wjert, 2022, Vol. 8, Issue 4, 122-137. Review Article ISSN 2454-695X

World Journal of Engineering Research and Technology

WJERT

www.wjert.org SJIF Impact Factor: 5.924

APPRECIATING THE TYPES AND IMPORTANCE OF CIRCULATION IN PUBLIC PLACES

***[1]Arc. Kianen Bonmene, [2]Sylvanus Ikashi Agihou, [3]Shadrach Noble Nicholas and Bright Izuu Joseph**

[1]Lecturer in the Department of Architecture, Rivers State University, Port Harcourt, Nigeria.

[2]First and Second Degrees in Architecture, from the Rivers State University, Port Harcourt, Nigeria.

[3,4]Master's Degree Holder in Architecture from Rivers State University, Port Harcourt, Nigeria.

Article Received on 04/02/2022 **Article Revised on 24/02/2022** **Article Accepted on 14/03/2022**

***Corresponding Author**
Arc. Kianen Bonmene
Lecturer in the Department of Architecture, Rivers State University, Port Harcourt, Nigeria.

ABSTRACT

Circulation is referred to as the way people interact with and within the building. It is a basic requirement in the architectural design process, such that it forms part of the design concept. Circulation system includes both the space provided for circulation and the machineries put in place to facilitate both the vertical and horizontal movement of both people and goods. Hence, his work is geared towards investigating, for the purpose of reemphasizing, the importance of designing an effective circulation system. It also seeks to highlight more on the various types of circulation and their possible application. The author started by describing what circulation is in the context of architecture, types of circulation and then, the importance and use of various circulation systems. The author, in other to make sure this works comes out to its best, has, gone ahead to look at various literature by other researchers; visited many public places in other to get first-hand information, and as well as, carried out some informal interview sessions with some frequent users of public facilities, like a shopping mall.

KEYWORDS: circulation, architecture, movement, public buildings.

1.0 INTRODUCTION

To a non-architect, the term circulation would basically bring to mind, the movement of blood in the human body, as was taught in science classes during secondary school days. Bringing it to architecture, the concept of circulation isn't so different. It refers to the manner at which people move and interact through spaces. Just as in the case of blood circulation taught in science class, the people are the blood of the building. Also, in science, we were taught that blood moves through veins and arteries. So, the question comes to mind: if people are the blood of the building, and blood moves through veins and arteries, what then are the veins and arteries in a building.

This work is aimed at reemphasizing on the importance of well-designed circulation system in public buildings, as well as discussing some types of circulation. It is expedient to understand that the way building is designed, especially the circulation pattern, can be a tool to control the way people behave within the facility. In public buildings like malls, circulations are designed in such a way that customers and visitors have no choice but to pass through sales areas, even as they walk towards the anchor points. More so, architects, in their ways of being creative have not only made circulation elements feature in internal spaces, but have also brought them out to be part of the building external elements, and this for sure, add to a great deal, to the aesthetic value of the structure. Hence, the issue of circulation, as it concerns architectural structures, can never be over emphasized.

2.0 AIM AND OBJECTIVE

1. To reemphasize on the subject matter of circulation as a rudiment for efficient and proficient architectural design.
2. To elaborate further on the fundamental application of circulation and circulation elements as an integral part of concepts of architectural designs.
3. To help designers remain focused as they venture into complex designs, so as not to compromise functionality.
4. To help younger architects and designers to keep functionality of design as an issue not to compromise.
5. To help designers understand the fact that, if there is a failure in the design of the circulation system of a building, the design itself has failed.
6. To promote the application of various circulation elements so as to make architectural design more interesting and attractive.

3.0 Research questions

1. Do the way internal circulations are designed have any effect on the behavior of users?
2. Can design be used to influence how business is done in retail outlets like a shopping mall?
3. Is there relationship, whatsoever, between circulation and aesthetics?
4. Does effective design define circulation, or is it the other way round?

4.0 What is circulation

According to the Student's Architectural Dictionary, circulation can be defined as a flow or orderly movement through a circuit. In the definition above, two words stand out – orderliness and movement.

