

Movable Wall System Solution for Maximum Area Utilization

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Abstract—in present days, there is great problem of space availability in India as the construction industry is rapidly growing in India. So it is necessary to utilize the available space more effectively. Use of brick wall as internal walls is responsible for increasing the dead load of the structure. It also increases the cost of the structure as it require more time for construction. The major disadvantage of brick wall is that it require plastering and for painting for aesthetic point of view. The solution for all this problems is replacing the internal brick walls with Movable Wall System as the function of internal walls is only divide the rooms as and it does not carry any type of structural load. The weight of these walls is thinner and lighter as compare the internal brick walls so dead load of the structure is reduced and speed of construction increases.

Index Terms - Dry sheets, Glass, Wood, Technical drawing, Installation, Maximum Utilization of Available Space.

I. INTRODUCTION

A. General

Now a day, the construction industry is rapidly growing in India. Precast products already used in the construction. Measure disadvantage of precast products and all traditional methods is that at the time of demolition the wastage of the material is more. There is one innovative solution “Movable Wall System”. This is new technique in India but in America this technique is used since 1990 but still not used in India. So it is necessary to use this technique in India as the construction sector is rapidly changing and the population also increases.

For the construction of brick wall various material are require. Brick wall also needs plastering for smooth surface and painting for increasing its appearance and to make it more beautiful. Once we construct the brick wall we cannot change its position or increase the size of room as per requirements. One measure disadvantage of brick wall is its own weight which is responsible to increase the dead load of the building. Due to this disadvantage the sizes of the structure member such as beam column etc. increases and cost of construction increases. Another disadvantage of brick wall is that we only construct the brick wall up to 1.5m in a single day i.e. construction of the structure with a brick wall is more time consuming. The function of internal wall is only dividing the rooms. There is no other purpose of internal

bricks. So when we replace the internal brick walls with movable partition wall system we get some measure advantages. When we use the movable wall system the maximum utilization of the available space can be achieved. We can easily change the sizes of the rooms as per the requirement. We can construct the movable wall from different materials such as glass, timber, aluminium or the combination of these materials as per the requirement of room such as whether we want to make the room more soundproof or more fireproof. We can construct the movable wall system in the workshop or in the factory and simply install it on the site so the time required for the construction of the structure is reduced. The load of the movable wall system is comparatively very less as compare the internal brick wall. So the dead load of the structure is getting reduced and the sizes of the structure such as beam, column, etc. get reduced. Movable wall system does not required plastering and painting. Hence the cost of the construction gets reduced. We can increase the aesthetic view of the structure by choosing the right material such as timber as per the requirements

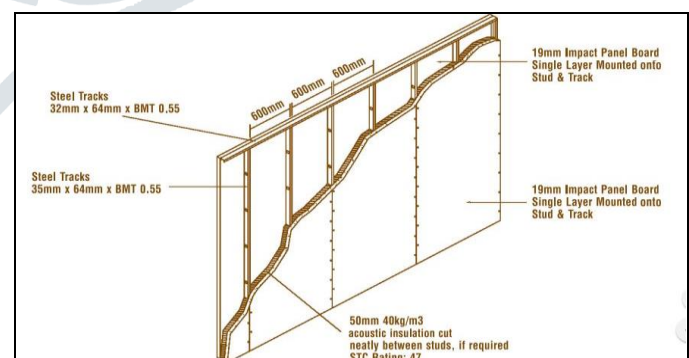


Fig.1 Movable Wall System

B. Scope of the study

- After construction of Movable Wall System we can change the size of room as per our requirement.
- Sizes of the structural members such as beam, column etc. reduces as the dead load of the structure reduces.
- Movable Wall System does not require plastering and painting.

- Reuse the wastage of material after demolition of Movable Wall System.
- Maximum utilization of the available space can be achieved.

C. Objectives

- Promote the low cost housing by reducing the cost of construction.
- Maximum utilization of the space available by using movable wall system.
- Reduce the sizes of beam and column as the dead load of the structure decreases.
- Reduce the dead load of the structure by replacing the internal brick wall with movable partition wall.
- Reduce the time required for the construction.
- Make the rooms more soundproof and fireproof as per the requirement.
- Reduce the cost required for plastering, painting, etc.
- Increase the aesthetic view or make the structure more beautiful and attractive by choosing right material as per the requirement.
- Adjust the size of room as per the requirement. Reuse the material used in movable wall system and reduce the wastage of material used in brick wall at the time of demolition.

