

# Mies's Convention Hall: Convergence of Teaching and Architecture

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On November 19, 1953, the *Chicago Daily Tribune* published an article on Mies's proposal for the city's new Convention Center.<sup>1</sup> The following month, *Engineering News-Record* magazine gave more details of on the project, pointing out, among other things, that Mies had taken Frank Kornacker on board as structural engineer.<sup>2</sup> However, not all the literature on this project explains its evolution as well as the involvement of the team that took part in it. In trying to establish a chronology of the literature that has been written on Mies's work in the course of the past century, we can find that the project for a Convention Hall is included in the monograph published by the ex-Bauhäuser Max Bill in 1955. Afterwards, the reprint of the catalog that had been edited by Philip Johnson in 1947, along with the biographies produced by the likes of Ludwig Hilberseimer, Arthur Drexler, and Werner Blaser, or by some of their students at the Illinois Institute of Technology (IIT) in Chicago, such as James A. Speyer, describe the project as the best of Mies's attempts to reduce architecture to pure structure: "It is a terminal statement of the clear span building. It transcends its structural and utilitarian basis (...) it illustrates perfectly that aphorism of Viollet-le-Duc, the father of structural rationalism, "any form that is not dictated by the structure should be postponed."<sup>3</sup>

In 1974 another monograph was published by one of Mies's students at IIT, Peter Carter, who began preparing for the book while working in his studio. *Mies van der Rohe at work*<sup>4</sup> discusses the thought processes of the German master through an analysis and rigorous description of twenty-eight projects, focusing especially on the structural component:

"Mies van der Rohe concentrated on a structural architecture because he was convinced of its basis in reason, of its generality in application, and of its safeness as a way (...) An examination of Mies van der Rohe's work will reveal a gradual and consistent unfolding of structure as Art – within the context of the needs and means of our time."<sup>5</sup>

On the pages devoted to the Convention Hall project, Carter includes a note on the building's structural development: "Mies van

der Rohe worked on the Convention Hall project both in his office and with a group of IIT graduate students in his masters' class. The following account of the building is drawn largely from the thesis report prepared in 1954 by Yujiro Miwa, Henry Kanazawa and Pao-Chi Chang under Mies van der Rohe's direction."<sup>6</sup>

After going through Mies's professional career, Carter offers a view of his contribution to the discipline as a professor, first in Europe, during the final years of the Bauhaus, and later at the IIT in Chicago. A description of the undergraduate study plan is included, as well as mention of the two-year postgraduate program, which ended with a master's thesis project. Among the final master's degree projects supervised by Mies was the one submitted by the three IIT students under the title *A Convention Hall: A Co-Operative Project*, kept in the IIT's University Archives and Special Collections and consulted during the development of this research.

The collaboration between Mies and his students in the development of the project for a Convention Hall throws light on the close relationship between architectural teaching and practice. In addition, the fact that the proposal for the Convention Center is the largest in scale among those drawn up by Mies suggests the experimental nature of the academic projects developed within the graduate program. This article aims to delve into Mies's unbuilt project from a new point of view, describing the characteristics of the first published proposal and bringing to light the academic character of the work continued by the students until they submitted it as their final master's project in June 1954. Our aim is to see how his architectural philosophy and way of doing things were transferred to the school. To do this, we first describe the original approach of the proposal, as published at the end of 1953, establishing this as the starting point for the development of the thesis. Next, each of the parts developed by the three graduate students under Mies's tutelage is analyzed separately, both from a descriptive and a graphic angle, including the alternatives tested and the solution eventually chosen. Finally, we link the students' project to Mies's "structural architecture," mentioned by Carter, seeking to throw light on the existing connections between professional practice and teachings in IIT classrooms.

## A New Convention Center for Chicago

In the Mies van der Rohe Archive, kept by the Museum of Modern Art (MoMA) in New York, there is a copy of the proposal for the new Chicago Convention Center, dated November 18, 1953, which was commissioned to Mies by the South Side Planning Board (SSPB).<sup>7</sup> The project statement, consisting of seven pages of text and four drawings, is divided into three sections: the proposal, the place, and the building. The proposal presents a highly versatile 500,000-square-foot (about 46,450 m<sup>2</sup>) building occupying a plot that stretches from Cermak Street south to 25th Street, and from South Parkway west to State Street [Fig. 01]. It is the largest

convention center ever conceived, with a capacity for 50,000 people and a parking lot for 10,000 vehicles, whose structural strategy, free of intermediate supports, means that it can be adapted to a broad range of conventions and exhibitions regardless of magnitude, and even sporting and political events and concerts [Fig. 02].

