

# **ALL GLAZED PYRAMID THE SABANCI CONVENTION & EXHIBITION CENTER**

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## **ABSTRACT**

The Sabanci Convention & Exhibition Center has been built in the Fair site allocated for it in Antalya, a very well-known holiday city lying along the Mediterranean coast of Turkey. Being in the shape of a pyramid with all glazed roof and walls, this building is a unique example to serve for congress, concert and exhibition hall facilities. Designed in early 1996, the construction was commenced in July 1996, and the building was inaugurated in September 1997.

## **1. INTRODUCTION**

The Municipality of Antalya, being the owner, asked the architects for the design of a prestigious building which would become the symbol of the city and function as an exhibition, convention and concert hall. In this project the essential design criteria was to constitute a light and convenient building with a flexible inner space to allow for the various functions of the building.

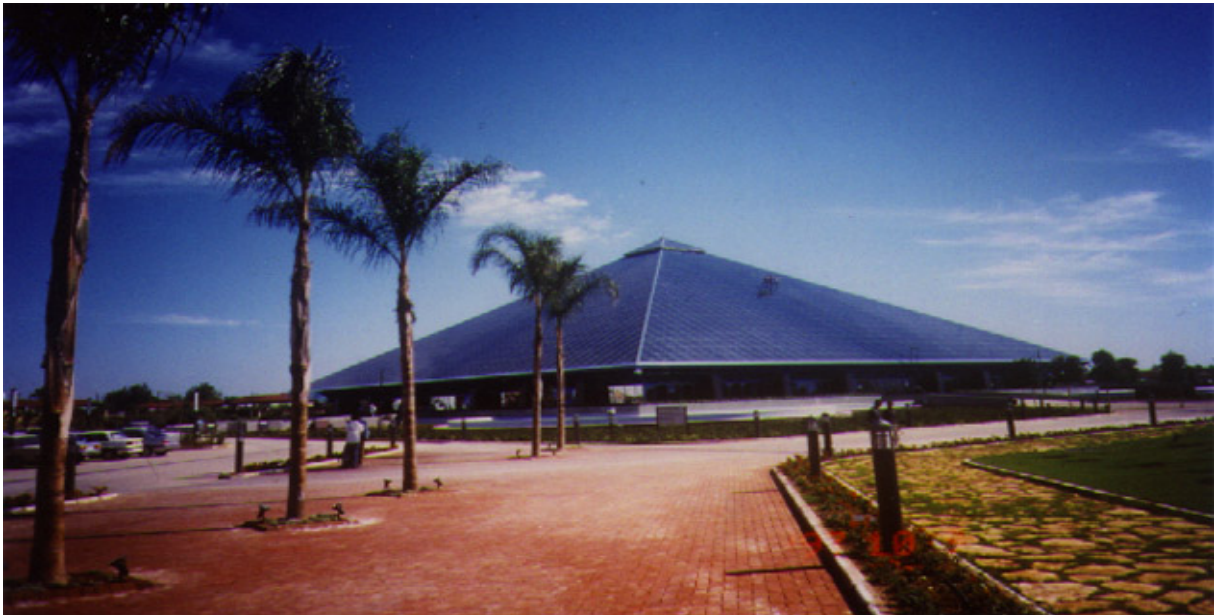


Figure 1 : All Glazed Pyramid The Sabanci Convention & Exhibition Center

## 2. ARCHITECTURAL DESIGN

The pyramidal shape that the architects came up with both fulfilled for the symbolizing function of the building, and also created a harmony with the silhouette of Bey Mountain Range lying on the background of the city in the West.

