionals in the following areas: history, geology, ornithology, recreational use and development of trails, botany, sea ecology and ictiofauna, sea biology (corals, sea turtles, dolphins), environmental interpretation and infrastructure team (architecture, engineering and visual communication).

The islands, 21 of volcanic origin, are located about 350 Km of the Brazilian Northeast coast, with defined environmental characteristics as "Atlantic Forest Islander" and with basically two annual climatic seasons: the dry and the rainy.

According to MITRAUD, 1999, the occupation of the Archipelago was marked by tragic situations since 1503. It began with the shipwreck of Américo Vespúcio's expedition, financed by the Portuguese Fernão of Noronha. Later, the Archipelago was occupied by French and Dutch, being in the XVIII century, built 10 fortifications, strategically positioned, aiming the protection against probable invaders. Its use as prison, about 1735, originated the village called "Vila dos Remédios", which had in 1883 a population of 2.382 resident people, being 1.561 sentenced, occupying the main island of only 17 Km². During the II World War the Archipelago was occupied by about 5.000 Brazilian and North American army people, staying under control of the army forces up to 1987. Since 1964 it was used as political prison. Only in 1988 the Archipelago passed for the federal administration, being constituted in a State District of Pernambuco.

Naturally, the occupation of the Archipelago generated a great devastation in the natural landscape. There was a strong deforestation to avoid that the prisoners formed hiding places or they used the wood for the production of escape embarkations. Open areas were needed for agriculture and domestic animals also. Some species were eliminated while others were inserted indiscriminately in the area. However, this disordered occupation was not enough to destroy the beauty flora and fauna. In the fauna, stand out the dolphins, the sea turtles, several species of sharks and a great biodiversity. It is the only South Atlantic Ocean insular mangrove, having been included in 1980 in the "World Strategy for the Conservation" as high priority area. Only in 1986 it was declared as Area of Environmental Protection (APA), being the creation of the Marine National Park of Fernando de Noronha instituted by decree in 1988, for a total of 112,7 Km². In 1990, the Park Management Plan was published.

PRESENTATION OF THE PROJECTS

The conditions

The main conditions for the infrastructure projects were:

- Interaction of the built elements with the natural environment;
- Adoption of local materials or of easy transport;
- Use of local labor;
- Maintenance easiness and visual identity with the Park.

These conditions were defined starting from the field activities, made with all the other areas studies components, following Recreation Opportunities Spectrum methodology- ROS (DRIVER, 1987). The main work instruments generated for the beginning activities were the diagnosis forms of selected trails and the definition of each ROS zone characteristics for the Park.

The criteria to choose the intervention places were defined in agreement with the impact level that the works could cause but also considering the local characteristics for the observation of the Park natural attractions.

For the projects development, it was observed some initial conditions, according to Table 1.

Table 1 - Summary of the conditions and project actions.

CONDITION	ACTION
• Period	3 months for the executive projects development
• Educational character of the Park	Being a National Park, the developed projects should attend the user's needs and the entrepreneur, as well as to serve as reference to the environmental concepts proposed in the visitation activities.
• Access difficulty	Being an Archipelago, the projects should consider the available means of transportation, so much in the technical aspect of the materials as in the relationship cost x weight of the transported material.
• Limitation of the resources	Use of, as far as possible, local materials.
• Non specialized labor	Search of technical solutions and coherent constructive details with the available labor and technical representation of easy reading and understanding.
• The Park while a model	Methodology development that could to be repeated in similar situations in other areas classified as of environmental protection.
• Maintenance and durability	Considering the difficulty of a continuous program of maintenance in areas under IBAMA responsibility, the projects were developed looking for the minimum necessary of maintenance and maximum durability.
• Absence of documentation, maps and basic information	Specific methods of planning and representation of the proposals were developed, especially with the Models creation.

