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A ghost image of the Colonia Güell church by Antoni Gaudí

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Abstract

Antoni Gaudí's hanging model for the Colonia Güell church design is a prominent example of working with the Laws of Nature. Departing from the reconstructed image of the unfinished church, a segment reconstruction is presented, to be built on a natural left site with pine trees near the original Colonia Güell crypt. A skeleton-like structure represents the eight major pillars of the church. The branched pillars and connecting arches demonstrate to the public on a light platform the main features of an organic space. Original basalt trunks are carefully integrated. The proposed pillar structure consists of a steel core with ceramic surface and threefold steel-wired arches are left visible between spaced ceramic elements. The whole is stabilized by cables; all is reversible. The author (with Graefe, Otto, Walz) contributed in 1982 to the reconstruction of Gaudí's hanging model and documented this in his thesis "the model"[5]. The design of "Ghost Image", interpreting a proposal by Cheryl and Emerson Martlage, was developed in 2001 together with students and assistants. This contribution is dedicated to Cheryl and Emerson Martlage

1 Introduction

Antoni Gaudí (1852-1926), the universal architect of catalan origin, impressed the architectural world. He applied a hanging model for his design of Colonia Güell Church (1998-1908), thus generalizing the statical principle of the inversion of the catenary, which generates an optimal arch shape. Gaudí researchers, gaudinists, living 150 years after Gaudí's birth, posess an admiration which happens to be mixed with a sense of distance to the historic and living personality. The gap between his spirit and the gaudinists seemed wide. His visionary architecture was theoretically reconstructed, or interpreted, or

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restored, but only few efforts were made to prolong his architectural route. Gaudinist experience became mature in building his Sagrada Familia design, using computer aided design, thus inventing futurist building methodology [2]. A next possible step by gaudinists may be to create new architecture, departing from Gaudí's vision, inhereted both in his buildings as well as in his theoretical impact [3].

The Colonia Güell Church was finished uncomplete in 1914. The church torso (a crypt and a stairway) is unique as a structure and a master piece in architecture, like has been stated by many critics. Being developed with the hanging model method, Gaudí's design got an optimalized shape. The resulting building would have included an elegant branched structure, domes and hypar vaults in a sweeping rythm and oblique walls covered by steep towers. In Gaudí's own words: "The building was intended to be a compound of brick, breeze block and stone fragments, which give the lower sections the grey color of the soil. Further upwards the grey color becomes silvery and similar to that of the pine tree trunks which surround the building. Even further up the green, purple and blue tones of the glass materials would have harmonised with the blue sky and the tree tops which obscure the horizon." [1]

The church torso occurs in an organic shaped surrounding, a pine tree covered hill. The dual relationship between church and workers colony is similar to NATURE versus CULTURE or HEAVEN / EARTH. The planned 40m entrance tower of Colonia Güell Church, would have been orienting towards the colony plaza and be visible from there, thus stipulating the mutual firm connection between the reign of God and the reign of laymen, the village people.

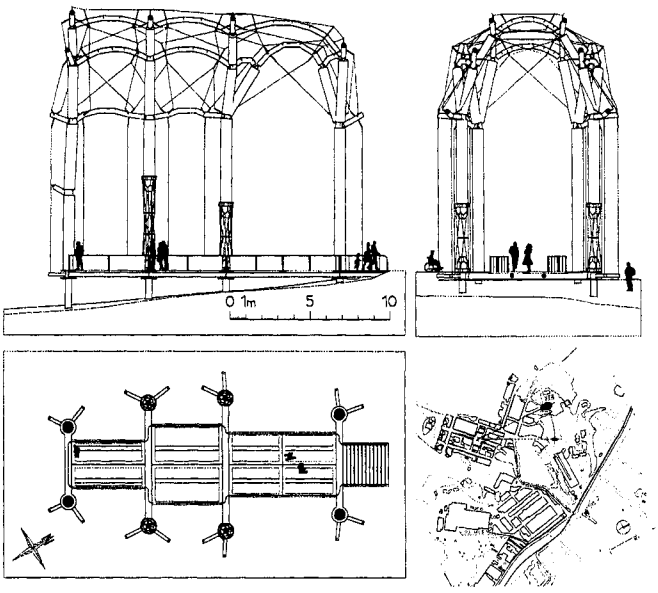


Figure 1: Plan/Sections of "*Ghost Image*" & building site in Colonia Güell

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2 The design project *Ghost Image*

The design project *Ghost Image* is a mere proposal, but ment to be built in the future, after having passed all necessary financial, conservation and planning administrative processes. The *Ghost Image* of the unbuilt church, in scale 1:1, gets its site in the pine tree park, about hundred meters east from the Church site, also directed towards the major plaza.