The building has a square plan of 700-foot (213.36 m) sides, and a single floor with a height of 100 feet (30.48 m), 30 feet (9.14 m) of which rises to the edge of the roof structure that frees the interior of structural supports and achieves unobstructed views of the entire room, which in turn is sunken below street level [Fig. 03]. In addition to this large hall, adjacent buildings are arranged to accommodate restaurants, meeting and conference rooms, and other facilities, which can remain open all year round, even when the hall is not in use.

Although the structural proposal is not detailed in the written document, the main characteristics of this first proposal can be deduced from the photography of the model that accompanies the report. The main structure consists of a bidirectional structure formed by lattice girders arranged at 90° angles, supported at six points on each side of the square plan: a convention center for 'our time'.

## A Convention Hall: A Co-operative Project

Yujiro Miwa, Henry Kanazawa, and Pao-Chi Chang presented their joint master's thesis entitled *A Convention Hall: A Co-operative Project* in June 1954. It is a document of 47 pages of text and 34 drawings. The written report is divided into three main parts and features a preface, a list of images, an introduction, and a bibliography. As indicated in the prologue, the three main parts correspond to the individual works of the students: Miwa studied the structural problem (13 pages), Kanazawa the architectural problems (12 pages), and Chang the facing problems (8 pages). It is pointed out, however, that these individual works are presented together, and not as a conclusion but as a compilation of studies. The prologue also acknowledges the inspiration and guidance of Professor Mies van der Rohe, "without which these studies could never have been accomplished,"<sup>8</sup> the critiques of Professors Ludwig Hilberseimer and Reginald Malcolmson, and the invaluable structural information generously provided by Frank Kornacker.

After the prologue, the introductory chapter, developed by Kanazawa, begins with a study of the evolution of convention centers, analyzing their common characteristics in order to draw conclusions that serve as a starting point for the design of the new building. These are usually large rooms, around which all the utilities within the same building are connected, resulting in a lack of spatial clarity inside. A "radically different" program is proposed for the new center, placing the "great room" within the main structure and relegating the secondary elements to adjacent buildings,

thus eliminating the problem of tortuous circulations. This main room is configured as a volume with a square plan, so that function and structure are expressed “clearly.” Kanazawa thus closes the introductory chapter by stating that “in evolving a satisfactory solution for a convention hall, the initial problem was to find a suitable and economic structural system to span the space.”<sup>9</sup>

### The Structural Problem

The approach and resolution of the structural problem is divided, in turn, into eight subsections: introduction, principle of the structure, bidirectional lattice girder system, wind bracing, uprights, distribution of forces due to wind load, column-joint foundation, and conclusions. The introductory chapter begins by justifying the use of the structural system, relying on two main grounds: first, the edge, and second, the lightness.

One main difference between the original proposal and the final master’s project is the size of the mesh, with the subsequent placement of the supports. The initial scheme proposed a square plan of 700 feet (213.36 m) per side and 30 feet (9.14 m) on the edge, with supports spaced 20 feet (6.10 m) from center to center. As Miwa explains, this dimensioning produces inconveniences when arranging the enclosure panels, since the rectangular proportion makes it difficult for the horizontal and vertical elements to meet with the diagonals as different angles are generated. Therefore, with the intention of achieving clear and simple joints, various dimensional options are tested, considering pros and cons, before deciding on the final solution. Based on the suitability of the square ratio, the tested dimensions were 20 feet (6.10 m), 33 1/3 feet (10.16 m), and 30 feet (9.14 m) [Fig. 04]. The option finally chosen uses a module of 30 by 30 feet (9.14 by 9.14 m), solving a square plan of 720 feet (219.46 m), with six supports per side with a cantilever at each end of 60 feet (18.29 m). “[F]rom the standpoint of structure, it is clear and is simple to fabricate and erect. After much study of the proportions of all the elements of the structure in model form, it was considered the best solution from the standpoint of architecture.”<sup>10</sup>