Considering the fact that what makes a building useful is when it is actually being put to use, by humans, as the case may be, the issue of circulation can never be over emphasized. In specific terms, the veins and arteries of the building refers to pathways people take through and around buildings or urban places. Circulation can be rightly thought as 'the space that connects other spaces.' The basic function here is that it connects, hence, making it much easier to move from one part of the building to another. But even much more than that, it is that concept that brings to bare the experience of expressing our curiosity around a building.

4.1 Components of circulation

In this segment, it is expedient to state that every accessible or occupiable space, forms part of the circulation system of that building o environment. However, for the purpose of this study as the accessible route most of the majority of user make use of. In real practice, architects usually consider a type of circulation system that uniquely suits their design, which off course, overlay with one another and the overall concept of planning. Some of these considerations include:

- Direction of movement: horizontal or vertical
- Type of use: private or public; front or back of house
- Frequency of use: common or emergency
- Time of use: day, evening or continuous.

The architectural considerations of each of these circulation types vary from one to another. Some of the considerations are: the movement in the given area, is it supposed to be fast or slow; will it require mechanical or manual means of movement; will movements be done in

the dark or fully lit times and spaces; will it be individuals or a crowd; leisurely and or wind, or narrow and direct.

Consequently, in all of these types of circulation, 'direct' and 'use' are often outstanding and critical to building layout. This is going to be discussed in details in the following subheadings.

4.2 Direction of use

Movement around a building is either vertical or horizontal. Vertical movement or circulation is how people move up and down within a facility. This includes the use of circulation elements like ladders, ramps, stairs, elevators and escalators. All these enable the movement of people and goods from one height to another height in the same building. Meanwhile, horizontal circulation is how people move from one point of the building to another point, on the same level. These also include the provision of spaces like hallways, atria, paths, entrance porches and exits. This aspect of circulation is strongly influenced by elements found along the horizontal plan. For instance: furniture, columns, trees, topography, etc.

This gives the reason architects use incorporate furnishing and furniture as part of their design concept. This is true because furniture and furnishing has a direct relation with the flow and the functions of a particular space, as well as the feelings you get in the space. That is why furniture arrangement has the capacity to render a space useless, or functional. A more detailed explanation on horizontal and vertical circulation.

4.3 Horizontal circulation

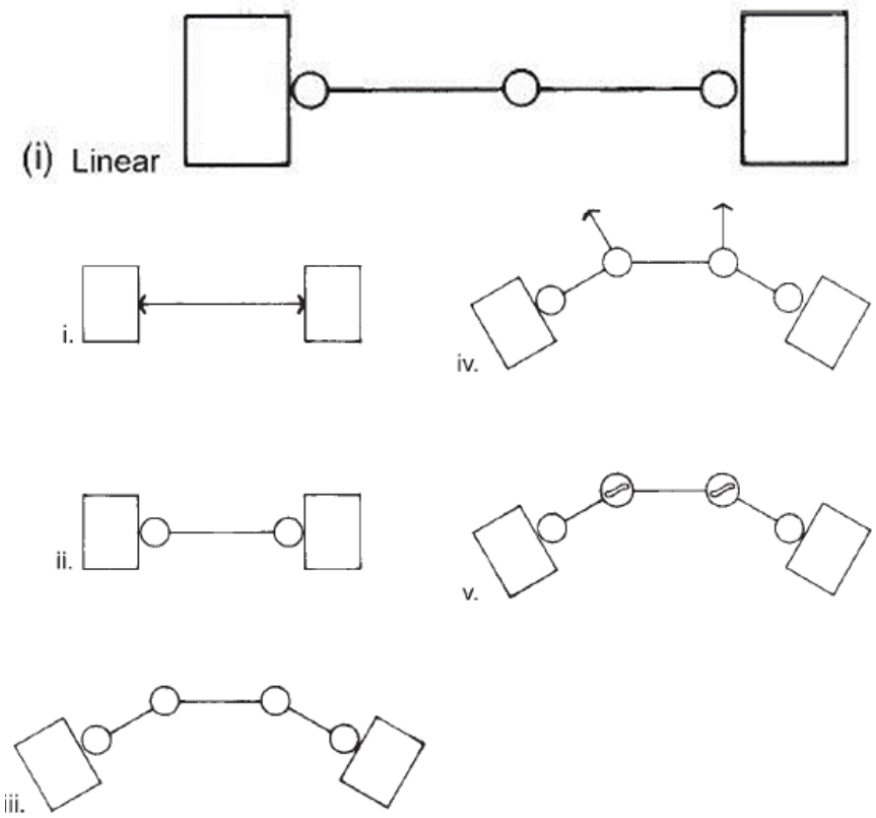
Positioning carefully footfall generators is one of the basic methods of developing strong pedestrian flow. In a retail facility, the areas that have the most footfall are usually those area with strong retail potential. But naturally, the busiest areas occur on approaching an anchor element, and subsides when moving away from the anchor, except that is another established anchor or attraction located somewhere in front. Hence, the generators of footfall should be positioned intentionally, in such a way that t enhances even distribution of footfall. If this done, it helps to provide relatively equal opportunity for those doing business, especially if it's a retail outlet.

