

Windows with Space Benefits

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Abstract—As there is seen an increase in population growth which leads to urbanization. New apartments are made with smaller space. To overcome the growth of cities, new smart ideas are needed. Imagine feeling relaxed in our private space but getting all the natural light. Imagine being warm and dry while looking at the raindrops falling on our head. Imagine resting on the windowsill having a cup of tea while looking at the people walking on the street. Imagine having a small place to meditate, where the view is unique and temporary and it is only used for that purpose and then can shut it down. Based on desktop and literature study this paper seeks to explore the network between the small Apartments, human well-being and most important Windows which can be convertible to the balcony.

Index Terms—Convertible windows to balcony, history of windows, small apartments, human well-being.

I. INTRODUCTION

Windows are a very important element of a structure, both in terms of design and function. While window designs have long varied in opening size, sash pattern, and shape, they remained largely made from wood until the early 20th century, when steel and aluminum became feasible material options. There are several ways of tackling the issue of small space in an apartment, from collapsible window to roll out walls transforming the space into different living areas. Is there a way of designing to meet the expectations or meet the requirement of the individual in small space living. The aim of the research is to study the basics of modern collapsible windows and upcoming types which morphs into a spacious balcony. The study follows the evolution of windows, types of windows with respect to human well-being and to ongoing growing population and urbanization which resulting in an increasing demand for housing in cities and smaller apartments. The study of convertible windows to balcony offers the user a flexible living environment. By opening the window frame it's literally possible to step out into space that is instantly created. The study is limited to convertible windows in high rise building. Therefore, the conclusion is derived from the study of windows type and evolution.

II. IMPORTANCE OF WINDOWS

Today's modern architectural design is developed the dynamic environment and therefore the constant changes and new ideas in a different architectural style is no surprise. In

Modern architecture, especially the windows have been an important element of style. Windows play a very important role in modern architectural design. Whether you opt for classic designs, or if you want a glass house, the size and shape of the window will determine the appearance of the house.

III. EVOLUTION OF WINDOWS

In the modern home, windows are one of the most important features. The function and form of the window have changed dramatically over the years, and the technologically advanced windows we find in modern houses are a far cry from the primitive structures our ancestors built in their homes. The earliest windows were wood casement windows, hinged at the sides. At the same time, the Industrial Revolution brought about major advances in rolled steel, permitting the mass production of steel windows. The strength of steel permitted larger expanses of glass, which enabled the thin profiles and repeated window patterns of Art Deco and early Modernist buildings. Toward the end of the 20th century, wood windows also fell out of fashion, as many homeowners replaced the original windows on their turn-of-the-century houses with vinyl, both for its inexpensiveness and for its promise of minimal maintenance. Unfortunately, the replacement of original wood or steel windows with cheaper materials can significantly impact building appearance. Aluminum, for example, is much weaker than steel, requiring bulkier frame profiles that can destroy the delicate look afforded by multi-pane steel windows.

A. Types of windows

Types include the eyebrow window, fixed windows, single-hung and double-hung sash windows, horizontal sliding sash windows, casement windows, awning windows, hopper windows, tilt and slide windows (often door-sized), tilt and turn windows, transom windows, sidelight windows, jalousie or louvered windows, clerestory windows, skylights, roof windows, roof lanterns, bay windows, oriel windows, thermal, or Diocletian, windows, picture windows, emergency exit windows, stained glass windows, French windows, panel windows, and double - and triple paned windows.

B. History of Windows

1) Ancient world

Windows consisted of holes in the wall. Ordinary people used wooden shutters to keep out draughts and let in light.

2) *Medieval Era*

Most houses were made of wood, so windows were little more than holes in the wall. Windows were simply incorporated to enable light to come into the home, and animal skins would have been put in front of the window for insulation. (Fig. 1) After this more and more building are made of stone. Now Mullins are made of stone and timber. (Fig 2)



Fig. 1. Medieval era windows



Fig. 2. Stone window

3) *The 1700s and early 1800s*

Sash windows with glass had started to be manufactured in the late 1600s. Vertical sliding sash windows became the norm in standard housing during the following century. (Fig.3)



Fig. 3. Sash window

4) *Modern Day*

As technology and industry have become more advanced, so have our designs of windows become more exciting. In the latter half of the twentieth century, plastic windows PVCu became popular due to their ease of manufacture and design

possibilities. Aluminum windows gained popularity in the 1970s, and due to an acceleration in technology and manufacture, they are the most advanced type of window. Advances in glass production and glazing mean that houses can have larger windows without compromising insulation too.

IV. HUMAN NEEDS AND WELLBEING

From the literature, the human being is explained to be driven by fundamental needs. Dividing the needs into three groups of human requirements; biological needs, social interaction requirements, and social institutional demands. The immediate space surrounding a person or individual, in which he or she feels belong to them. This buffer zone is used by the individual to stay comfortable in various situations. The personal space is considered adjusted in size depending on various factors e.g. social settings or by means of protection.

V. CONVERTIBLE WINDOW TO BALCONY

A. *Needs*

In the congested urban settings, we inhabit, with pigeon-hole sized apartments being the norm rather than the exception; windows are usually the only source of natural light and ventilation. A balcony is the urban apartment-dwellers most luxurious form of access to the sky. And in the restrictive real estate scenario, balconies in low to mid-level apartment blocks have become virtually extinct. The comparison in space we can see in Fig. 4 and Fig. 5.



Fig. 4. In Mumbai apartment, they use the grills to extend the space

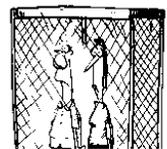


Fig. 5. Why not in place of grills cage they can use the convertible window



B. Types of Convertible Windows

1) Hooper window



Fig. 6. Collapsible Hooper type window

2) Casement window



Fig. 7. Collapsible casement window

3) Awing window



Fig. 8. Collapsible awing window

C. Advantages

1. Creates extra space for city apartments.
2. Will bring light and air into the apartment.
3. Outdoor space becomes an option for all urban dwellers.
4. Designed with convenience and safety in mind.
5. Accessible for wheelchairs and other disabilities.
6. Aesthetically simple, sleek and pleasing to the eye.
7. Suitable for installation and use for private homes, apartment buildings, offices, hotels, and cruise ships.
8. Emergency manual override.
9. Will continue functioning when raining.
10. Anti-slipping options available for balcony floor.

D. Disadvantages

1. Only 3 size options, so far.
2. Cannot customize balcony depth

VI. CONCLUSION

With the increase in population and urbanization. People are losing connectivity to nature due to small space. Windows with space benefits i.e. converting Windows are the solution for these minimal space in an apartment which provide a space for a cup of tea and interaction.

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