The explanation of the structure is divided into two parts: consideration of vertical loads, and stabilization against horizontal forces. Regarding vertical loads, Miwa states that the roof plane made of latticework has an initial countershaft calculated by Kornacker. As for horizontal loads, Miwa explains that, with respect to the original proposal, and for reasons of architectural and structural quality, the interior bracing was eliminated. The final solution, which went through having two types of bracing, one in the horizontal plane and the other in the vertical plane, is detailed in the corresponding section. In the horizontal plane, the bracing is arranged on two levels: first, diagonal elements are arranged between the lower cords of the mesh in the second and third rows with respect to the perimeter; second, a 30-foot (9.14 m) edge truss is arranged in a horizontal position, whose outer cord is

connected to the vertical structural elements of the perimeter, while the interior cord is hung from the upper mesh in each of its knots, 60 feet (18.29 m) below. On the other hand, in the vertical plane, diagonal elements are arranged at 45° angles coinciding with the plane of the structure’s vertical supports [Fig. 05 and Fig. 06].

With respect to the original proposal, the meeting of the metallic structure and the ground is also different. Two options were tested, one resolved in steel, as in the first proposal, and the other in concrete, as finally chosen, consisting of blocks of variable section, from 5 by 5 feet (1.52 by 1.52 m) up to 20 by 20 feet (6.10 by 6.10 m), on which the metal structure rests [Fig. 07].

Finally, Miwa concludes that although engineering is based on minimums, economics calls for a balance (order, clarity, and harmony), so the proposed structure cannot be a mere matter of calculation, but the result of “intuitive sense of forces and counterforces, qualities more necessary indeed to a real architect than a full knowledge of mathematical intricacies.”<sup>11</sup>

### The Architectural Problems

The section devoted to architectural problems is divided into six subsections: principles underlying the development of the project, description of the room, the structure, the skin, the space, and conclusions. It begins with Kanazawa stating that “a structure clearly conceived, developed, and expressed forms the very essence of true architecture.”<sup>12</sup> Kanazawa refers to the first part developed by his colleague, which includes all the details regarding the structure, stating, however, that the final decision on the structural form was an architectural consideration. In this regard, Kanazawa states that another drawback of the original scheme was the architectural treatment of the cantilevers, since the diagonal elements had to be arranged differently, with the consequent loss of continuity; a problem ultimately solved through the use of the module of 30-foot square previously defined by Miwa (9.14 m) [Fig. 08]. Kanazawa also justifies the elimination of three-dimensional bracing against horizontal actions by citing reasons of clarity – not only structural, but also architectural. Likewise, the decision to use concrete supports as a base for the metallic supports where they meet the ground is reinforced from an architectural angle, since they help give the upper structure a sense of lightness.

As for spatial distribution, the use of this structural system allows an interior free of supports, with capacity for 50,000 people. 17,000 fixed seats are arranged in eighteen rows along the four sides of the floor, descending 14 feet (4.27 m) from the previous level inward. In the central area, at the lowest level, there is room for as many as 6,000 temporary seats. Behind the seating area is a lobby 30 feet (9.14 m) wide, where additional seating can be put if required. On each of the four sides of the floor are five covered entrances, aligned with the corridors

of the seating areas. In addition, on one side is a platform 20 feet (6.10 m) wide under which access is provided for people arriving by taxi or bus, and on this same end, too, are entrances for vehicles and trains. On a lower level, under the seating area, are eight blocks of toilets and sitting areas, two on each side, which are reached through stairs from the upper corridor. The remaining space under the seating area can be used for storing chairs and tables as well as accessories and mechanical equipment [Fig. 09].

Kanazawa concludes that a large space, completely free of interior supports, is feasible structurally, architecturally, and aesthetically: “Since structure in our philosophy of architecture and in this technological era is the very essence of form, its orderly discipline must not be violated. The clarity of the structure, maintained by the proper placement and usage of materials, can enhance to a greater degree the monumental proportions of this structure.”<sup>13</sup>

### The Enclosure Problems

The final part of the thesis deals with the resolution of enclosure problems, and is subdivided into five parts: introduction, placement, materials, color, and conclusions. It talks about the possible locations of the enclosure with respect to the structural element; on the outer face, on the inner face, or arranged between elements. Chang opts for the latter, so that the visitor can contemplate the same expression of the structure from outside and inside alike.

