



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume3, Issue3)

Available online at www.ijariit.com

Typology of Retractable Roof Structure

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Abstract: Retractable roof structure is mostly used for a stadium and sports complex. The roof is helped to protect the structure from various climatic conditions, it provides maximum circumstances to facilitate various activities. Which are designed with stadium and sports hall. Retractable roof structure gives quality atmosphere as well as rememberable experience to the visitors. The retractable roof structure is the best structure which permits sunlight and ventilation. It gives required atmosphere to the ground. Retractable roof structure which can be folded level by level, the folding feature of retractable roof structure enhance the effectiveness and efficiency of the whole structure. Now, we research different system and identity characteristics of the retractable roof structure and it can be a moving system or folding structure.

Keywords: Retractable roof, Typology, Rigid elements, Movability, Expendable.

I. INTRODUCTION

The retractable roof structure is been used from ancient time by romans. They used this structure to cover their buildings and to protect himself from various weather conditions. Now, in these days retractable roof structure are mostly used in sports hall and stadiums. Retractable roof structure decreases the sunlight and rain and gives a batter atmosphere to perform various activities.

Design and technology which are introduced in Morden retractable roof structure are based on the application of movable components and folds simultaneously on each other. Retractable roof structure are a large dimensional movable component and they are heavy weighted, retractable roof structure uses different fundamental principles at different places or spans. They structure are folding, sliding, lifting, rotating. And due to this feature, a building becomes a point of attraction. Movable roof structure changes the whole of the space inside the sports complex. It increases the safety of the structure. Different types of movement structure, retractable roof structure are not only used in sports hall and stadium but also used in museums playing areas and exhibition hall.

II. DEFINITION OF RETRACTABLE ROOF STRUCTURE

The retractable roof structure is the structure which covers the large area rapidly in respect of time so that the building can be used with the open or closed roof. Retractable roof structure can be formed at the time of construction of a building or at a time when activities are going on but taking safety measures.

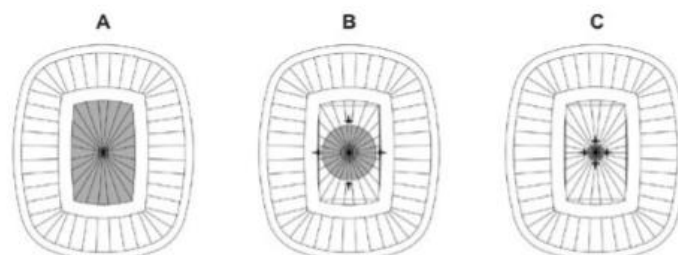


Fig. 1

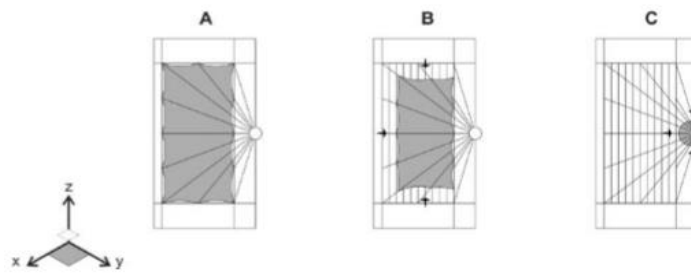


Fig. 2

Typology of retractable roof structure is based on frequency of opening and closing

The typology of opening and closing roof structure. It depends on its design, construction techniques, types of movement, the size of movable roof element and maintenance. Retractable roof structure open in summer and closed in winter that means twice in a year.

Open and closed retractable roof structure are widely used in the longer area, and the structure is opened in summers for proper air conditions. And they are closed in rain, wind, heat, or cold.

There is no restriction that retractable roof structure can only be opened and closed twice in a year it can be opened or closed monthly, weekly, daily and sometimes it also happens that structure can be opened or closed several times a day. The movement of structure can also be seen by the audience which gives them an unforgettable experience and it creates a different atmosphere.

Typology of retractable roof structure based on structure design

The retractable roof structure is designed differently in different stadium and sports hall, these structures are made of different materials and it depends on its size, movable elements, depends on its closing and opening on its additional load. Retractable roof structure depends on its Movability and fixed element.

If we use rigid elements in Retractable roof structure so we can open its small parts in different ways.

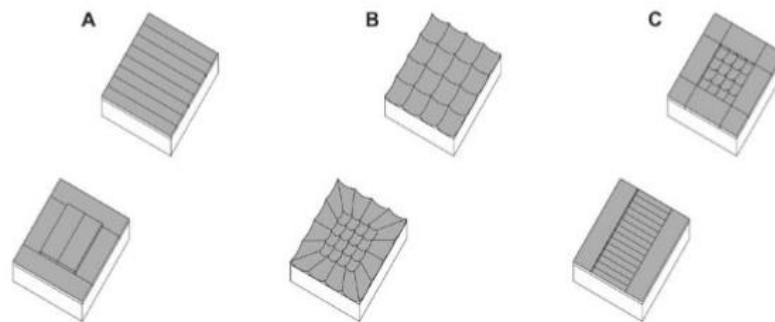


Fig.3

If we use component of the membrane in Retractable roof structure then we can open individual part of the roof in different ways.

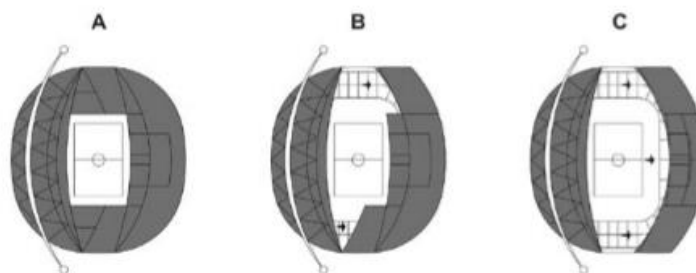


Fig.4

When we think to make Retractable roof structure for sports hall or stadium, museum or for any other purpose, then we think, about its movement, building size, and size of the movable element for its opening and closing.