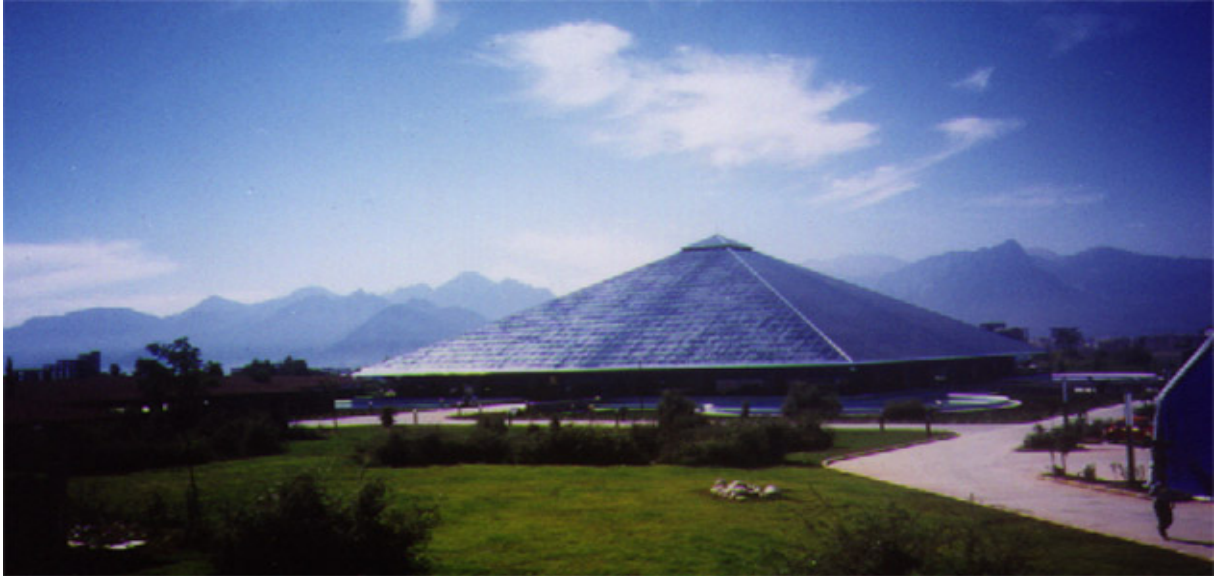


Figure 2: The silhouette of Bey Mountain Range lying on the background of the structure

The main hall having an area of 3600 m<sup>2</sup> has been designed as flexible, columnfree, single spanned and to serve for exhibitions, concerts and conventions alternatively. The capacity of the hall for a concert or a convention has been assumed to be 2500 people. The platforms holding the audience seats are moveable and taken to the warehouse incase of exhibition. The acoustic wall panels standing beside the platforms and behind the podium were mounted to removable prefabricated steel frame. On the basement floor, there are two meeting halls for 320 and 420 people, a management section, a press center, an art gallery, WC's, lavatories and technical rooms. The pool surrounding the pyramid provides a naturel cooling effect, reflecting light plays on the glazing.