II. METHODOLOGY

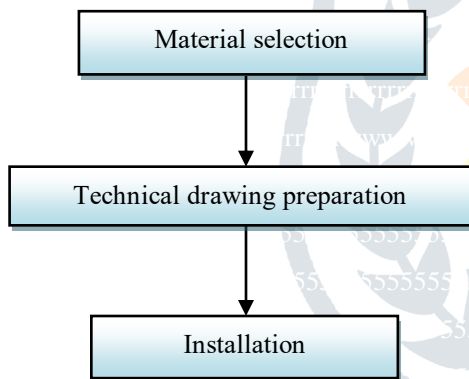


Fig. 2 Methodology

A. Selection of material:-

Selection of materials for the construction of Movable Wall System is really important thing. For the selection of materials following things should be consider:-

- Movable Wall System requirement
- Personal aspect
- Overall design
- Purpose and function

When the materials are properly chosen, the Movable Wall will serve for a long time and also entertain you by their appearance.

Following materials are used for the Movable Wall System:-

1. Wood:-

For decoration point of view wood will serve as very good material. As compare to other materials, it is quite strong, durable and environmental friendly when used in the construction of Movable Wall System. But as compare to other sound insulation of the wooden Movable Wall made of

timber can withstand loading from 100 to 135 kg/m², suitable for the average buildings. But the wood materials are flammable, so the electrical wiring, which will be installed under the partition, must be isolated.

2. Dry sheets:-

Dry Sheets are used as Movable Wall System materials for decoration and room construction years ago. Dry Sheet panels are mounted on the metal frames on both which provide sound and thermal insulation materials inside – and your partition is ready in a short period of time. Light and fire resistant, Dry Sheets are perfectly smooth and often don't need additional processing. But there are some major disadvantages of dry sheets if we use it as panels in Movable Wall System, such as it has poor moisture resistance, fragility, inability to hold heavy objects. The flexibility of the material allows us to provide varied and diverse shapes, curves and three-dimensional constructions.

3. Glass:-

Use of glass in the movable wall system is become more popular in the design of homes and offices. When the Glass is used in Movable Wall System clear lines, combination of light and transparency not only visually increase the room but also add an atmosphere of lightness. The Glass used in Movable Wall System is tempered toughened glass with the thickness of 12 mm in different configurations – transparent, frosted, tinted, and patterned, with the paintings, in other words – for every taste. The Glass panels Mounted on an aluminium frame. The only nuance is the size of the glass – we need to accurately measure all the parameters, because it will be impossible to change the size of the panel during installation. But it provides fashionable design and bright room decoration.

B. Preparation of Technical Drawing:-

After selecting the right material for the Movable Wall system the next step is preparation of the technical drawing. Technical drawings are essential for design purpose of movable Wall System. Technical drawings are gives the clear idea about the size of panels used in the Movable Wall System, stacking process of the panels, thickness of panels, etc. Technical drawings are essential for the communicating ideas to the site engineer and also to the labour that is install the movable wall system.

Following figure give the idea about the technical drawings.

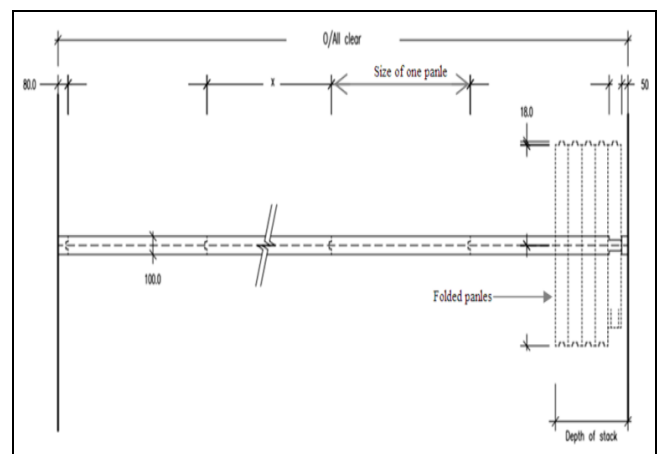


Fig. 3 - Technical Drawing of Movable Wall

C. Installation: - After preparation of Technical drawings, installation of Movable Wall is done at required place. The panels are stacked to each other and Movable Wall is formed. End of the Movable Wall is fixed at the place where it is require to be installed. Rollers are connected at the bottom of Movable Wall for the movement of the movable wall.