In the *Ghost Image* a skeleton like structure represents the eight major pillars of the intended Colonia Güell Church, with conecting arches and branches in real scale. The structure consists of the original basalt trunks, carefully montaged inside a modern structure of ceramic elements and steel and stabilized by a tension system. This skeleton structure stands on a slender platform construction with eight point-foundations, leaving the natural park flora almost untouched. Part of the esthetic concept is that the skeleton mingles with the some meter lower pine trees, From a conservation point of view the *Ghost Image* structure is completely reversibel.

The public is allowed to enter the platform and thus one may esteem the space according of the Colonia Güell Church in a reduced way. The shape of the skeleton follows the design reconstruction in my thesis "the model" [5], which results from the reconstruction of Gaudís hanging model of 1898-1908 by Rainer Graefe, Frei Otto, Jos Tomlow, Arnold Walz and team in Institut für leichte Flächentragwerke (IL) Stuttgart University, 1983 [4]. If appropriate, recent research results and new reconstructions will be integrated in the project.

The dimensions of *Ghost Image* are approx. 21 m length and 12 m width. The height is approx. 17 m over platform level and 2.6 m more over the lowest point of the site around.



Figure 2: Intended "*Ghost Image*" site in Colonia Güell with pines

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The eight pillars of the central nave and the structural elements which connect them (arches, branches) form a skeleton which represents, as a fragment, the planned Colonia Güell Church. Original basalt stone trunks, intended to be part of the planned church, have been carefully integrated into the *Ghost Image* skeleton. A tension system stabilizes the overall structure, which is symmetrical along the long axis.

Pine trees around reach up to 15 m height, leaving the high zone of *Ghost Image* visible from a distance, mingling with the natural trees as a group of "artificial trees". The entrance to the platform is from the north-east. The platform, to be used as a balcony by the public, reaches its highest distance from the soil on the south-west, the village side.

From inside the skeleton of *Ghost Image* one may experience a similar architecture of organic character as the one of the planned church. The steel wires, an important feature of the new structure, concentrate on the exterior. Near the viewers on the platform all wires which connect the tension elements of the arches are conceived to be strictly vertical, thus harmonizing with the church main pillars, which were also thought vertical. The wires on the exterior of the skeleton structure symbolically add the missing parts of the unfinished image of the reconstructed church.

The experience of visiting *Ghost Image* explains the special architectural features of Gaudí's highly experimental building. One may esteem a human scaled, organical space. All this is developed from Nature itself and from the wisdom of its inherent laws, visualised in Gaudí's hanging model of Colonia Güell Church.

