

Assessment Of Historic Timber Structures In Brazil

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Abstract This article presents the assessment of historic timber structures in Brazil. Large wood structures originated with the engineering company HAUFF, whose production of wood structures contributed in great measure to the technological advance of the industry of construction engineering with wood in Brazil. Based on graphic, photographic and descriptive documentation, this paper offers examples of roof structures and of structures for other purposes built by HAUFF, focusing on structural systems of roofs, bridges, and scaffolding that constitute most of HAUFF's production.

Keywords Brazil, historic, timber structures, assessment, Hauff structures

1. HISTORY OF TIMBER STRUCTURES IN BRAZIL: THE COMPANY "HAUFF"

Erwin Hauff, founder of the company HAUFF, was born in Vienna, Austria and graduated in civil engineering from the Technical University of Munich in 1920. At the end of World War I, Mr. Hauff moved to Brazil, where he became fascinated in studies of Brazilian forest species upon observing the physical characteristics of their wood. He collected samples of a wide variety of species, observing their drying behavior, their defects such as cracking and warping, and their workability. All these observations were based on empirical trials(Cesar,1991).

Hauff built several types of roofing structures for warehouses, deposits, bridges, soffit scaffolding and other works in the city of São Paulo in the 1920s, until, in 1928, he founded the civil engineering company HAUFF. As head of this company, he designed and built wood truss structures with dowelled connectors, which earned him national and international acclaim. His international prestige came through the Technical University of Munich, which conferred on him the honorary degree of lecturing professor for his contribution to the area of wood structures constructed in Brazil. Erwin Hauff's experience in the field of wood structures and his knowledge of the technology of this material contributed to the formulation of the Brazilian NB-11/51 standard for timber design.

HAUFF's success in the 1920s, 30s and 40s was due, among other things, to the greater availability of skilled labor which was abundant in those days as a result of foreign immigration, which brought to Brazil a large contingent of individuals of medium level very experienced and highly qualified in carpentry trades, as well as in other general construction tasks. Also, at times, HAUFF itself brought over several European technicians to train their workers, who were required to be qualified at a technical or specialized level in one area of carpentry, since the Brazilian labor market was

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going through a crisis, particularly in the late 40s and 50s. These foreign professionals were, in large part, responsible for training many excellent Brazilian carpenters.

2. ASSESMENT OF ACTUAL HAUFF TIMBER STRUCTURES

Nowadays we still have in use important Hauff timber structures and its assessment is very important. Nondestructive evaluation is the science of identifying the physical and mechanical properties of materials without altering its end-use capabilities and then using this information to make decisions regarding appropriate applications (PELLERIN & ROSS, 2002). Nondestructive evaluation (NDE) technologies have contributed significantly toward detect structural problems. Most of the structural problems here are related to bracing and buckland because they change the tiles and remove the bracing, deterioration due moisture and deterioration due fungi and insects.

3. CONCLUDING REMARKS

Throughout its existence, HAUFF played a highly relevant role in the history of civil engineering in Brazil, but particularly during the period of its greatest production, which corresponded to its wood structures phase.

HAUFF can be considered a company that introduced wood structure technologies in the country and which was in large part responsible for training artisans linked to the production of wooden structures, i.e., master carpenters, draftsmen and designers, and for enriching the body of technical knowledge if many engineers who participated in this production.

In this way the assessment and rehabilitation of Hauff timber structures must be a important subject for the future of timber structures in Brazil.

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