

Constructive systems using eucalyptus logs for ecological parks in central Brazil

Roberto L. DE MELLO
Researcher
LPF/IBAMA
Brasília – DF Brazil



Architect, BSc, Catholic University of Goiás, 1988. Working with Physics and Timber Engineering at LPF/IBAMA, developing projects in wood with priority use of well know and lesser know Amazonian species

Júlio E. DE MELO
Researcher
LPF/IBAMA
Brasília – DF Brazil



Civil Engineering, MSc. University of Brasília, 1972. Especialist in Wood Structures, University of São Paulo, 1984. Working with Physics and Timber Engineering at LPF/IBAMA, developing projects in wood and physic-mechanical characterization of Amazonian species

Summary

The use of eucalyptus wood in the building site is intensifying in Brazil, consolidating it as an alternative to the native tropical woods. The good structural performance and linearity of the rounded pieces result in a larger use of the wood. With 30 years of existence, the Forest Products Laboratory of IBAMA develops characterization studies to indicate the final uses for this fast growth species. Starting from several past experiences with this material, it is proposed the construction of a structure made of two 12 m-span rustics eucalyptus logs, for the two pavements constructions and ceramic tiles covering, destined to ecological parks to be implanted in the city of Goiânia, in central Brazil. The frame design provides well distributed stress, besides allowing roofs in several levels, that contributes for natural ventilation in an area of hot climate. Logs structures were also used in small constructions such as sanitariums, kiosks, police station and porticos.

Keywords: wood, timber structures, wood buildings.

1. Introduction

Progressively the eucalyptus wood is becoming an alternative to the native ones in our country. His use is especially intensifying in the furniture industry, where is used in the sawed form. It is also found in rural constructions, fences, as well as in country houses and in high standard beach houses, as round wood with preservative treatment.

His use in the form of round wood represents a better application of the material, as well as a smaller manipulation cost and improvement, besides providing an economical form of construction. Among the disadvantages, the difficulty in the execution of connections is the most important, being usually used limited solutions that don't explore the qualities of the material.

Starting from the experience of previous works executed with the structural use of the round eucalyptus wood and of the physic-mechanical characterization and final uses determination carried out by the Laboratory of Forest Products of IBAMA, the use in constructions destined to ecological parks in the city of Goiânia, in the central area of Brazil, was suggested.

2. Description of the projects

The projects destined to the ecological parks were defined as: large constructions, as the Environment Centers (NUMA) 1 and 2; small constructions as the sanitariums, kiosks and police station, and equipments as entrance portico and fences.

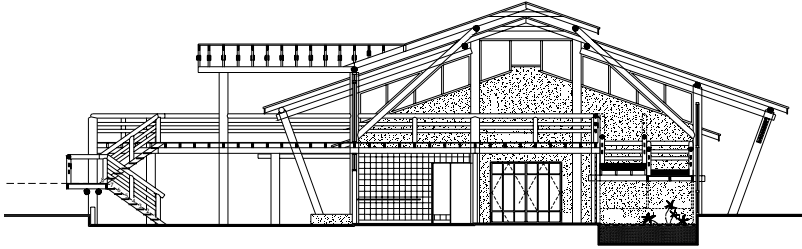


Fig. 1 Section of the NUMA 1

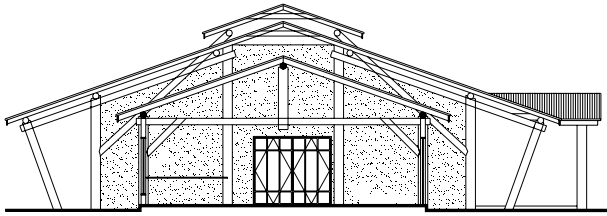


Fig. 2 Section of the NUMA 2

In NUMAs 1 and 2, the structural frames were used with double pieces with 12,00 m-span and design that provided well distributed loads. It allows different levels of roofs in ceramic tile with spaces for natural ventilation, and with quite significant aesthetic result, as it is observed in Figures 1 and 2.

The use of the same structural solution for a building with one (NUMA 2) or two pavements (NUMA 1) confirms its versatility, besides contributing to rationalize a possible mass production of the frames.

Regarding the wall finishing, these are proposed in ceramic bricks, plastered and painted with colors of our natural landscape. The double-beams used in the frameworks allows the free passage of the built-in facilities in the masonry.