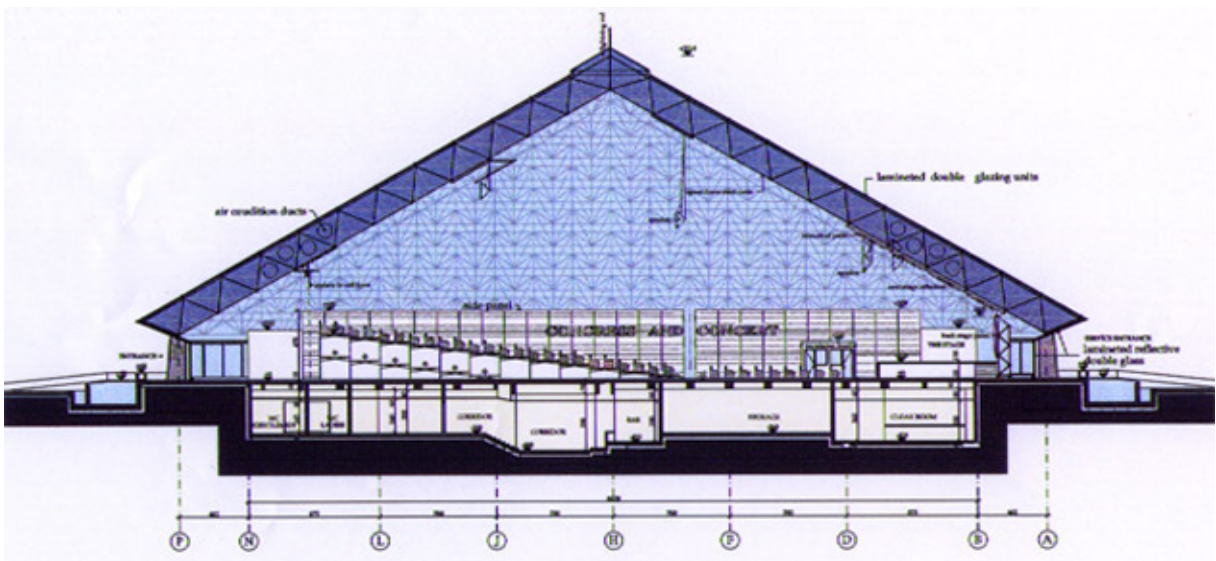


Figure 3: The section of the structure

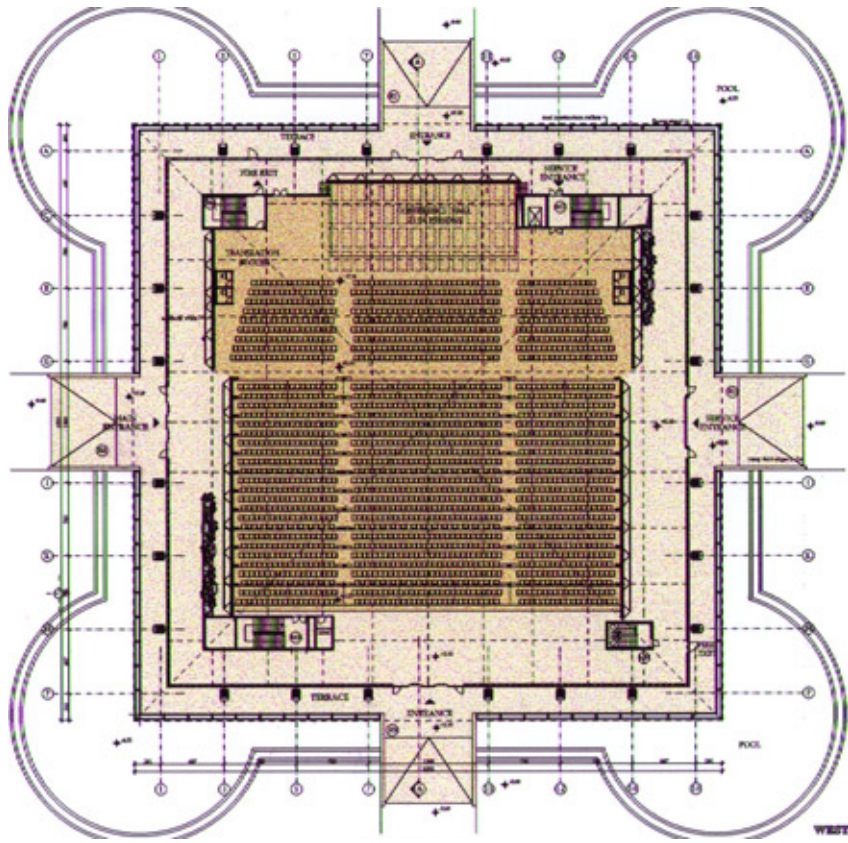


Figure 4: Ground Floor Plan for Congress & Concert Usage

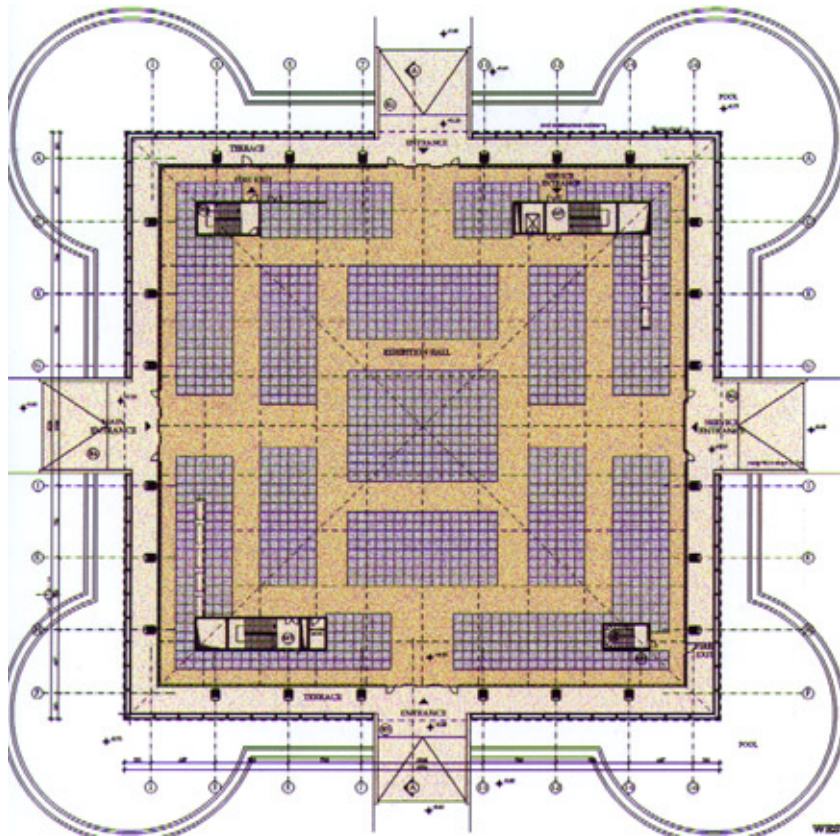


Figure 5: Ground Floor Plan for Exhibition Usage

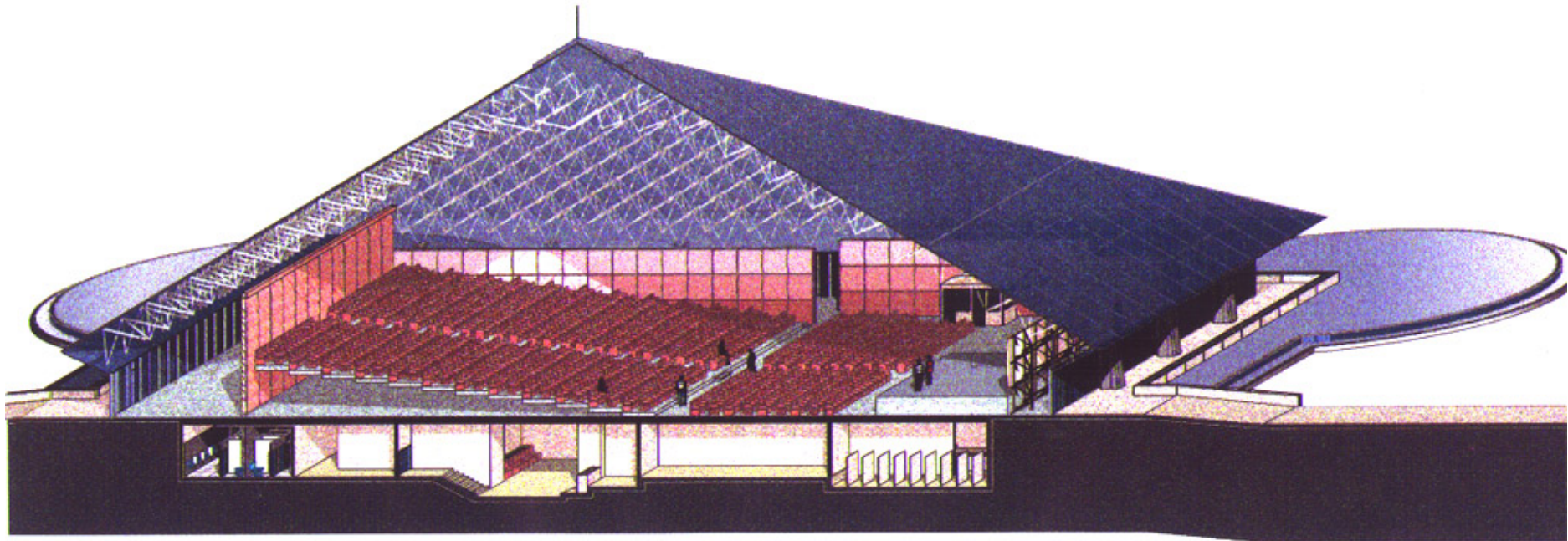


Figure 6: Section Perspective of the All Glazed Pyramid The Sabanci Convention & Exhibition Center

### 3. STRUCTURE AND THE GLAZING SYSTEM

The glazed roof has been assumed to be prefabricated steel space frame structure as for its efficient, cost-effective and time saving facilities. The space frame of pyramid has been designed and fabricated by USKON. The space frame has been calculated by taking modules of 2.60m.x3.00m. into consideration. A purlin system composed of meshes sized 1.30m.x1.50m., has been installed all over the space frame to carry the double glazed panels. The roof and the walls of the pyramidal structure are all glazed. The double glazed panels fabricated in 1.50m.x1.30m. size have been supported on the purlins by its four edges using a double sided structural silicone system. In this case, rainwater can easily flow causing no accumulation. In addition to this, by forming 3 separate expansion joints on the roof surface, the harmony between the expansion and contraction characteristics of the space frame structure and the glazing has been provided.