4.3.1 Types of horizontal circulation

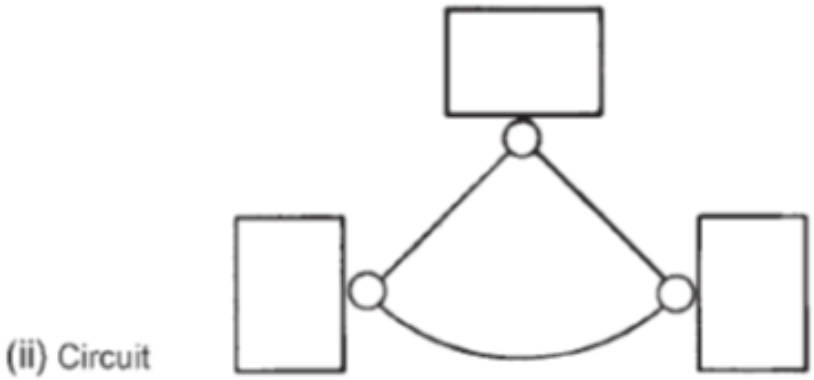
There are various types of horizontal layout, they include: linear arrangement, circuit arrangement and keyhole arrangement.

Linear arrangement

This is usually the simplest arrangement. This type of arrangement is set out in such a way that it is between two anchor elements. Another name for the linear arrangement is the dumb-bell or gun-barrel malls and the anchors at the two points define the movement pattern. We see that this simple linear arrangement can be varied by one or more points of interference brought about by focal spaces.



The number of the focal spaces or interference along the length in the public circulation space is dependent on the total size of the facility and, of course, the site. These interfering spaces can be used to introduce an angle into the layout or to indicate the transition from one circulation space to an adjoining circulation space.



Circuit arrangement

In this type of arrangement, the various apartments, offices or shop units should be arranged in such a manner that the circulation forms a natural flow of pedestrian movement. Also, this circuit pattern allows for continuous movement, making it possible for people to pass in front of all the retail shops, and return to the place of entry. This arrangement is very much welcomed in shopping malls or other retail outlets. Hence, the formation of circuit gives visitors the opportunity to visit all the shops at one journey without having to branch into any other route. By so doing, the shop also owners enjoy the benefit of having visitors and customers stop over at their shops to make purchases.

Circuits can have a three-dimensional formation. This is ascertained by considering both the vertical and plan arrangement of the entire facility. By adopting a figure of eight, circuits can be singular or multiple. Pedestrian movement in a circuit arrangement is basically made effective by the strategic positioning of anchor elements at certain or various corners along the circulation path. This will help maintain the interest of customers as they move along the circuit. It is also very important that anchor elements be made very visible o lead the users on, on their way through the circuit. Achieving sightlines and clear visibility as you move and appreciate sampled products, from one interference point to another are very important considerations.

