



ASSESSMENT OF FLEXIBLE COMPONENTS IN THE DESIGN OF TRADE FAIR COMPLEXES IN NIGERIA

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Abstract: *A trade fair complex is a large complex or a public space in which major trade shows and exhibitions are held, which accommodates large numbers of people. Exhibitions held at these trade fair complexes have become a means of achieving direct access to promotion and marketing. From time memorial, flexibility has been known to enhance the peculiarity of a space, making spaces adaptable to multipurpose use, without altering the functional requirements. The focus of this paper has to do with design components and techniques that allow for changing situations in the use and operation of spaces in a trade fair complex. Components such as walls, floors and roofs are the design features that affect space in any building. Trade fair complexes being hubs for cultural and social activities, attract an unpredictable population, therefore the need for flexible components for trade shows which are fast becoming stable and developing features of any developing city. The study assessed available trade fair complexes and the design features used to achieve flexibility, examining their adaptation to inadequacy of exhibition spaces in selected trade fair complexes in Nigeria. It was observed from the study that the selected trade fair complexes had adaptability as their flexible design approach and this is as a result of the use of large open spaces. The research methodology adopted for this study is based on observation and literature review only. An extensive research was carried out and relevant journal articles, conference papers and books summarised. The paper recommended that design components for flexibility such as moveable walls, retractable roofs and sitting should be used in trade fair complex designs to achieve an effective flexible design.*

Keywords: flexibility, trade fair complex, design components, adaptability.

1. INTRODUCTION

The ability of a built space to adapt to changes is known as flexibility. Flexible spaces could be identified and restricted through design features such as floors, ceilings and walls and these should be designed in a way that changes flexibly. A space may be required to be shrunk or expanded and since these design features identify and restrict the space, they should be designed for dismantling or separation to achieve a flexible space. An event centre offers a multipurpose space where events with a huge number of people take place like exhibition halls, conference centres, exposition centres and convention centres. Flexibility and adaptability are key factors required in these spaces in order to be subdivided into various sized spaces as the case may be. These sizes expand the design possibilities for demountable structures using modular construction. Each module can be attached, detached, modified, relocated and replaced easily for upgrading, repair, recycling and reuse. The focus of this paper has to do with design components and techniques that allow for changing situations in the use and operation of spaces in a trade fair complex. Components such as walls, floors and roofs are the design features that affect space in any building. Trade fair complexes being hubs for cultural and social activities, attract an unpredictable population, therefore the need for flexible venues for trade shows which are fast becoming stable and developing features of any developing city. The study assessed three available trade fair complexes which are Lagos international trade fair complex, Kaduna international trade fair complex and Enugu international trade fair complex and the design features used to achieve flexibility, examining their adaptation to inadequacy of exhibition spaces in these selected trade fair complexes in Nigeria.

2. LITERATURE REVIEW

2.1 Design Features in building

Design features are the distinguishing characteristics or unique component parts that form the houses, buildings and structures. A building includes the structure itself and the non-structural components attached to and supported by the structure. For a basic structure, the floors, walls and roofs make up these features and components.

2.1.1 Floors

Floor is regarded as the lower enclosing and supporting surface that extends horizontally throughout a structure. It forms the bottom of a room and divides space horizontally into stories. Floor systems form a horizontal partition at each level where they occur and transfer load to braced walls below that floor level or directly to the foundation where the lowest floor is supported on a foundation. The floor assembly must support its own dead load, furnishings and the live load of occupants engaged in any variety of activities. The horizontal supports beneath its top surface-and the vertical supports with which they intersect to form a frame must be sufficiently large and spaced closely to prevent sagging of the assembly. Materials used for floors range from compacted soil to reinforced concrete.

