

illuminating the artistic problem of ambient design

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Abstract: *The present paper deals with the lighting system specific to an exhibition room presenting art works (paintings, showcases and 3D exhibited items). The gallery is to be designed so as to host more types of exhibitions. The main goal is to equip the art gallery with a lighting system consisting of a certain number of different types of lighting apparatus that can be set on rails. These apparatus can shed light on different exhibitions displaying 2D and 3D items different as far as their value, sensibility, material, age, colouring and ornament is concerned. The dimension of the lighting is set both for an exhibition containing paintings placed on the walls, easels and 3D items set in showcases and also for the future exhibitions.*

Key-words: *gallery; light; design; source*

1. INTRODUCTION

As contrasted with the museums that mainly exhibit objects, the galleries that temporarily show paintings and sculptures require a project that will lighten the exhibits. The lighting of the devised project will be important for keeping the architectural balance of the art. A lighting system meant for art galleries has to take into consideration the setting of the proper light for the exhibits, their protection,[3] the flexibility and performances of the special lighting systems so as to adjust them to other types of exhibits.

The main goal of the special lighting systems is to prevent the artificial light from damaging the exhibits; the light should be guiding, it should create the atmosphere, define the spaces so as the viewers could enjoy each exhibit to the fullest without being disturbed by a too intense or too dim light. Too intense or too dim light can simply diminish the experience when visualizing the art works or other exhibits.[2]

Light is an electromagnetic radiation that is only partly perceived by the typical human eye. We distinguish only visible radiations including all rainbow colors (the spectrum) and the wavelengths are measured by means of nanometers.

A light source, whose illumination generates power radiation equaling all spectral colors, produces a white light. Depending on the size of one glittering color or another, white varies towards warm or cold. Visible radiations range between 400 and 750 nm, from violet to red. Regardless the light color variations, our main focus here regarding the art works lighting are the visible radiations, given the unfortunate effects thereof. Ultraviolet light (over 400 nm) and infrared light (over 750 nm).

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The ultraviolet radiations are the most harmful for the exhibited works, and particularly radiations below 360 nm. The rest ranging between 400 and 500 [4] nm correspond to violet and blue while infrared radiations are to be found over the 700 nm limit and the heating effects thereof are quite frightening. They share the effects with the entire visible spectrum and this heat level increase may trigger harmful chemical effects.

Light sources

Besides the visible ones, light sources of either artificial or natural origin, generate ultraviolet and infrared waves. Since the human eye does not distinguish them, they have, therefore, no contribution to the increase of the brightness the objects receive (except for fluorescent pigments) [2].

2. EXHIBIT LIGHTING

Exhibition halls - related specific lighting must be designed so as to comply with the following requirements:

- Maximum exhibit protection against light harmful radiations:
 - UV waves elimination,
 - Minimization of I.R. waves effects (heat),
 - Limitation of lighting level and of light exposure time, depending on exhibit value and sensitivity level, as per the C.I.E. (Commission Internationale de Eclairage) classification.
- Visitors must be provided with a perfect exhibit visibility and observation
 - Assurance of an adequate lighting level,
 - Assurance of the exhibit lighting level uniformity,
 - Avoidance of the direct or reflection glare effects,
 - Accurate color and detail rendering .
- Assurance of light effects in order to create a specific atmosphere, direct the visitors flow or draw the attention on certain focus-objects [5].
- Flexibility and adaptability of the lighting system, for the exhibition re-arrangement or change situations, as well as for the lighting of both two-dimensional and three-dimensional objects that are placed in the same location .
- Possibility of control and command.
- Facilitation of subsequent development .
- Simple and low-cost maintenance .

3. LIGHTING SYSTEM DESIGN

In order to comply with the requirements as stated[1] under section II, the devices are selected so as to provide the following:

- Light spectral stability,
- Adequate color temperature,
- Adequate power,
- Heating and mechanical stability of the lighting devices,

- Possibility to provide the lighting devices with certain accessories (UV and IV filters, “sculpture” type lenses etc,
- Electric and mechanical stability of the auxiliary gear (rails, stands etc),
- Power efficiency,
- *Limitation of the devices noise level.*

4. LIGHTING SYSTEM SIZING

Throughout the system design process, we had the following at our disposal:

- Location map of the space in question,
- Hall decoration blueprint, with the position of all exhibits,
- A list of exhibits, with data regarding: size, materials and classifications under the 4 light sensitivity categories, as per the C.I.E. specifications,
- The exhibition special lighting project was designed in close cooperation with all factors involved: exhibit restoration and preservation specialists, exhibition design specialists, electrical design engineers, lighting design engineers

The light is meant to put the art works under the spotlight, without causing any damage. Regarding the oil paintings conservation aspect, the annual lighting dose is set for 600.000 lxh/year, which means that we calibrated the exhibit lighting level around 150 lx. In what the aquarelle and chalk paintings are concerned, the annual lighting dose is set for 150.000 lxh/year, the recommended lighting level is 50 lx, but at this light level the visitor can hardly take any delight in the paintings, we therefore calibrated the level at 100 lx according to the international custom, yet under the specification that the exposure time must be limited.