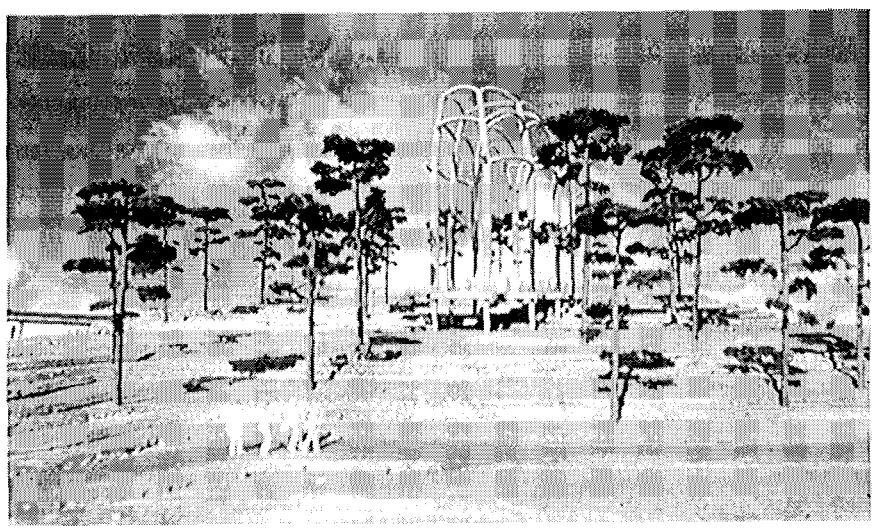


Figure 3: Site model of "*Ghost Image*"

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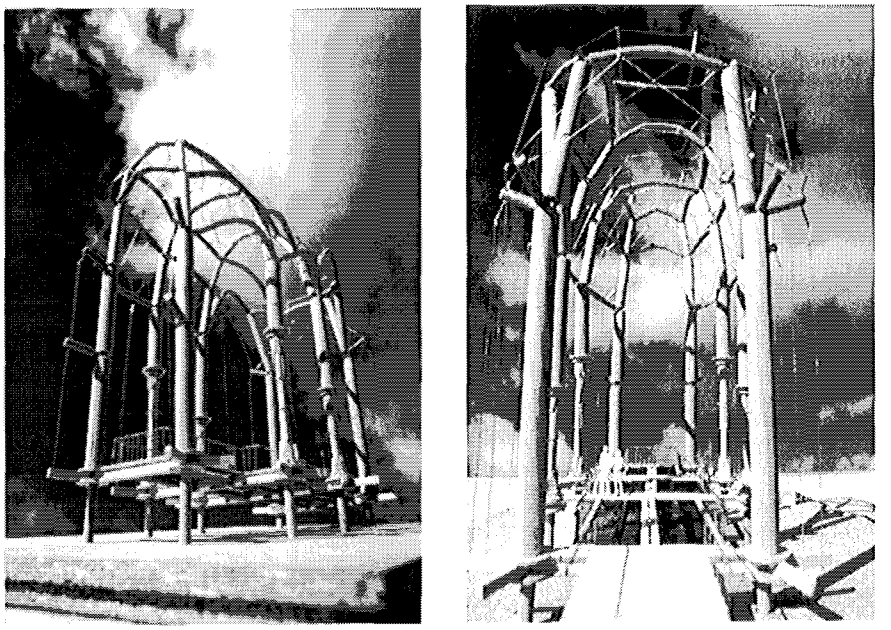


Figure 4 & 5: Model views of "*Ghost Image*"