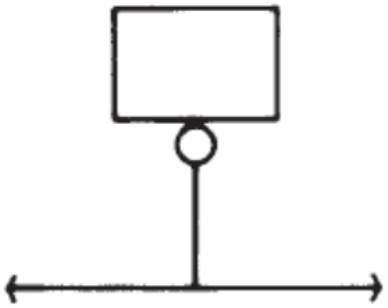
Keyhole arrangement

The keyhole arrangement is basically about a single entry and exit point. The uniqueness of this arrangement is that it aims at focusing the visitors' attention on one or more anchor stores situated at the end of the circulation route. By this, visitors are attracted as they move along and also have the opportunity of seeing other products on their way to their destination. The concept of single point of entry and return functions very well in a multi-level arrangement.

Visitors enter and move to their destinations on one level and return, taking another. This step helps to avoid the retracing of steps pass the same route. One of the key enablers to the functionality of the multi-level shopping layouts is actually the inclusion of vertical circulation. Off course, this has made the shopping development located on high value land more feasible.

It is a certainty that in multi-level schemes, vertical circulation must be seriously considered, while the horizontal circulation is not allowed to suffer. This brings to mind that both horizontal and vertical circulation systems work hand in hand to give building users that comfortable experience.

(iii) Keyhole

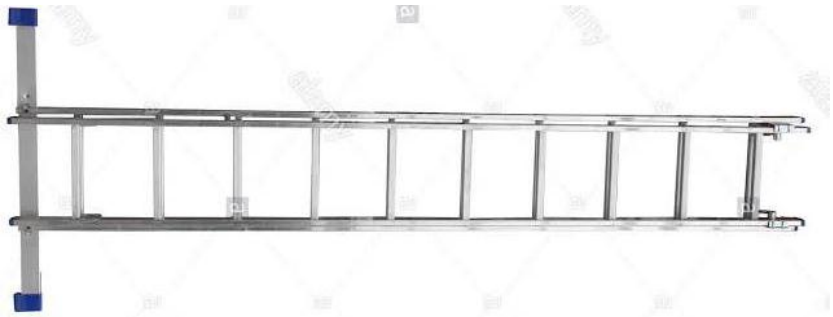


The positioning of vertical circulation elements is critical to achieving balance between facilitating pedestrian footfall, and providing convenient means of moving from one level of the facility to another. It is important that vertical circulation should enable visitors to pass in front of a reasonable number of shops before advancing to the next level. And in returning, pass another length of shop front. More so, it is important for vertical circulation elements to be positioned so that it is easily located and understood, and allowing visitors to enjoy their transition from one level to another. The interval at which vertical circulation is positioned is also very important and must be taken seriously. It should be positioned at regular intervals which falls between 80 – 100m.

4.3.2 Vertical circulation

Vertical circulation refers to the means of moving from one floor of a building to another. While this is a very technical means of movement, it can be through variety of ways. In achieving efficient vertical movement, one or a combination of these vertical circulation elements must be introduced. Meanwhile, the height to be covered is also a factor to choosing a vertical circulation element. For instance, moving from a ground level to finished floor level of about 600mm above ground level, would only require steps or a gentle ramp. Not a

lift, elevator or an escalator. The various types of vertical circulation elements are: ladder, stairs, ramp, elevators, escalators and travelators.



Ladder

A ladder is an equipment or device that grants vertical access to a higher level or floor from a lower level – or the other way round. It is usually inclined at an angle but can be vertical if effectively secure in place.

A ladder typically comprises two uprights that are connected by a series of parallel horizontal elements called 'rungs' which support a person's weight and can be thought of as steps: stepping on one rung after another produces vertical movement either to allow ascent or descent.

One-section ladder

Ladder can be differentiated by type or material. Classifying by type we have the One-section ladder, Multi-section ladder, Step ladder, Telescopic ladder (usually aluminum), Cat ladder (usually steel or aluminum).

Classification by material, we have wood, steel and aluminum. Aluminum is mostly used because it combines strength, affordability and light-weight.