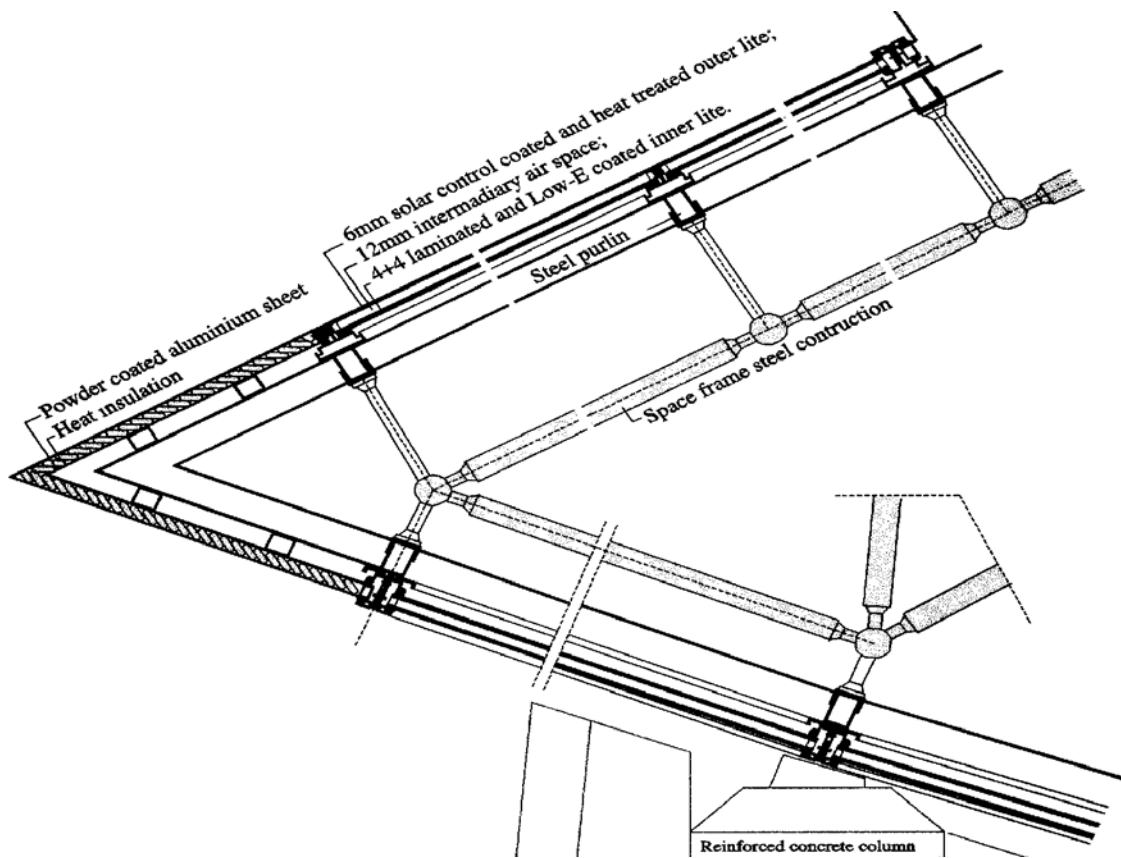


Figure 7: Connection Details and System Section

### 4. LAMINATED SAFETY GLASS

The total exterior laminated surface with an approximate area of 7000 m<sup>2</sup> is composed of ;

- 6 mm. solar control coated and heat treated outer lite;
- 12 mm intermediary air space;
- 4 mm + 4 mm laminated and Low\_E coated inner lite.

The units have been manufactured completely in Sisecam facilities using DuPont Butacite PVB lamination films and Intercam ITB (titanium blue) and (Low-E clear) coating not allowing to recognize inside while looking from the outside to the structure.