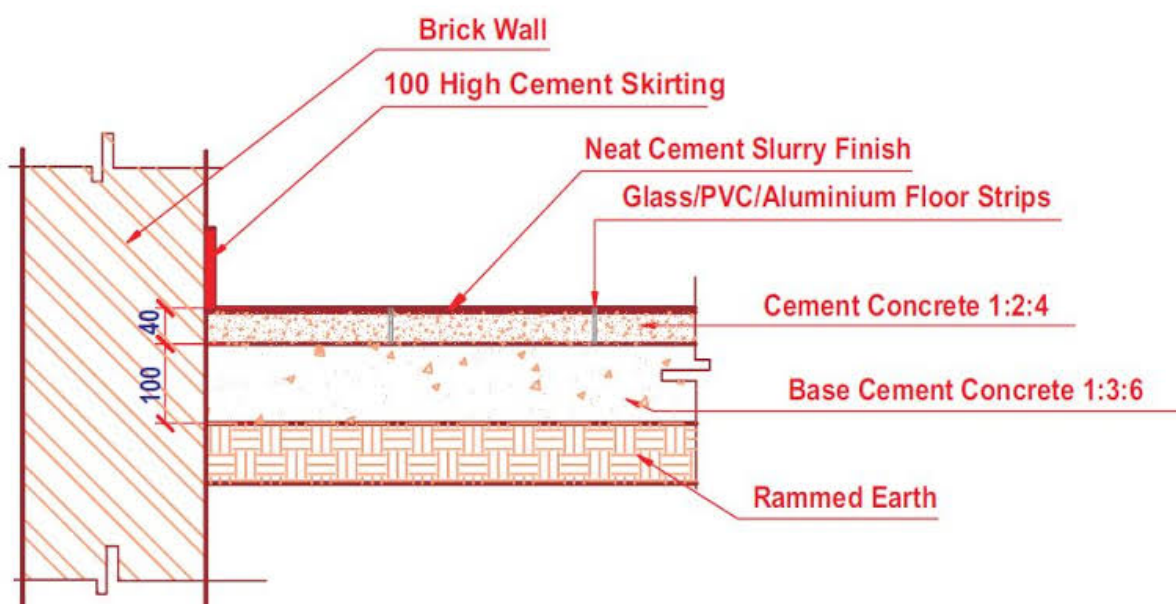


Fig: 2.1.1. A sectional area of a floor

2.1.2 Walls

Walls are vertical structural elements used to divide or enclose in building construction, to form boundary of a room or a building. Walls are the physical barriers that provide privacy, security, and fire and sound separation in a building. In traditional masonry construction, they support the weight of floors and roofs but modern steel and reinforced concrete frames, as well as heavy timber and other skeletal structures, require exterior walls only for shelter and sometimes distribute with them on the ground floor to permit easier access . Positioning of walls depend on type of support given floor and roofs. These walls can be categorised

according to their functions; load bearing walls and non-load bearing walls. Load bearing walls are part of the structure of a building, that bears a load resting upon it by conducting its weight to a foundation structure, and their maximum length establishes the distance between them. Materials often used to construct load bearing walls in large buildings are concrete, blocks or bricks. Non-bearing walls are partition walls that are used to divide rooms, used where loads are carried by beams, or other members, and are sometimes referred to as curtain walls; they are attached to the frame members. Any durable, weather-resisting material such as glass, plastic, metal alloy, or wood may be used, since non-bearing walls are freed from the limitations of structural requirements.

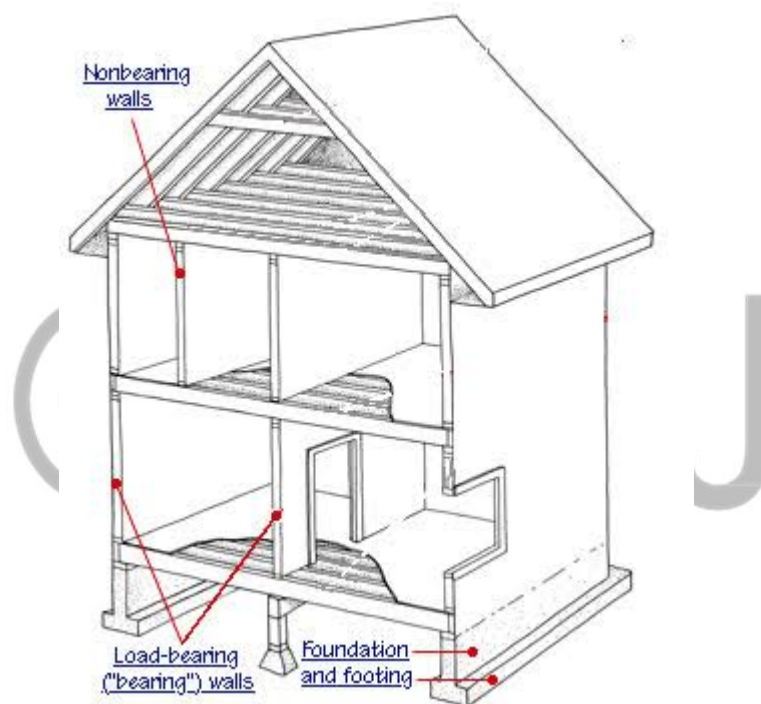


Fig: 2.1.2. A sectional area of a wall indicating both load and non-load bearing walls

2.1.3 Roofs

Roofs serve as a cap to the building. Roof is the covering of the top of a building, serving to protect against rain, snow, sunlight, wind and extremes of temperature. In many buildings, the roof is a major element that gives the building its characteristic profile. Roofs have been constructed in a variety of forms as dictated by technical, economic or aesthetic considerations.

