

## Retractable roof of the “Great Mosque” of Paris

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The great mosque of Paris is an iconic building built between 1922 and 1926. It is characterized by its spanish-moorish architectural style and contains a library, a prayer room, a conference room, a restaurant, and beautiful gardens and is registered on the new inventory of the French historic monument. The whole surface of the building is 7 500 square meters. The central courtyard, called the patio, is the heart that welcomes each Friday all the faithful. To improve the hospitality of the place, it was decided to cover it with a movable roof. Nevertheless, due to the historical value of the building, the movable the roof and all its mechanical systems must be totally invisible from the inside of the patio while it is in the uncovered position.

To achieve this goal, it was chosen to design a steel and fabric structure to make a light and easy structure to move. The structure is so made of nine steel truss arches linked by a high-performance polyester fabric. The span of the trusses is 20 m and these ones are equally displayed all along the 29 m of the patio needed to be cover. Five trusses run from the south side and four from the northern side. The first truss of each side is the “leading one” and is equipped with two motors, one on each end of the truss. The other trusses follow the leading ones thanks to the fabric. A special device was designed to connect each leading truss in order to avoid any gap at the connection between the two sides. The fabric is set on the top members of the arches and is reinforced by a main cable set at mid span of the fabric. This main cable is linked to the pantographs thanks to two cables, one at each end. The pantographs permit to keep the main cable and the fabric in the good position during all the sequences of the motion without any risk to create a damage or to stop the moving system. The trusses slide on rails that are supported by 8 columns, 4 on each side of the patio. The existing roof was reinforced under each column of the movable roof. Each column is equipped with an axis that permits to elevate the rail in order to hide the whole structure and its motion equipment behind the parapet surrounding the patio during uncovered periods. All the sequences of the motion are launched and monitored by a central program which avoids any risk from a wrong use. Some pictures of the project are shown below.



### References

- [1] Jean-Marc MARION, Gilles VAURAY, *Une tente amovible à la mosquée de Paris*, Cahier Techniques du Bâtiment, 2013.