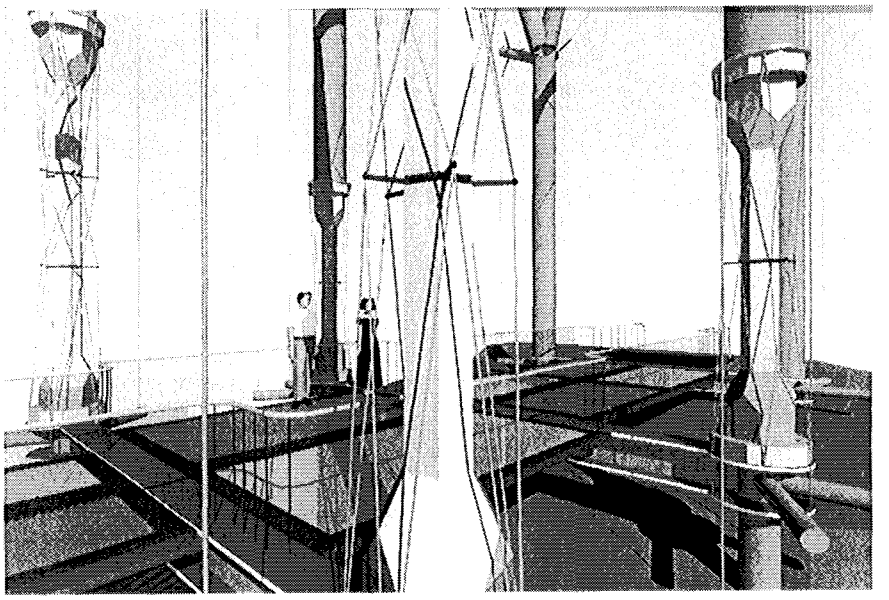


Figure 6: The platform in "*Ghost Image*" with integrated basalt trunks

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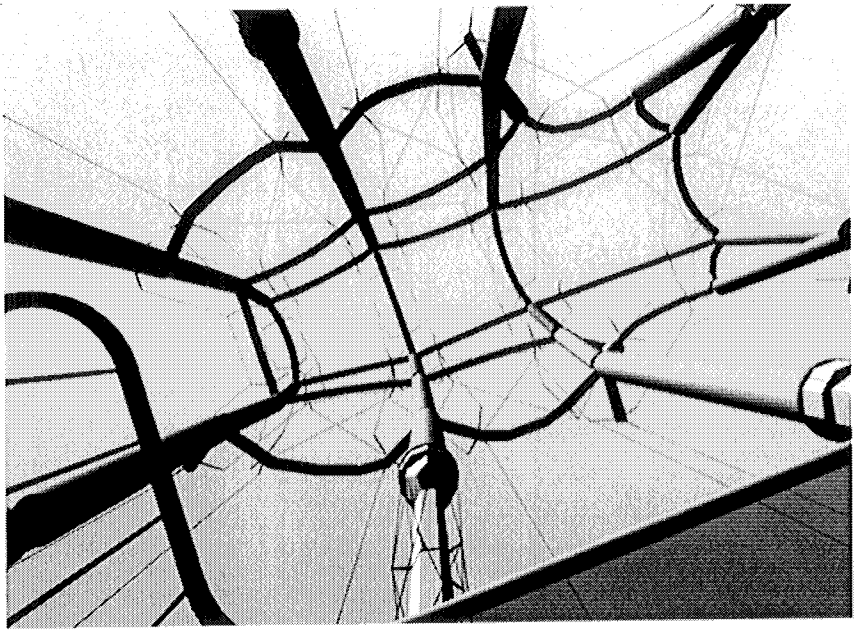


Figure 7: CAD-Drawing of "*Ghost Image*" as seen from platform

Ghost Image from a low view-point shows a strong and self-confident structure. It is freed visually from its site by using slender platform elements, including glass panels and a steel grid floor, fixed in wooden frames. The base of *Ghost Image* consists of a stiff steel platform on reinforced concrete point foundations.