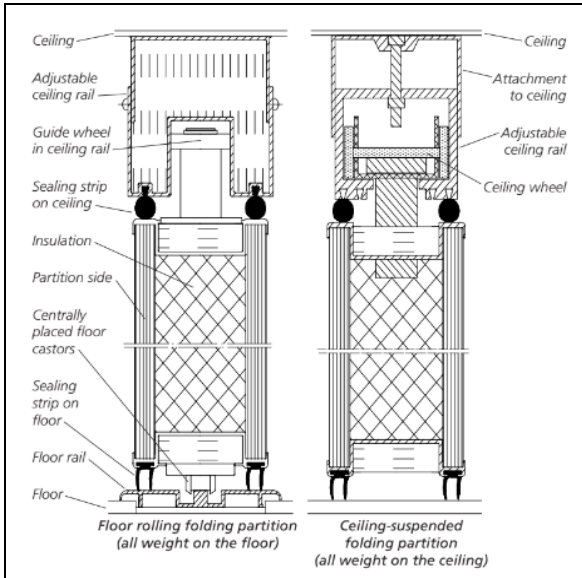


Fig. 4- Connection of Movable wall at ceiling and floor level

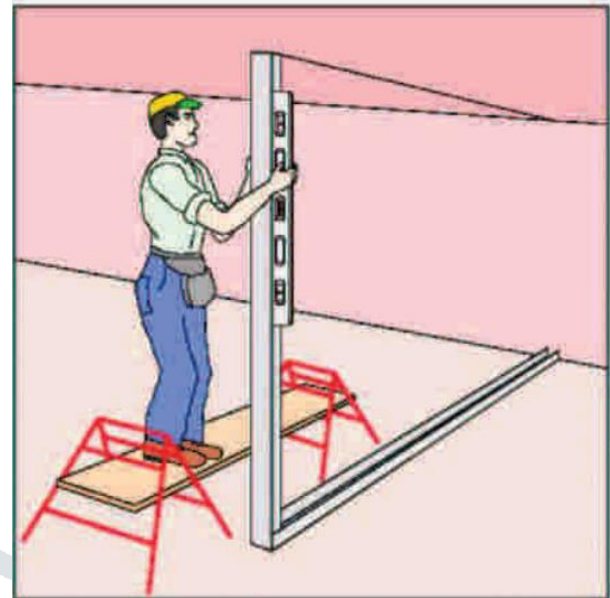


Fig. 6 - Steel Tracks Installation

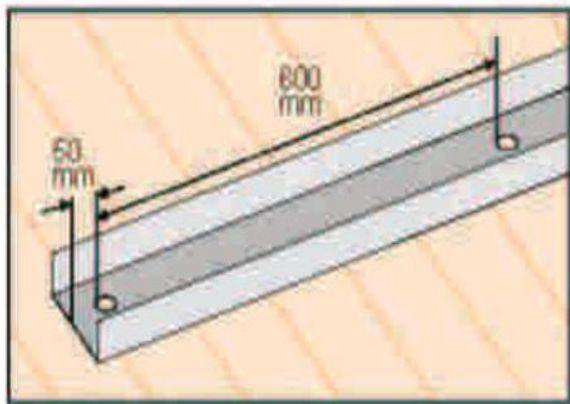


Fig. 4 - bottom Track

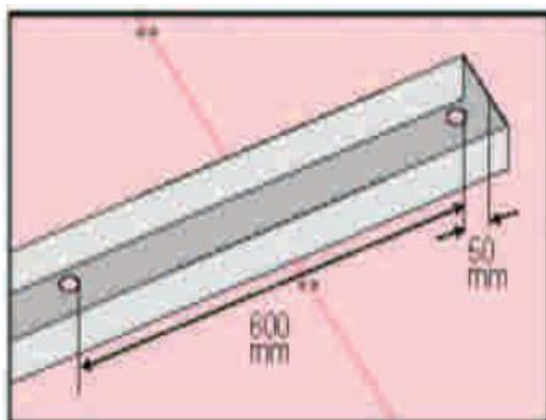


Fig. 5 - Top Track



Fig. 7- Installation of Movable Wall Panels

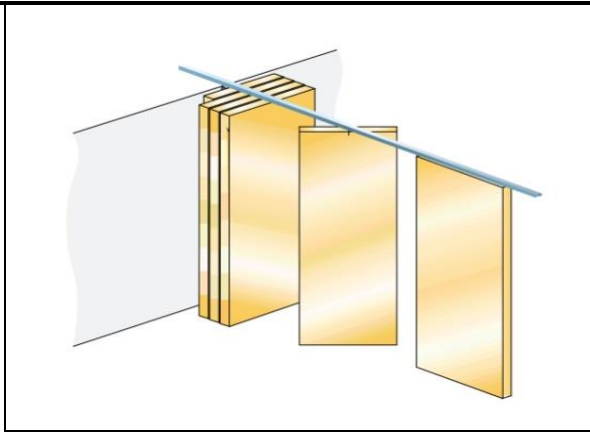


Fig. 8 – Finished Movable Wall

III. RESULTS AND ANALYSIS

1. To prove that Movable Wall is beneficial to use in commercial building we must first of all study the maximum utilization of the available space, cost effectiveness, load reduction and so more.
2. To study the maximum utilization of the available space, we first consider the case study of the commercial building's conference hall where we construct the walls by either wooden, glass or by dry sheets.
3. To prove that Movable Wall is best in maximum utilization of the available space we consider the following analysis as follows:-

