

Functional Planning and Design of a Fan Shaped Technical Museum

Dr. Lovely K M**

Amrutha C V*, Misha Maria Mathew*, Reiva Sibi*, Vinitha E V*,

ABSTRACT

The proposed building aims at the development of the built environment. The principal objective of this paper is the functional planning, analysis and design of a fan shaped technical museum. Technical museum is a museum that tells the stories of architecture, engineering and design. The functional planning was done according to the clauses given by Museum Building Design and Exhibition Layout: Patterns of Interactions, ICOM Code of Ethics for Museum, and Key Concepts of Museology. Plan, elevation and section were drawn in AutoCAD 2010. The design involves load calculations and analyzing the whole structure by STAAD.ProV8i. The design methods used in STAAD.ProV8i analysis are limit state design conforming to Indian Standard Code of practice. Also the building was analyzed for all possible load combinations.

Keywords – Technical museum, Functional Planning, STAAD Analysis, Design

I. INTRODUCTION

In the past, the responsibility of the museum officials was limited to acquisition, conservation, research and display of different art, archaeological, ethnographical, scientific and technological objects. But in the modern world responsibility of the museums have much wider role for the visitors. The visitors not only look at the objects and admire and enjoy them, but also learn from them and pass them to the succeeding generation. Whatever is the collection, educating the public through various educational activities, is now regarded as one of the primary functions of a museum. As the realities are changing, students should be equipped with practical exposure as much as theoretical knowledge. Education needs to focus more on vocations in this job oriented era. Application, exposure and experimentation will definitely prove to be a support for the dwindling sheen of our education system. They annihilate fear from the minds of those who have the potential but hesitate to test it. A technical museum is an establishment that provides a unique interactive experience of getting up close to things we usually see only in books, newspapers or on the television.

A technical museum tells the stories of architecture, engineering and design. Technical museum serves as an innovative space where students can express their own ideas and get exposed to new developments through seminars conducted at these museums. While most people think of technical museums as places for public entertainment, the importance of museum specimen collections for documenting the developments that took place in the built environment cannot be overstated. Technical museum aims to

combine elements of history, technology and design to illustrate the evolution of technology, how and why it has influenced society from inception to the current time. Technical museum aims at advancing the quality of the built environment by educating people about its impact on their lives.

Agricultural University, Thrissur proposed an agricultural museum at Mannuthy, Thrissur. But recognizing the significance of a technical museum in the present scenario, a Technical museum was proposed in lieu of an agricultural museum at the same site. The functional planning of the technical museum was accomplished by considering The National Building Museum, Washington, D.C as a basis. The National Building Museum is America's leading cultural institution devoted to the history and impact of the built environment. One of the prominent feature is the two sets of four colossal Corinthian columns provided, supporting the metal and glass roof structure that divide the Great Hall into three courts.

II. LITERATURE REVIEW

University of Maryland, Baltimore Country [1] suggests that lecture hall should be provided with a projection screen that is large enough to display images of adequate size and it must be placed high enough from the floor to provide unobstructed sight lines. It also specifies that carpet should be used throughout.

LAWA Public Restroom Design Guidelines and Specifications [2] specifies that every public restroom should be equipped with a baby changing station. And prefabricated baby changers should be the type with stainless steel door and flange.

City of Auckland Operative [3], specifies that it should be ensured that all verandahs are continuous along the length and they express the structural technique employed to support the verandah.

Kali Tzortzi [4] suggests that the visitable space and gathering space should be well organized and should express informational dimension and social dimension. ICOM Code of Ethics for Museum [5], states that the governing body should ensure that institutional standards of health, safety, and accessibility apply to its personnel and visitors.

Key Concepts of Museology [6] specifies that architecture should be given due importance in design of museum. [7] five common pitfalls that could occur in planning of a technical museum.

III. BASIC MUSEUM LAYOUT

Considering 2294 sq. meter of total available built up area, a fan shaped structure was adopted to provide enough of walk through space for viewing objects in gallery. The fan shaped structure has many other advantages like better aesthetic appearance, symmetry and easy accessibility.