Retractable roof structure can be moved by various ways.

- Roofing structure with the folding system.
 - Roofing structure with the sliding system.
 - Roofing structure with the rotating system.
 - Roofing structure with lifting system.
 - Roofing structure with expandable system.
- Elements which can be folded on each other are known as a folding system.

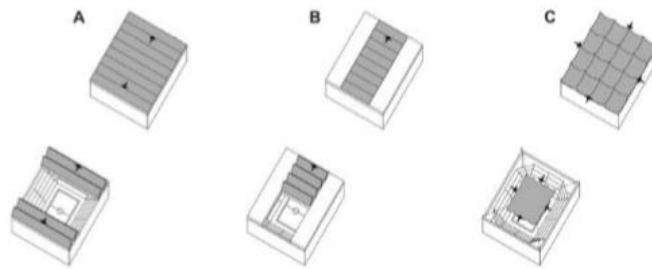


Fig.5

- Elements which can be slide to the horizontal direction its known as a sliding system.

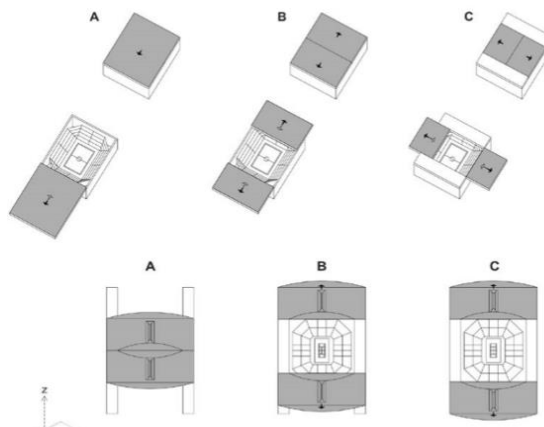


Fig.6

- Roof structure which can be rotated around a axis is known as rotating system.

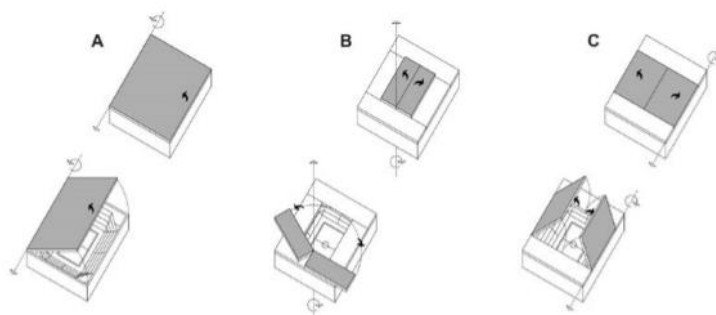


Fig.7

- The lifting roof structure is fixed to a decided height or level.

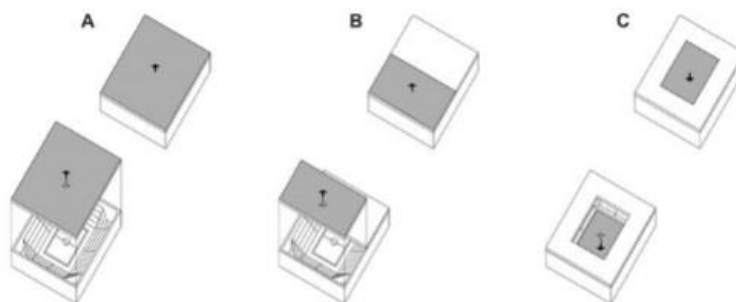


Fig.8

- In expandable structure system, its expands and contracts roofing system.

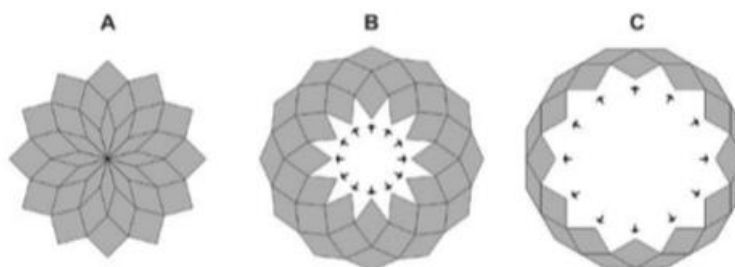


Fig.9

III. ARCHITECTURAL DESIGN OF RETRACTABLE ROOF STRUCTURES

Whenever we built any building with Retractable roof structure have specific property requirement and condition and on basis of this, we built the building.

- Attention should be paid on its speed while opening and closing.
- Multipurpose use of space when we contract retractable roof structure.
- Retractable roof structure provides shade.
- Open Retractable roof structure allows the wind or proper ventilation.
- When we install any design or movable element attention should be paid to it.
- Safety purpose from fire while opening and closing retractable roof structures.
- Retractable roof structure must be in economical.
- Its cost depends on the moving material used in the Retractable roof structure.

CONCLUSION

Typology of Retractable roof structure gives common instructions for designing of sports halls and stadium. Which fundamental aim is to give flexibility, high quality, and greatest possible number of the events to be organized within a year.

Retractable roof structure not only protects use from weather condition but other than this it gives use various reasons to use the place and also gives an ideal condition. When we think to build this structure. Predetermine plan and transformation technique. This changes the feature of the building. It's the combination of different types of movement and if we manage it so we can do any changes in it, this feature will give away to using a space in various ways, and they will get the same condition while using it.

When we design this building its high quality. We can perform a number of activities under it, it's economical in construction and it depends on maintains of such structures.

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