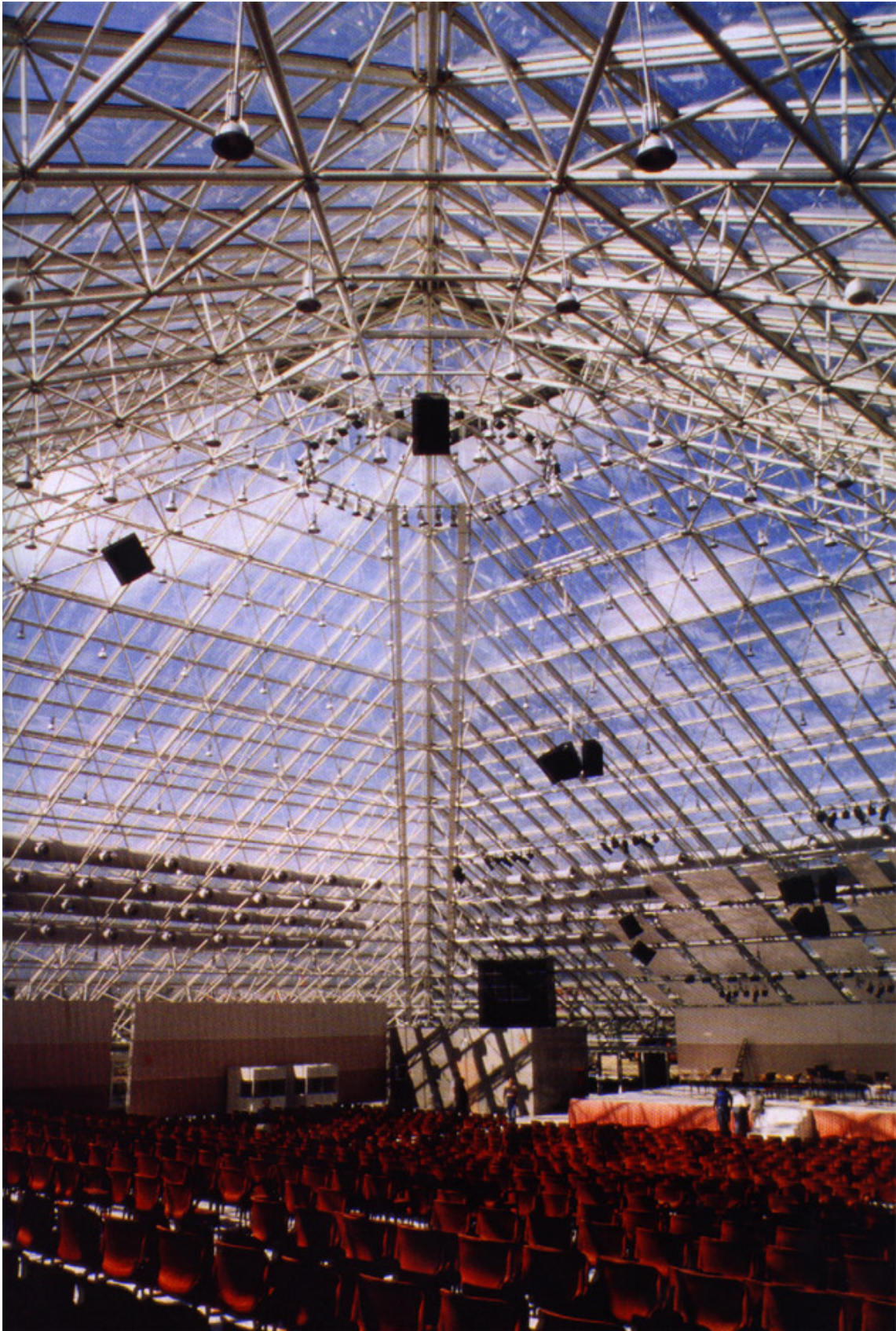


Figure 8: Inside View when the structure is completed

## 5. THE SPACE FRAME STRUCTURE

The space frame system, which has two layers, consists of four planes rising as a pyramid at an angle of  $30^\circ$ . The space frame having hinged joints is composed of top and bottom levels which are parallel to each other and diagonal members lie between these two levels. The height of the space frame between the top and bottom levels is 1986 mm. The space frame is supported on 24 pieces of reinforced concrete columns having a span of 57.80 m. The modulation of the space frame is 2.60m.x3.00m. in plan and the height of the pyramid between the support axes and the peak point is 19 m.