Cases of Movable Wall System

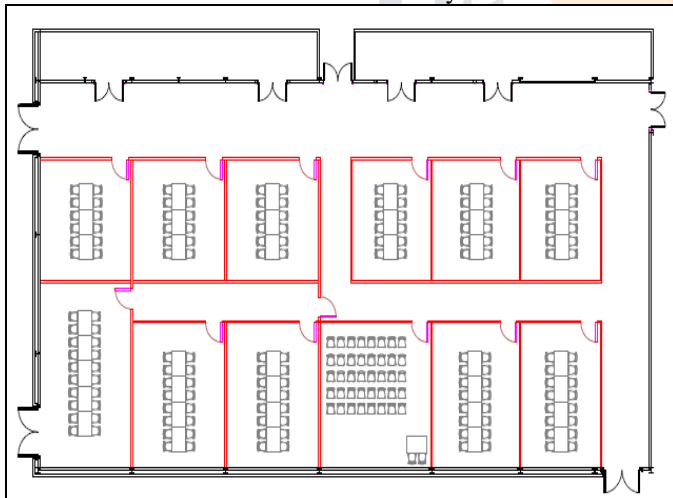


Fig. 9 -Conference hall is divided into 12 smaller meeting rooms

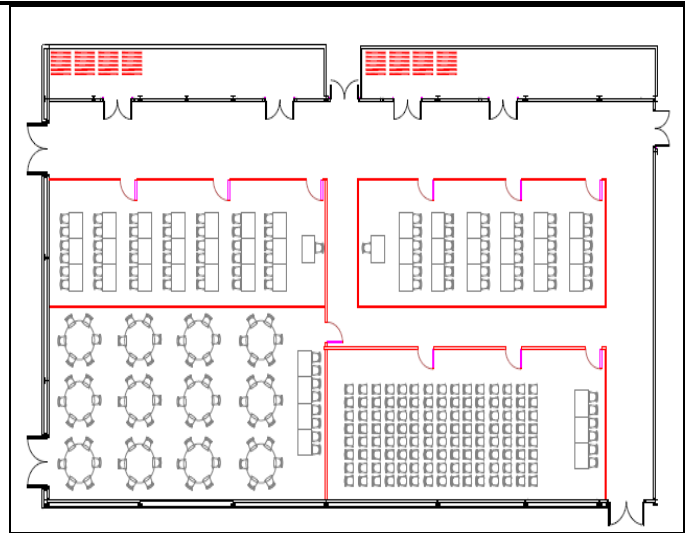


Fig. 9 - Conference hall is divided into 4 separate function rooms

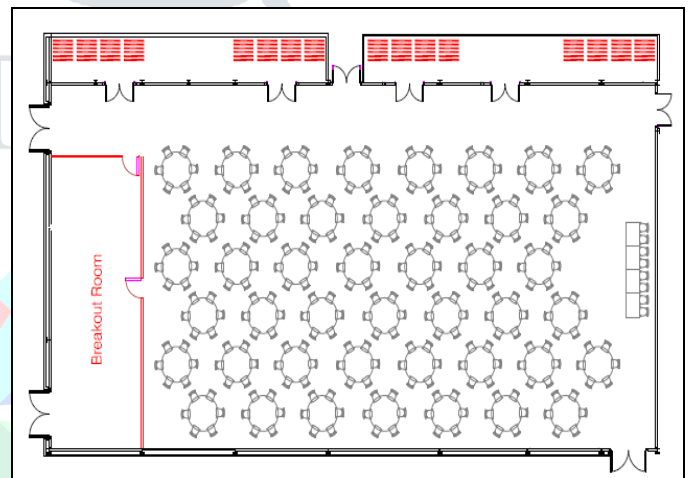


Fig. 10 - Large conference hall is with a breakout area

IV. CONCLUSIONS

- Replacement of brick wall system with movable wall system is quite economical.
- It requires less time for construction as well as the wastage of material is less. So this technique has good impact on environment as compare to brick wall system,
- This technique does not require plastering and painting. It can be built in factory or workshop and simply install where we want.
- Various options are available for the selection for material as per the requirement and situation.
- The material can be reused for other purpose.
- This technique is quite suitable where the space availability is less and is requirement to utilize the maximum space. The room size can be easily adjusted as per the requirement.
- The dead load of the structure will reduced by using this technique and therefore the sizes of the member will get reduced. So the requirement of material will get reduced.

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