

Office Building Daylighting Design in Indore

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Abstract—Generally, all the commercial buildings have been designed as a working environment that majorly focus on creating functional spaces that meet their basic working needs. The research majorly focuses on the new design concept for the office building. Daylighting design has recently taken on a new importance. The use of daylight effectively in an office building is both an art and science. The major purpose of this research is to provide a post occupancy evaluation of an office building and the effect of the daylight on the users of the building. A questionnaire was prepared and provided to the occupants of the building to know their perspective regarding the daylight design in their office building.

Index Terms— Office Building Daylighting

I. INTRODUCTION

Daylighting design is the process of allowing the natural light to enter inside a particular room or any area so that it helps to reduce the electrical load on the artificial lightening devices present in that area. The effective use of daylight in a building is the first step towards making that building energy efficient and further leads towards the sustainability. Admitting the daylight in the indoor spaces of the building depends upon the size and orientation of the window, proportion of the size of the window to the size of the room, interior finishes used and the external obstruction if any present in the surrounding of the building.

Usually daylighting design is misunderstood by mean that lots of light should be allowed to fill a space, whereas the actual meaning of the daylighting design includes the admission of sufficient amount of daylight in a room so that it does not create any eye discomfort such as glare, and also a careful design to counterbalance between the heat gain and heat loss that is been taken place in the space.

II. EFFECTS OF DAYLIGHTING ON HUMAN BEING

There are various physical and psychological effects of daylight on a person.

- Morning sunlight is the best source of Vitamin D for the human body.
- Morning sunlight put a positive impact on the circadian rhythm of the person.
- Working in the natural light increases the productivity of the person.
- Natural light helps a person to stay alert during work and increases the mental focus.

- Daylight helps in synchronizing the circadian clock, which stimulate blood circular, which improves the metabolism.
- Working in natural improves the visual system and sleep quality.

III. STANDARD ILLUMINATION LEVELS

India has a prevailing metric system for the daylight illumination that have the various standards for the illumination values for different types of spaces in the different type of buildings.

TABLE I
 RECOMMENDED VALUE OF DAYLIGHT ILLUMINATION

Types of spaces	Illumination in lux
Entrance halls and Reception area.	150
Conference rooms	300
General offices	300
Business machine operation	450
Drawing offices:	
i. General	300
ii. Boards and tracing	450

Source : IS 3646 (part 2) 1996

IV. CASE STUDY

To fulfill the purpose of the study the office chosen is the office of the head of the department of the Architecture and Interior Designing of SDPS women’s College. The study was conducted in the month of October of 2018. The illumination was calculated with the help of the lux calculator. The office was studied at the 4:00pm in afternoon.

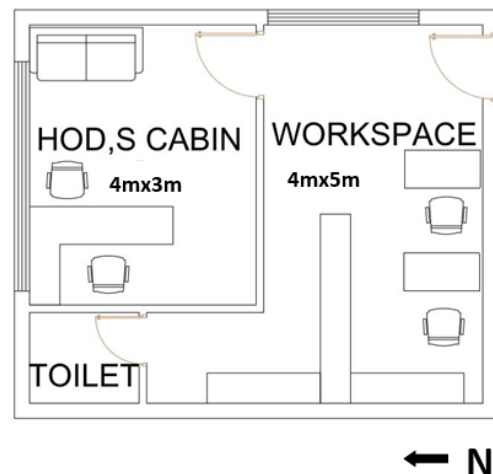


Fig. 1. Plan of the office

A. Building Location

The office studied is located on the third floor of SDPS Women’s College, Khandwa road, opp. Bilawali tank, Indore

B. Openings

The size of the openings of the office is given in the Table-2.

TABLE II
SIZE OF THE OPENINGS

S. No.	Space	Area (sq. m)	Size of opening (m)
1	HOD’s Cabin	12	3
2	Work space	20	2

C. Average Illumination

The illumination level noticed in the office at 4:00pm are listed in Table-3.

TABLE III
AVERAGE ILLUMINATION LEVEL

S. No.	Space	Lux value (lx)
1	HOD’s Cabin	44
2	Work space	65

V. USER’S POINT OF VIEW

In order to know the user’s perspective about the lightening environment of the office a questionnaire was prepared and presented before the workers working there and their answers to those questions are compiled and are given in the charts below.

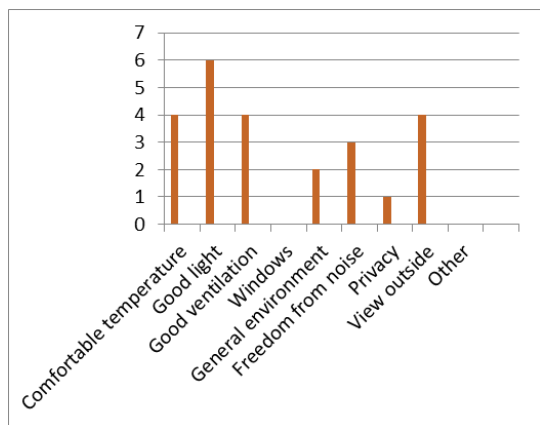


Fig. 2. Physical features that are most important for the users for making a work place pleasant one

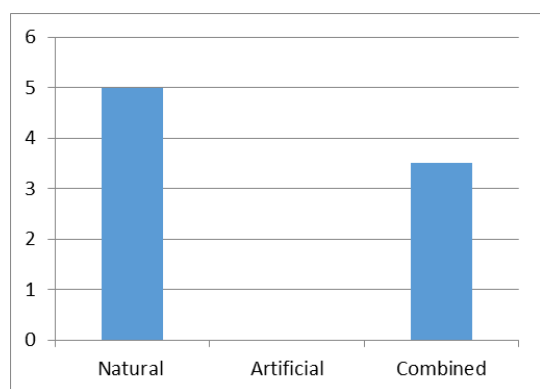


Fig. 3. Kind of light user prefer to work in

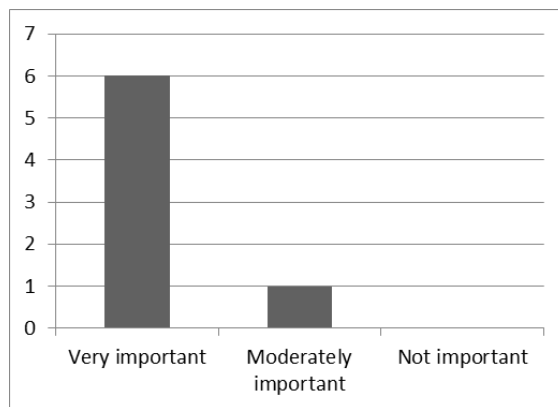


Fig. 4. Importance of window in immediate work area

VI. KEY OBSERVATIONS

- 1) HOD’s Cabin: The illumination level in the HOD’s cabin is very low as compared to the average illumination level required for a general office. But as the orientation of the window in the cabin s towards North, so the daylight that enters the room is diffused light so the glare problem in the office is easily avoided.
- 2) Workspace: The illumination level in the workspace is also very low as compared to the required illumination level.

VII. CONCLUSION

The daylighting designing in any building majorly depends upon the size, and orientation of the openings present in the space. And from the results of this study its can be seen that the amount of daylight that enters the office is not sufficient for a general office building. And after knowing the user’s perspective through the questionnaire it is very clear that for creating pleasant work environment for a person to work in, there are some physical features that are very important and those features are i) Good light, ii) Comfortable temperature, iii) Good ventilation and iv) View outside. From the same survey it can also be concluded that major number of people likes to work in the natural light as compared to the artificial light, and they also like the presence of the windows near them.

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