The apparent rigidity of the structural modulation doesn't limit the possibilities of the architectural design, that can be observed in the Figures 3, 4 and 5.

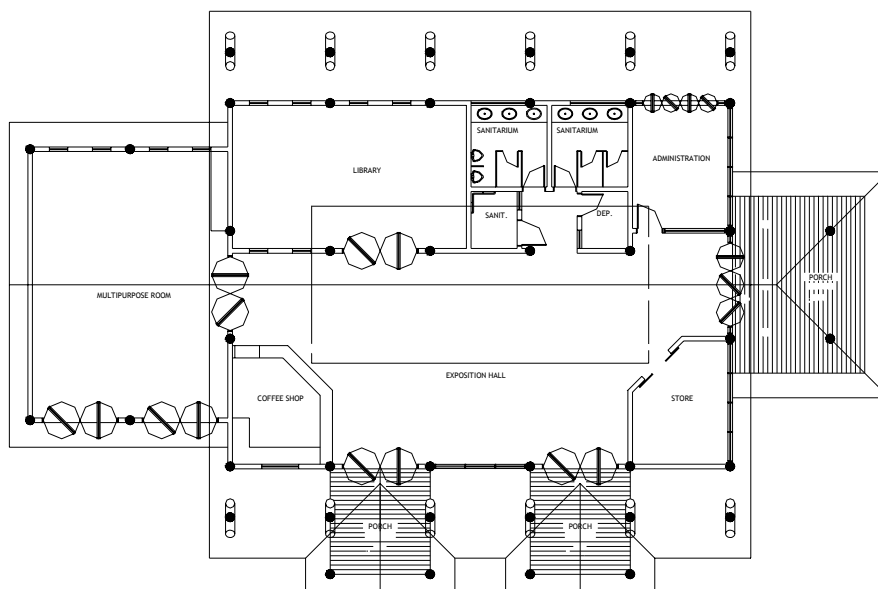


Fig. 3 Plan of NUMA 2



Fig 4. External view of NUMA 1

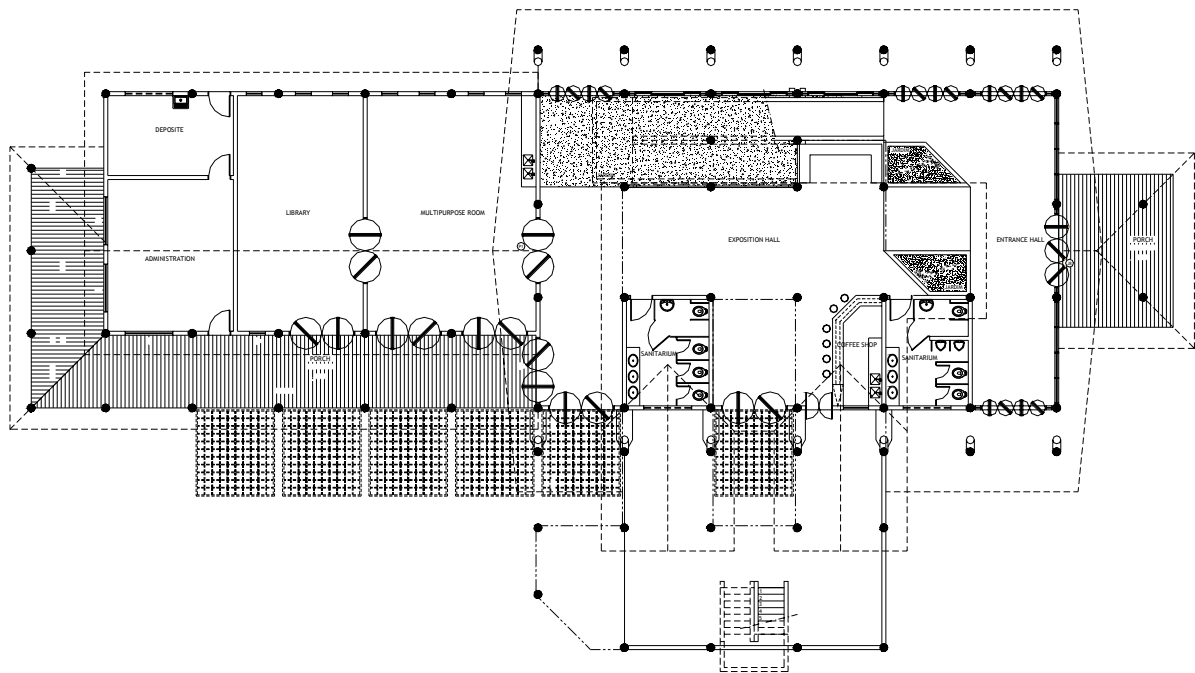


Fig. 5 Plan of the ground pavement of NUMA 1

In small constructions as sanitariums, kiosks and police station, the structures made of eucalyptus logs also lend an outstanding aesthetics and provide natural ventilation in an area of very hot climate. The groups of sanitariums are identified visually for the timber structure, where the central double-beam signals the main accesses. Internally, the displacement of the pillars provides reduced spans for the support of the coverings, as presented in the Figure 5.

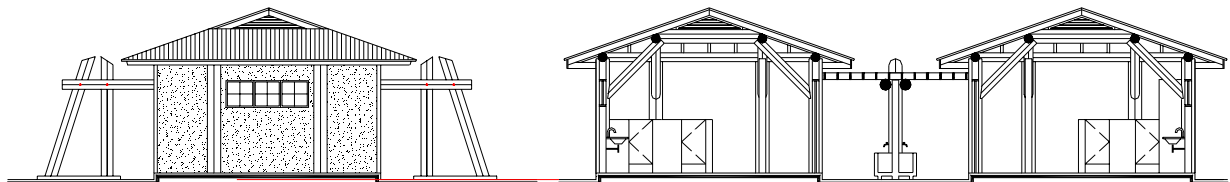


Fig. 5 External view and section of the sanitariums

In relation to the mezzanine structures and coverings, the use of Amazonian wood was proposed, aiming to explore the contrasts between colors and shapes of the forest essences in the composition of the buildings. The use of sawed wood with regular sizes simplifies the execution of floors and roofs on the pole structures.