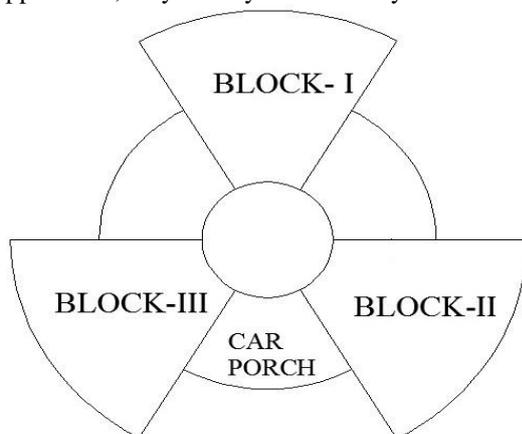


Fig. 1 Basic Layout of Technical Museum

The structure is divided into three main blocks and the remaining area is utilized for providing food court and toilets. Galleries are provided in Block I and Block II. Block III houses Lecture hall, Library and Administrative Wing. For easy accessibility Ticket Counter, Sales Counter, and Cloak Room is provided at the central portion.

3.1 DIMENSIONS

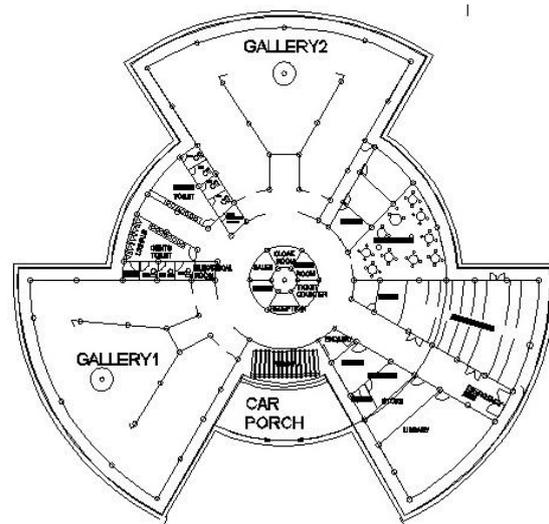


Fig.2 Plan of the Technical Museum

An area of 415 sq. meters is provided for both the galleries. The Lecture Hall is designed for a maximum capacity of 120 occupants and an area of 165 sq. meters is allotted. Food Court has an area of 82 sq. meters and both Ladies toilet and Men's toilet has an area of 54 sq. meter each.

3.2 FLOORING

Modern vinyl floor tile that resembles wood is used for gallery areas because of its low cost, durability, and ease of maintenance. If properly installed, vinyl tiles can be easily removed and replaced when damaged and are available in a variety of colours from several major flooring manufacturers. Porcelain is much harder than ordinary ceramic tiles and is usually selected, despite its higher price etc. in areas where strength is more important, such as floors and commercial use, or in areas of high wear and hard knocks.

3.3 LIGHTING

The main galleries are naturally lit throughout - a risky strategy, and one that would horrify many curators, since daylight has many moods, some kind to paintings, some cruel. So great care has been taken to maintain consistency at the level of the displays; meanwhile, up above them, daylight is allowed to play its gentle games among perfectly positioned windows. CFLs are used in gallery along with LEDs. Since CFLs use between one-seventh and one-third of the power of equivalent incandescent lamps.

3.4 OTHER AMENITIES

Space has been provided to install Special Back Light Ink Jet Film colour outputs displaying all the relevant information about the museum collection and its activities. This will educate the visitors in all manners.

Other amenities like Warm Reception Counter, Ticket Counter, Sales Department, Administrative Wing, Security and Fire Fighting Department,

Centralized A/C, Baby Changing Station, Overhead water tanks are also provided.

IV. ANALYSIS AND DESIGN

The structure was analyzed in STAAD.ProV8i. Altogether twenty load combinations were considered for the analysis. Then the envelope of all the load combinations was taken into account.

CONCLUSION

The project was aimed at promoting variety in shape from commonly seen cubical structures of buildings. The fan shaped structure was found to have many advantages.

The paper was able to throw light on the significance of functional planning of a technical museum for its efficient working.

Various load combinations as per IS code were used, considering wind load as the major load apart from other loads. Analysis and design were done using STAAD.ProV8i. This paper concludes that the structure is capable of taking external loads and moments as far as design is concerned.

REFERENCES

- [1.] General Lecture Hall Design Guidelines, University of Maryland, Baltimore Country, Revised Draft, August 25, 2000.
- [2.] LAWA Public Restroom Design Guidelines and Specifications, updated version July 2008.
- [3.] City of Auckland - District Plan Central Area Section - Operative 2004.
- [4.] Museum Building Design and Exhibition Layout : Patterns of Interactions.
- [5.] ICOM Code of Ethics for Museum
- [6.] Key Concepts of Museology
- [7.] Raed.m.a Elottol, Framework of Satisfaction Assessment, International Transaction Journal of Engineering, Management and Applied Science and Technology.
- [8.] Sue Allen and Joshua Gutwilll, Designing Science Museum Exhibits with Multiple Interactive Features.