The models

The models were created so that they could be repeated according to specific indications of the technical reports. The local verified problems were erosion, absence of guard-bodies, swamped areas, seasonal rivers crossing the trails, need for shaded areas (for rest). For similar problems– for instance drainage– similar solutions were adopted (Figure 2). In the models conception, it was especially considered the local materials, the minimum interference in the landscape and the warranty of the maintenance easiness. Ten basic models were developed, embracing all the problems verified in the trails.

Model 1. Elevation of the trail letting the rain water runs under the rocks.

Model 2. Completion of the ditch with local rocks.

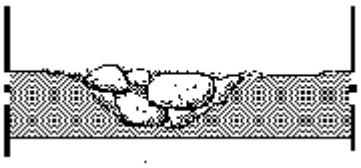

Figure 2 - Example of adopted models. In these specific cases, the adopted solutions looked for to maintain the original trails characteristics, using local materials and simple construction technique.

Due to lack of documentation and maps, the representation of the infrastructure projects was made on photographic images, simulating the effect wanted after the end of the works. These images were added to the drawings and technical reports facilitating the execution and the exact location of the areas.

The “PICs” and observatories

Besides the trails maintenance, small support constructions were projected. These constructions were divided in categories according to the complexity level, being the PIC's, (Station of Information and Control) the most complex constructions, and the observatories the simplest, varying from 60m² to 9m². The modulation adopted was 3m based in the foreseen uses and the size of wood pieces, especially beams and pillars. The more complex units were composed by the Information Center (9m²); Vigilance Station (9m²); Snack bar (9m²); Service Area (4,7m²); Sanitariums (9m²) and an open area for tables.