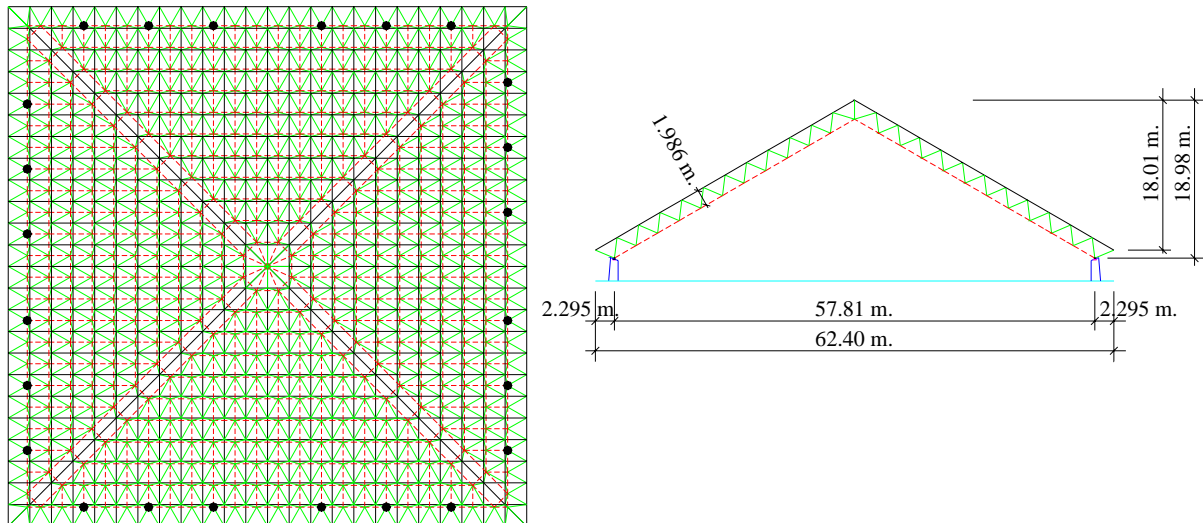


Figure 9: Plan and section for the space frame system

In the structure, the tubes are of ST37 quality with a diameter ranging from 48.3 mm. to 139.7 mm., the bolts are of 10.9 quality with a diameter ranging from M12 to M33. In addition to this, the spheres are of C45 quality and the smallest diameter is  $\phi 60$  mm. and the largest diameter is  $\phi 160$  mm. The space frame is analyzed and designed to stand the space frame self load, the weight of purlins and glass cladding, live load, aircondition ducts, service and lighting loads, weight of the speakers, wind load, earthquake loads and thermal effects, assuming that all loads act on the space frame by the nodes.

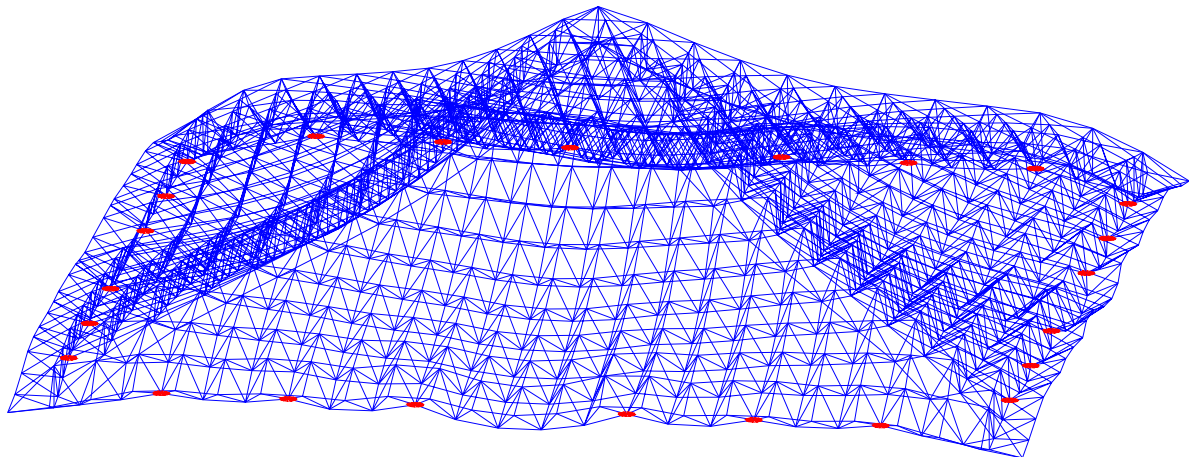


Figure 10 : 200 times exaggerated deformations of the structure under dead load+live load

## 6. ERECTION

All stages of the erection have been taken into account as a part of the design and an erection project has been prepared. According to the erection project, assembly works have been carried out by rotating at the same level and enlarging by only one modulation until the ring has been closed. By means of structure geometry, no additional temporary supports were required while applying this method depending on the geometry of the structure.