Stairs

Introducing stairs in a public circulation space is one of the most popular ways of making vertical movement efficient and conducive. Stairs are commonly used and accepted in most buildings with more than one floor. Stairs can be located in a separate location or positioned in such a way that it's together with an elevator or other circulation elements, for the purpose of complementing each other. This will give the users the opportunity to have alternatives, and also reduce traffic in case of a rush situation. Stairs is usually the number one option for

vertical movement because it does not require any mechanical or electrical support to function ones constructed. However, stairs must be designed in such a manner that it does not become a danger zone or due to factors like poor natural lighting, and poor riser and tread ratio calculation. In other words, it must be user friendly.

Typical half-turn stairs

The following must be looked into while designing a staircase

1. As much as possible, it should be designed and positioned such that it benefits adequately to natural lighting.
2. Riser and thread ratio must be considered and properly applied. In doing this, the concept of anthropometrics and ergonomics must be recalled and implemented.
3. Other accessories like hand rails must be installed to enhance the safety of users.
4. Apart from benefiting from natural lighting, accessibility is another factor to consider while positioning stair cases.
5. The size of a staircase (flight width) must be proportional to the expected traffic expected to come upon it.

Ramps

Ramp is a vertical means of movement that uses slopes instead of steps. Sloping floors or introduction of independent ramps is a discreet way of covering height or making up for floor level differences. Ramps are compulsory requirements for means of vertical movement in public place, for the purpose of including people on wheel chairs and other disabled peopled.

Concrete ramp

Pre-fabricated ramp

Alongside other elements, ramps are provided to make vertical movement easy for those on wheel chairs and other members of the public who have who one form of disability or the other, and might find it difficult or impossible to use the stair due to their condition. In places like hospitals, the provision of a ramp makes it easy to roll sick people on stretchers or wheel chairs up and down the various floors, especially in small hospitals that don't have a lift. That is the reason why the traditional, or simply put, the historical design of hospitals was for all the facilities to be located on one floor – ground floor precisely. However, the advent of modern technology has made this concept a history.

Escalator

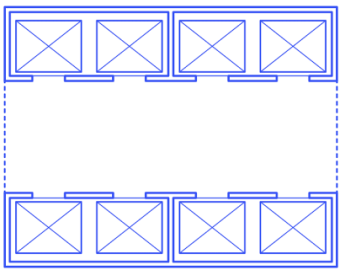
Escalators are described as mechanical moving stairs. This is one means of vertical circulation that has been adopted in public places for over 100 years now. One of the earliest installations of the escalator is in the late nineteenth century in the New York department stores by Bloomingdales. Since then, the use of escalators has greatly been accepted and put in use all over the world.

Typical escalator, usually a straight flight.

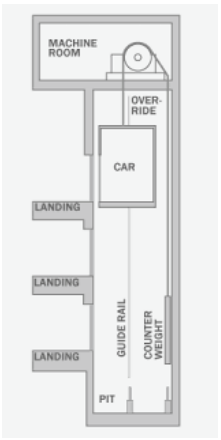
America was first to accept it as primary means of vertical circulation in shopping malls, to convey large volume of the shopping public between different floors levels. The positioning of escalators is key to its functionality and sometimes functions like stairs when not functioning mechanically.

Lifts

In addition to the fact that lifts are efficient means of vertical circulation for the public, it also enhances the easy conveyance of goods from one level to another; easy movement for the disabled and those with prams and wheel chairs. Just as it is in the case of other vertical elements, the positioning of lifts has a lot to do with the way it functions. For example, lifts directly linked to basement parking will greatly help to balance the distribution of footfall.



Plan view of lift hall.



Lift located on the external, adding to design aesthetics Lift section, showing workability

Use of the building can comfortably go straight down to their car lot. Lift can also be used to enhance the aesthetic value of a building by situating it in such a way that it forms part of the external elements of the building. Most times glass is introduced to give the user that feeling of fun and adventure.

Travelators

Another name for travelator is passenger conveyor. It is similar to the escalator as a mechanical means of conveying people from one level to another. The difference, though is that travelators do not have steps like the escalators, they have flat floor. While escalators are referred to as moving stairs, travelators could be equally referred to as moving ramp.