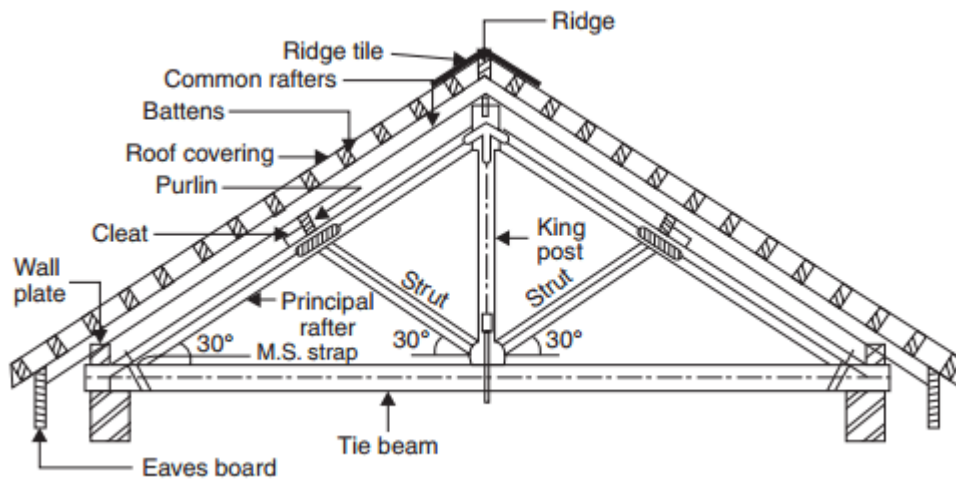


Fig: 2.1.3. A sectional area of roof trusses

2.2 Flexibility of Design Components

The flexibility of the design features that form a structure is the basic factor that determines how flexible a building or structure can be. These design components can easily be identified and assembled to enable one realize, create or modify the change requirement. The breaking down of these components that can be reassembled non-destructively from the product as a unit is referred to as modules and each module can be attached, detached, modified, relocated, and replaced easily for upgrading, repair, recycling, or reuse. Consequently, Demountable structures include modular design which serves as basis for adaptability, mobility and transformable design.

2.2.1 Basic Elements of Design Components

It is noteworthy to know that there are two distinctive ways for creating flexible multi-functional spaces; the first has to do with the use of furniture and secondly by the building construction such as walls and floors. Though it is true that flexible walls yield flexibility of space, however modular design also leads to flexible spaces and can be realized by building elements such as walls, furniture, ceilings, doors or windows.

2.2.2 Moveable and Folding Walls

Moveable walls are specified where functional space demarcation is an essential element within the partition project. No doubt it is clear that walls are a necessity in forming flexible interior spaces. Moveable and folding walls offer maximum flexibility and reusability to accommodate frequent and quick relocation of work without loss of materials, damage or

modification to panels or to adjoining structures such as ceilings, fixed walls and floors. Demountable and movable partitions should be used in areas that are susceptible to future partition rearrangement. They allow large rooms to be conveniently sub-divided to maximise space utilisation due to their flexibility and cost effectiveness.

2.2.3 Moveable and Retractable Roofs

Retractable roofs can be seen in residences, restaurants and bars, swim centres, and other facilities wishing to provide an open-air experience at the push of a button. They vary in shape, material and movement and could be categorised based on frequency of opening and closing, structural design, type of movement, size of movable roof elements, and type of moving system. Retractable roof structures are a type of roof structure, which can be completely or partly moved or folded in a short period of time so that the building can be used with an open or closed roof.

2.2.4 Moveable and Retractable Seating

When static seats are used in a multipurpose hall, it limits the type of function that the space can be used for, thereby making the space less flexible, but when flexible seats are introduced, the space can be rearranged to allow several functions in the hall. Moveable and retractable seating platforms are used in a range of facilities including performing art centres and theatres where there is a requirement for seating areas and floor space to be racked. The most flexible seats that offer multi-functional spaces in performing spaces like in multipurpose halls are the retractable seats. The benefit of this type of seats is that it maximizes use of venue space, allows for multiple uses within a facility and provides optimum viewing for the users.