For the configuration of the closure, horizontal uprights are arranged between the nodes of the roof mesh and the lower lattice, and vertical posts intersected at 90 degrees at the midpoint of the horizontals. Each of these modules is then further subdivided into smaller panels by introducing smaller metallic elements. Once their positions were decided on, solutions were tested using three different materials – glass, marble or granite slabs, and metal panels – and various colors. Considering the disadvantages, the final decision was to use metal panels in the shape of an equilateral triangle, and in two shades [Fig. 10].

Chang concludes that a building with these characteristics has a social meaning that requires an objective expression, so the use of a neutral and quality material such as sheet metal, “is not only in agreement with the metallic nature of the structure itself, but also expresses the anonymous character of its function.”<sup>14</sup>

### Conclusions

“It was Mies van der Rohe (...) who brought with him the idea of structural architecture to the school ...”<sup>15</sup>

This article has studied the evolution of the proposal for a Convention Hall that Mies drew up at the end of 1953 and was continued as a joint master’s degree project, submitted in June 1954, by Yujiro Miwa, Henry Kanazawa, and Pao-Chi Chang. Through analysis of the written account that

accompanies the drawings of the students' scheme, we can deduce how the structure was conceived in terms of the ordering element of space. Both the content and the sequence of the three main parts of the report – the structural problem, the architectural problems, and the enclosure problems – indicate that the space is conceived from the structure; it is the structure that imposes its order and gives expression to the architecture.

“Our philosophy is really based on construction and if you use modern means of technology you will have structural means, and that is one of the reasons I am convinced that if we have in the future an architecture it will be a structural architecture.”

The philosophy that Mies calls “ours” is the one that students assimilate and make their own, since “within his canon of a structural architecture, Mies encouraged particular research proposed by members of his staff if it was a logical development of a direction he had established.” Hence, the development of the project for a Convention Hall reveals how closely intertwined were the two facets of the German master's lifework: Mies teacher and Mies architect.

1. *Chicago Tribune* (November 19, 1953): 12.
2. *Engineering News-Record* 151 no. 24 (December 10, 1953): 25.
3. James A. Speyer, *Mies van der Rohe: A Retrospective Exhibition* (United States of America: Art Institute of Chicago, 1968), 76.
4. Peter Carter, *Mies van der Rohe at Work* (London: Phaidon, 2006): 2006).
5. Peter Carter, *Mies van der Rohe at Work* (London: Phaidon, 2006): 172.
6. Peter Carter, *Mies van der Rohe at Work* (London: Phaidon, 2006): 6.
7. SSPB had been set up in the late 1940s as an organization committed to the fight against urban decay, made up of representatives of various institutions in the city of Chicago, including the Illinois Institute of Technology (IIT).
8. Yujiro Miwa, Henry Kanazawa and Pao-Chi Chang, “A Convention Hall. A Co-operative Project” (Degree of Master of Science in Architecture in the Graduate School of Illinois Institute of Technology, 1954), iv.
9. Miwa, Kanazawa and Chang, “A Convention Hall. A Co-operative Project,” 12. Master thesis. Graduate School of Illinois Institute of Technology, 1954.
10. Miwa, Kanazawa and Chang, “A Convention Hall. A Co-operative Project,” 17.
11. Miwa, Kanazawa and Chang, “A Convention Hall. A Co-operative Project,” 25.
12. Miwa, Kanazawa and Chang, “A Convention Hall. A Co-operative Project,” 27.
13. Miwa, Kanazawa and Chang, “A Convention Hall. A Co-operative Project,” 37.
14. Miwa, Kanazawa and Chang, “A Convention Hall. A Co-operative Project,” 45.
15. Mahjoub M. Elmimeri, Myron Goldsmith and David Sharpe, “Design and Planning of Tall Buildings at IIT, *Tall Building Structures: A World View* (EEUU: Council on Tall Buildings and Urban Habitat, 1996), 14.
16. Ludwig Mies van der Rohe, “Proceedings of the 37th Annual Convention”, *Journal of Architectural Education*, vol 7, n 1 (verano 1951): 14.
17. Phyllis Lambert, “Punching through the Clouds: Notes on the Palace of the Toronto-Dominion Centre in the North American Oeuvre of Mies”, en Detlef Mertin, *The Presence of Mies* (Nueva York: The Princeton Architectural Press, 1994), 19.

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