The portico was conceived to be an outstanding visual element, signaling not only the main access to the park as well as showing the wood structure in prominence, and creating a favorable expectation close to the public visitor. Once again, the main structure in rounded eucalyptus serves as support for elements in sawed wood, as the sign of the park, as it is observed in the Figure 6.

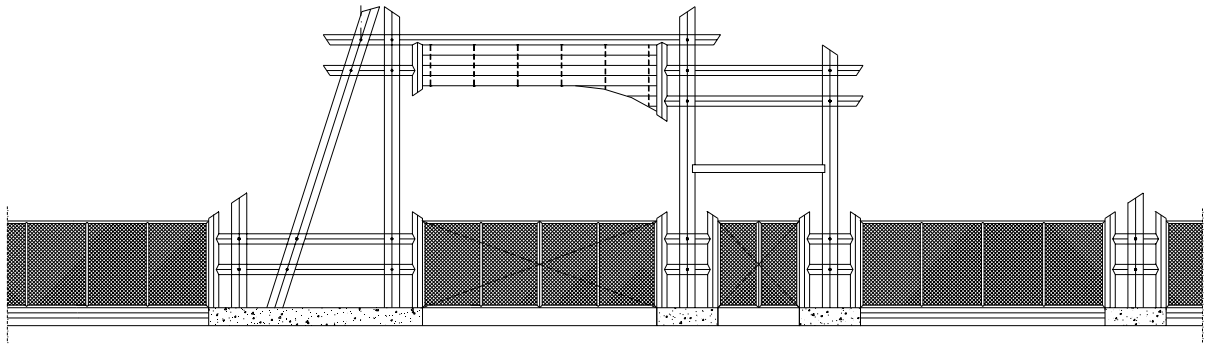


Fig. 6 External view of the portico

3. Final comments

The use of eucalyptus poles as a main structural element of constructions and equipments for ecological parks reveals the great aptitude of the material for the architecture and engineering fields. The outstanding aesthetics suggests that no other material transmits with so much energy the integration between the built space and the natural areas.

Besides, it should be pointed out the importance of demystifying the use of the wood in the construction as "non-ecological", because it is the only renewable material and, especially in the case of fast growth species as the eucalyptus, it can be made available in short space of time and at quite accessible price in our country.

4. References

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