Travellator in a public space

An inclined travellator (linking floors)

Travelators are mostly used in places like a mall where a large number of customers make use of trolleys to convey goods from one level to another. Travelators are usually placed close to where these trolleys are used, to avoid them being pushed around the rest of the mall. Travelators require longer linear spaces for its installation, and they are less flexible than escalators. Theoretically, travelators can be configured in variety of ways as outlined for escalators. But realistically, considering the greater physical requirements for installation and operation, it is much reasonable and possible to install them on a single parallel pair, with the up and down routes position beside each other.

4.4 Use of circulation

The use of circulation can either be public or private. Public circulation refers to the parts of the building that are easily accessible and are frequently used by majority of the building users. In cases like this, there is a flow or a strong connection between circulation spaces and other activities. A typical example of this is a foyer leading to a theatre; a lobby leading to a classroom etc. In considering circulation in public spaces, escape routes are clearly indicated in case of emergencies.

The intent of private circulation can either be to create a more intimate movement in a particular zone within the building, or to hide the ugly part of the facility which require a high

level of privacy. This can involve the back door in a living home; staff/changing room in a large organization; storage/safety/security quarters in a production company, etc. Paths leading to any of these parts of the facility is usually out of bound.

5.0 Designing circulation

Religiously speaking, there are two rules of thumb that are obtainable in the design of circulation spaces. They are

1. Make sure circulation paths are clear and unobstructed
2. The shortest distance between two points must be first taken into circulation in designing for circulation.

The main purpose for establishing these rules is to help people achieve the need of being able to move around a facility easily and to also achieve some level of efficiency. This is important because, users of a building should not feel or be lost in the process of exploring their space or the facility. Also, on the part of the designer, it is important for, especially young, designers to understand the rudiments of designing circulation spaces. But after these rules have been understood, and properly established, then the designer is free to break them.

Architecture is not a course that is stereotyped or rigid in nature of practice. For the purpose of achieving interiors, or the spaces that will give the user the feeling of involvement and participation, an architect might prefer to create a form of interruption along a direct circulation path with an item of furniture, or better still, a change in level. This helps to achieve proper definition in terms of change of function; make people slow down, or even focus their attention to a particular thing or place. More so, contrary to the rule that shortest points are to be considered in designing circulation spaces, circulation does not necessarily need to always follow that. Rather, it can take advantage of the sequence of spaces and atmospheres encountered through movement. This gives the amazing experience while transiting from one point to another. The concept of circulation can be expressed in such a choreographic manner that it adds some architectural flavor to movement. An example of this kind of arrangement is the circulation system in shopping malls, supermarkets and parks.

It is normal to sometimes consider certain spaces as useless, adding to the total cost of the project. This why designing circulation spaces must go along with its efficiency. This also, is the reason commercial office buildings and apartments buildings will usually reduce the

amount of spaces for circulation. This 'saved' space are rather incorporated as part of the tenancy interiors, and in turn, generate more profit.

In high rise buildings, the vertical circulations are often designed to form the core at the center, short corridors leading away from the center into the various office apartments. Contrary to the above described method of arranging circulation to minimize space consumption – where the circulation is positioned at a central point and often hidden, the circulation can also be externally positioned and shown off right at the entrance or front elevation. Sometimes, architects take advantage of this to express some architectural aesthetics.

6.0 CONCLUSION

In architecture, circulation is defined as the way people move through and interact with a building. In public places, circulation is very importance; things such as elevators, escalators, and staircases are known as circulation elements, as they are located and designed to enhance the movement of people through a building, sometimes through the provision of a core.

Being able to connect through circulation is one of the important requirements of living space organization. Basically, it involves the establishment of an uninterrupted communication within the system chain of inter-related spaces. It is used in circumstances where it is desired to attain a higher level of space in terms of the small surface area, thereby weakening or nullifying the feeling of lack of space, but also in larger surface area with the intention of clearly distinguishing or linking distant useful areas.

In the nutshell, what make a building functional is in its ability to enable user interact freely through it. A building with bad circulation is a failed design.

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