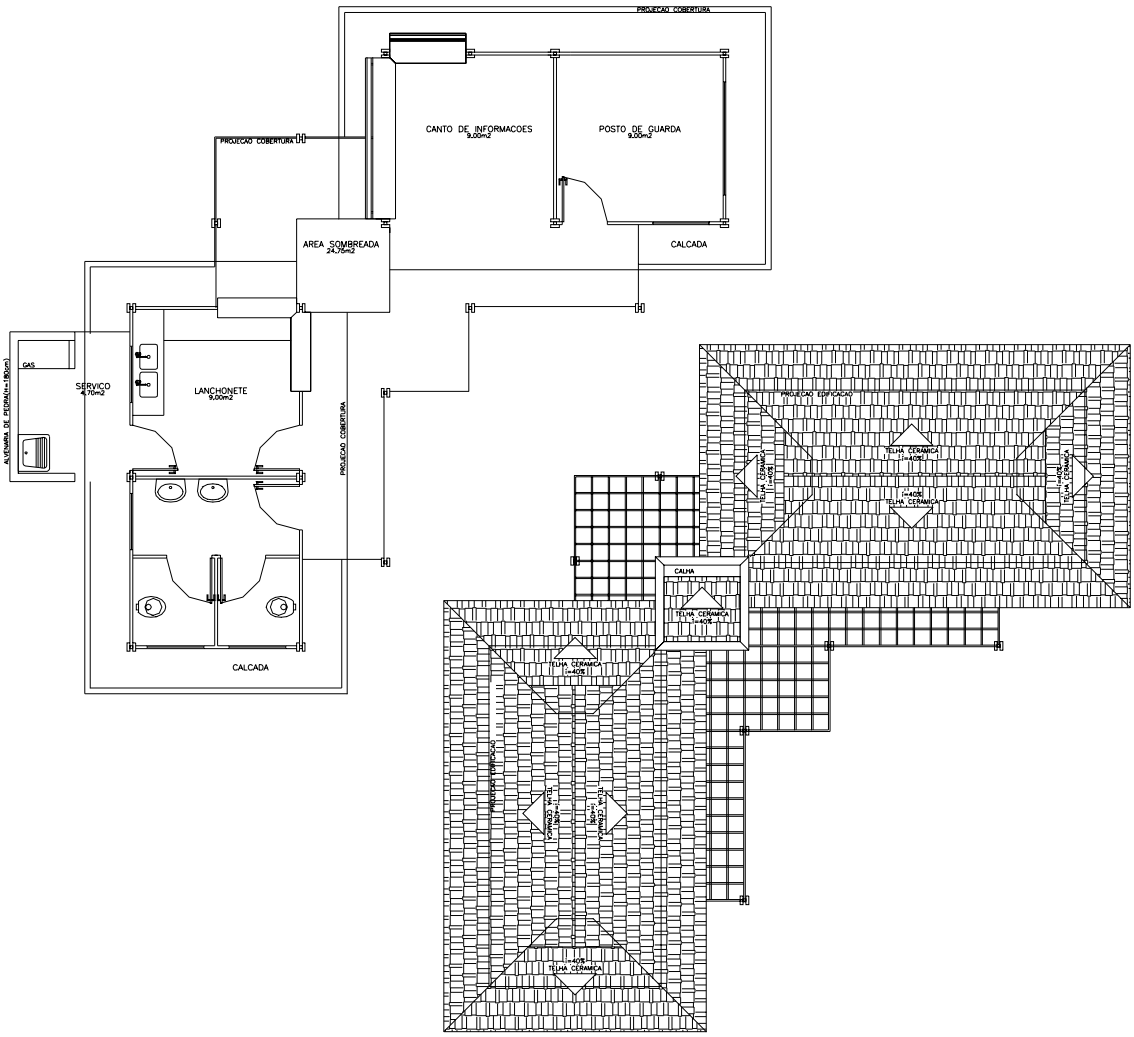

Figure 3– Example of a "PIC", where is observed the modulation and its insertion in the natural environment. It is important to see some constructive elements such as pillars, coverings and wooden bench - they will be repeated in other built elements.

The type and construction size to be implanted at each place was defined starting from the identification of the probable number of users, specific needs and category of the trail, higher or smaller degree of difficulty or rusticity, environmental impact of implantation and effective use. Following the established requirements, the constructions (rest area, snack bars, sanitariums, vigilance station and centers of information), the infrastructure (bridges) and signs (indicative and informative plates) were projected using the wood as main element.

Figure 4–To the left, view of a “PIC” built in the junction of two trails: Sancho and Dolphins. To the right, details of the pergola and the wooden bench between pillars.

Figure 5 - Rest and information area; the simplest structure of " PICs ", being observed the repetition of elements that characterize the adopted typology.

FINAL COMMENTS

The great challenge to the team was to establish a balance among the natural environment, the appropriate technology, the program needs, the labor and the available resources, which was softened by the previous experience in similar projects. However, to make a project which inserts buildings in the natural landscape without causing visual impact and at the same time that it made possible the creation of the visual identity of the Park, was the largest challenge. It is believed that the success of the enterprise was especially due to the union of the technological solutions with the criteria of environmental drawing, found in several involved professionals, generating the desirable global vision in the process of the planning.

REFERENCES

Driver, B. L. et alii. 1987. The ROS Planning System: Evolution, Basic Concepts and Research Needs. Leisure Sciences, vol. 9 p. 201-212.

Edwards, C. 1997. Guia para projetos de interpretação. USDA Forest Service, Brasília,. (traduzido por Edna June Morley e Maria da Graça Nobre Mendes, DEPROM/IPHAN).

Mitraud, S. (coord). 2000. Uso Recreativo no Parque Nacional Marinho de Fernando de Noronha: um estudo de caso. Brasília: WWF Brasil (no prelo).

Plano de Manejo do PARNAMAR - Fernando de Noronha. 1991. FUNATURA/IBAMA, Brasília,

Tuan, Y. 1980. Topofilia. Um estudo da percepção, atitudes e valores do meio ambiente. São Paulo, Difel.

Vachowski, B. 1996. Trail Construction and Maintenance Notebook. USDA Forest Service. Technology & Development Program. Missoula. Montana. (Revisado em Abril de 1997).