3. RESEARCH METHOD

The research method used is Observation method of research. This method of research involves directly observing and studying a sample of a population. The survey was conducted by directly observing the number of spaces provided in the trade fair complex, with its types of structures and exhibition spaces provided and the flexible design features and approach adopted in the selected trade fair complex. The observation schedule was designed to reveal types of trade fair complex structures and exhibition space available, availability of flexible design elements, types of flexible design features and approach used. The population was divided into three states in Nigeria which comprise of Lagos, Kaduna and Enugu state. Data

analysis took the form of simple descriptive statistics and content analysis represented in the form of percentages. Data collated was computed manually and tabulated in Microsoft Excel Spread Sheet Program.

Table 1: Trade Fair Complexes Studied Categorized Into States.

S/No.	Name Of Trade Fair Complex	State
1	Lagos international trade fair complex	Lagos
2	Kaduna international trade fair complex	Kaduna
3	Enugu international trade fair complex	Enugu

Source: Authors' fieldwork, 2021

Table 2: Types of Exhibition Spaces Available.

S/No.	Name Of Trade Fair Complex	Outdoor	Indoor	Both
1	Lagos international trade fair complex			✓
2	Kaduna international trade fair complex			✓
3	Enugu international trade fair complex			✓
	Total Available	0	0	3
	Percentage	0%	0%	100%

Source: Authors' fieldwork, 2021

Table 3: Types Of Design Approach Adopted.

S/No.	Name Of Trade Fair Complex	Flexible Design Approach		
		Adaptability	Mobility	Transferability
1	Lagos international trade fair complex	✓		
2	Kaduna international trade fair complex	✓		
3	Enugu international trade fair complex	✓	✓	
	Total Available	3	1	0
	Percentage	100%	10%	0%

Source: Authors' fieldwork, 2021

Table 4: Flexible Design Elements.

S/No.	Name Of Trade Fair Complex	Available	Unavailable
1	Lagos international trade fair complex	✓	
2	Kaduna international trade fair complex	✓	
3	Enugu international trade fair complex	✓	
	Total Available	3	0
	Percentage	100%	0%

Source: Authors' fieldwork, 2021

Table 5: Flexible Design Elements Used.

S/No.	Name Of Trade Fair Complex	Types Available		
		Moveable Walls	Retractable Roofs	Adjustable Floors
1	Lagos international trade fair complex	✓		
2	Kaduna international trade fair complex			
3	Enugu international trade fair complex		✓	
	Total Available	1	1	0
	Percentage	10%	10%	0%

Source: Authors' fieldwork, 2021

4. Result and Discussion

The result obtained from the observation schedule shows the number of trade fair complex in each state. As shown in table 1. It is observed that each of the three states in review has one trade fair complex each. In assessing exhibition spaces available, it was observed that a total of 100% of the trade fair complex studied were both outdoor and indoor exhibition spaces as seen in the Table 2. Deduction from the result obtained shows that a trade fair complex design should have provision for both indoor and outdoor exhibitions. Due to the fact that majority had both permanent and temporary structure, it shows that these trade fair complexes under review are flexible.

4.1 Assessment of Design Features for Flexibility

As observed from Table 3, 100% of the population studied had adaptability as their flexible design approach and this is as a result of the use of large open spaces. However, mobility was seen in 10% of the population, and this was seen where temporary structures were used for the exhibition spaces since they can always be disassembled and assembled at another location. The result also shows that none of the sample population had transformability as a flexible design approach. There was no change in their shape, space and appearance; their basic design features such as roofs, floors and walls were not flexible. From Table 4 it was observed that 100% of the population had flexible design elements available. Also from the Table 5, it can further be seen that, the trade fair complex in the study area, had 10% moveable walls and the other 10% retractable roofs; whereas none of the trade fair complex had adjustable floors.

5. Conclusion and Recommendation

5.1 Conclusion

The research has clearly shown that trade fair complexes are facilities that attract different categories of visitors together, and should be flexible enough to accommodate the needs of different users. From The study it shows that the trade fair complexes under review do not have flexible design features that create or modify a space for change requirement. However it was observed that the entire trade fair complex studied had the open space design which is adaptability, 80% failed to have flexible design features. The 20% that provided few of these features used materials that partially achieve this purpose making spaces non-functional. Most of these adaptable spaces made use of raked concrete platforms for change in level with fixed seats making the space unable to adapt to changing activities of the event space.

5.2 Recommendation

Architects need to recognise the fact that trade fair exhibition spaces are multipurpose spaces, therefore it is important to use design features for flexibility such as moveable walls, retractable roofs and sitting should be used in trade fair complex designs to achieve an effective flexible design. Trade fair complexes are also seen as cultural complex that attract an unpredictable population so space flexibility should be considered at all times and adopting all the flexible design approach so that as the users' needs change, the building also changes to meet their needs.

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