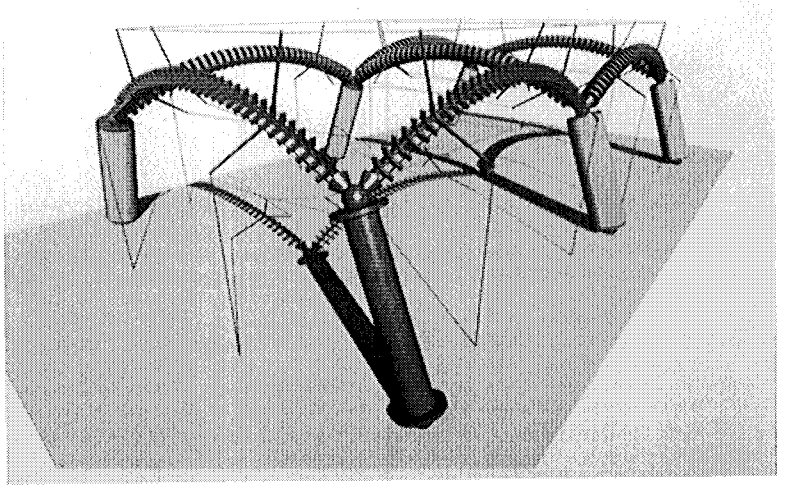


Figure 8: Structural typology: tube core, steelwired arches with ceramic cover

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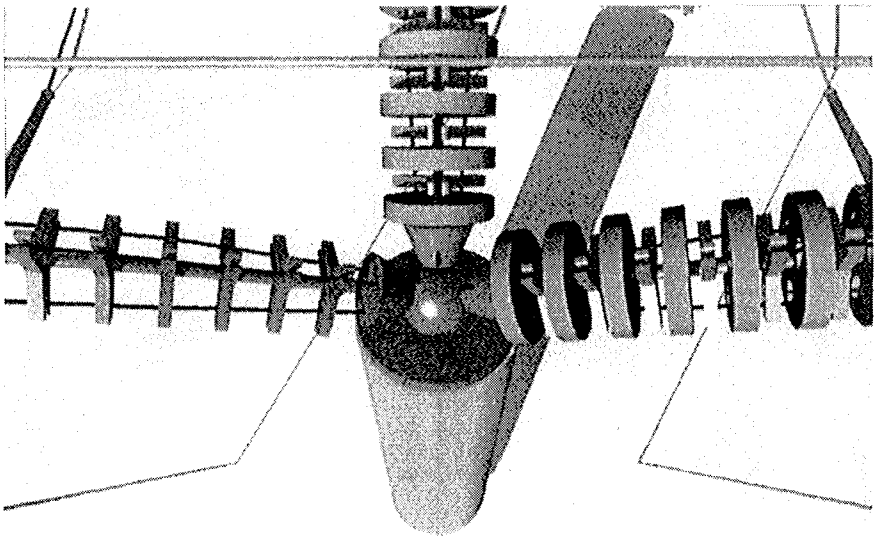


Figure 9: Detail connection point of arches and pillar branch

3 Structural aspects

Part of the esthetic concept of *Ghost Image* is that it shows a hybrid structural approach, rather than interpreting the optimized idea of Gaudí's hanging model. The hybrid structural approach was deliberately developed because of the fragmentary character of *Ghost Image*, which resembles the core of the planned church.

The building materials of the skeleton itself consist of ceramic elements, which for esthetic reasons cover a steel core of tubes, wires and knot elements. The structural system with tubes, giving stability to all main parts is firmly attached to the base structure. The original basalt trunks by Gaudí are stabilized onto its exterior by a system of steel high-stressed wires, leaving only compression forces to the hard stone trunks. The ceramic elements of the trunks are of ring sector shape. They are attached to the tubes, with inox-steel threads, imbedded in a joint fill of a common masonry mortar.

The ceramic elements of the arches are of a 30 cm diameter and 5 cm thickness, thus shaped similar as the half-round bricks, which Gaudí used in Colonia Güell crypt. The disc ceramics show four holes, a central one for the steel core, and three in radial positions to allow the wires to be fixed on optimized distance from the core, according to the overall arch shape. Steel elements in the skeleton are in inox quality.

The steel tubes, are of reduced thickness and weight. They have on its both ends a steel plate, on which knot elements are fixed. These knots are rather

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conceived as elements of reduced stiffness than as hinges. The threefold steelwired arch consists of uniform star-shaped elements, which form a torsion free chain, stabilized by three high-stressed cables. Due to its complexity, a montage (and testing) in a workshop is thought to be necessary. The arches are stiff as a part, but they are held into the overall shape by additional tension elements, being wires, connected to the arches with starshaped steel elements. These wires are conceived as to endure rather low tension forces. Between the ample spaced ceramics the steel structure is left visible.

Acknowledgements

During the VII Jornadas Internacionales de estudios Gaudinistas in Delft University (NL) in November 2000 possibilities of such a future gaudinist architecture, as presented here, were thematized.

The pre-design of *Ghost Image* by Prof. Dr.-Ing. Jos Tomlow is part of his research at the Hochschule Zittau/Görlitz (FH). Its idea responds to the Colonia Güell Church Proposal by Cheryl and Emerson Martlage – July 20, 2000 (Saratoga, USA). Contributors to the pre-design in the period November 2000 - November 2001 are model builder Jens Freudenberg and the architectural students BA 99: Bührdel, Franz, Haschke, Hülle, Kerger, Söffel. Models in scale 1:200 and 1:100 show additional informations. CAD drawings are by Jan Fallgatter. Currently a statical calculation of the structure is prepared by civil engineering student Arnd Melzer, coached by Prof. Dr.-Ing. habil. Holger Theilig and the author.

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