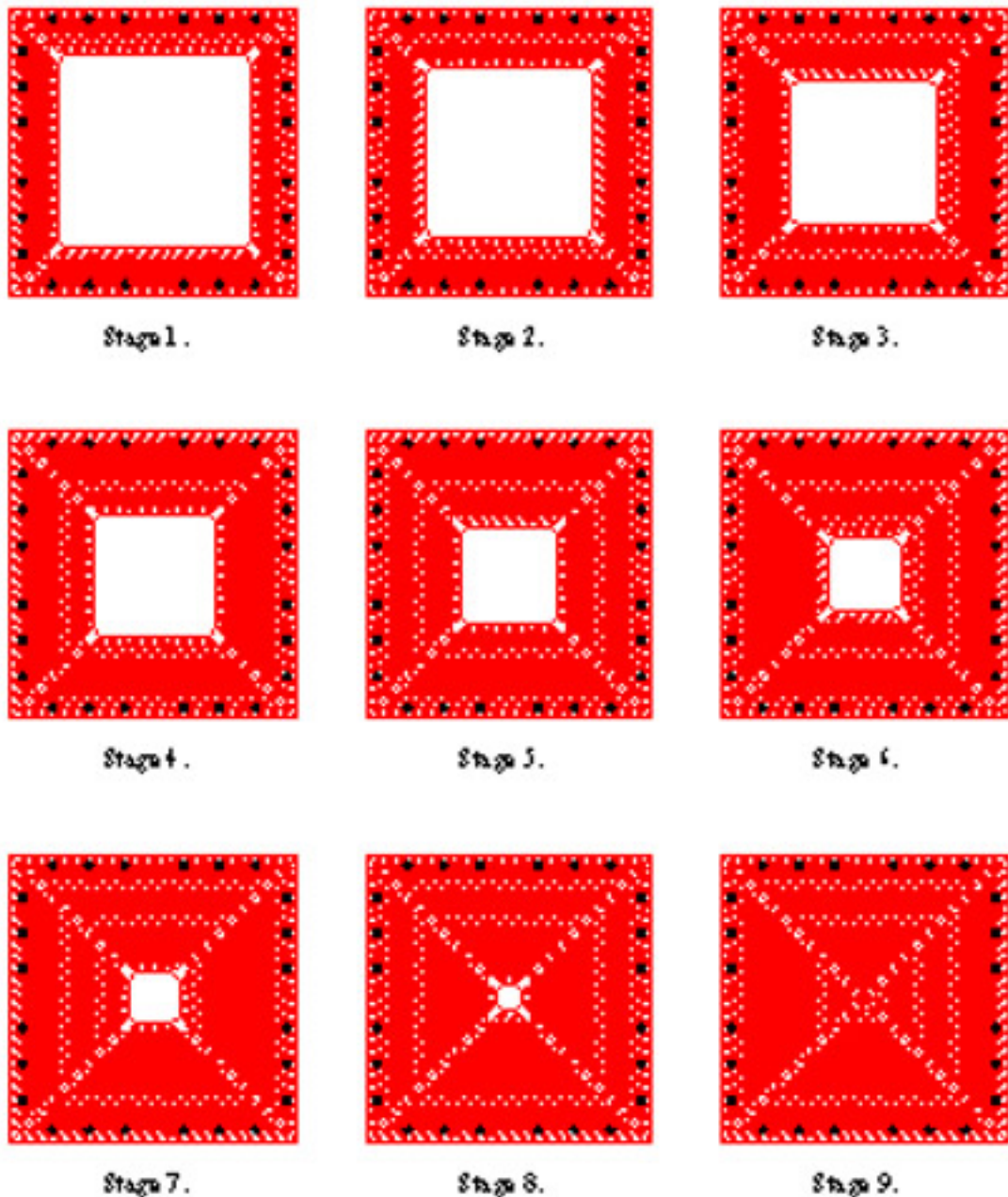


Figure 11 : The stages of the erection

Having completed each stage of the erection, the deflections have been measured and controlled at site. The completion of the erection works of the space frame system has taken only 30 days since the structure has been prefabricated.



## **7. CONCLUSION**

The quality of design and selection of proper materials has resulted in a convenient and safe building, allowing the audience or participants to enjoy the fine view of the sky while listening to a concert or attending a meeting, with a full feeling of safety. Thus, this project is a model to show how steel and safety laminated glass can meet the most stringent requirements set forth in a congregational building where crowds can gather in complete safety.

The Sabanci Convention and Exhibition Center has been the host to 3000 delegates attending The World Forestry Convention held on September 1997, right after its inauguration and won great approval. At present, the building is a point of reference and a landmark for the native people and for those visiting Antalya.

## **8. ACKNOWLEDGEMENTS**

Owner : Antalya Municipality, Antalya, Turkey

Architectural Design : UMO Architecture Engineering Contracting Consulting Company  
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