In order to put under the spotlight both the paintings (chalk and oil) and the glass window exhibits, I used the “panorama technique”, i.e. the visitors watch the well-lighted painting from a poorly lighted spot. The ceiling and the walls color also leads us to using the technique. Within this given context, we shall use mixed emphasis techniques (such as windows, part of the paintings on the wall and the oil painting on the easel) and wall washing (wall light wash for another part of the paintings on a wall). By emphasizing the exhibits, the light also becomes the adequate guide for visitors by leading them through the various exhibition themes/stages.[6]

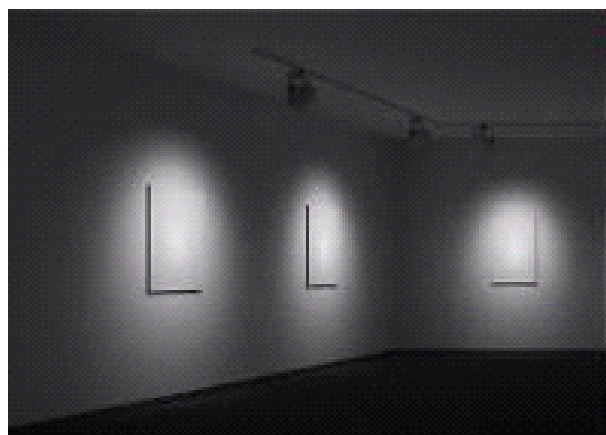


Fig. 1 - *Lighting accent*

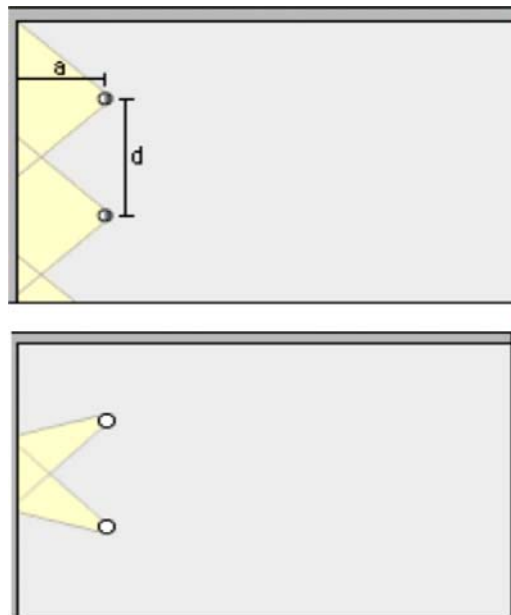


Fig. 2 – Wallwashing

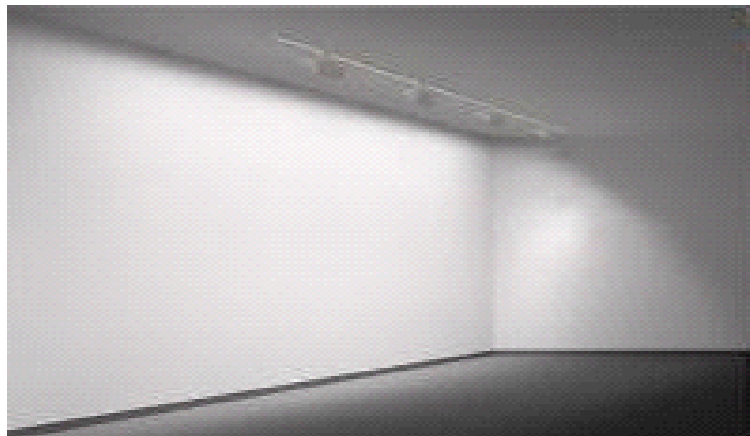


Fig. 3. Light Wallwashing

Lighting system sizing implies the selection of the adequate gear and devices, depending on:

- Lighting maximum level (lx),
- Exhibits features and number ,
- Exhibition hall sizes.

The following stand for the technical content:

- Accessories rails (power supply and electric connection couplings, mechanical support devices) [6].

- Various lighting devices (of the spot, flood or wall washer type)*

- Various accessories: filters, flow control blades, lenses

- Light sources, adjusted in terms of power, color temperature, type, U.V. protection.

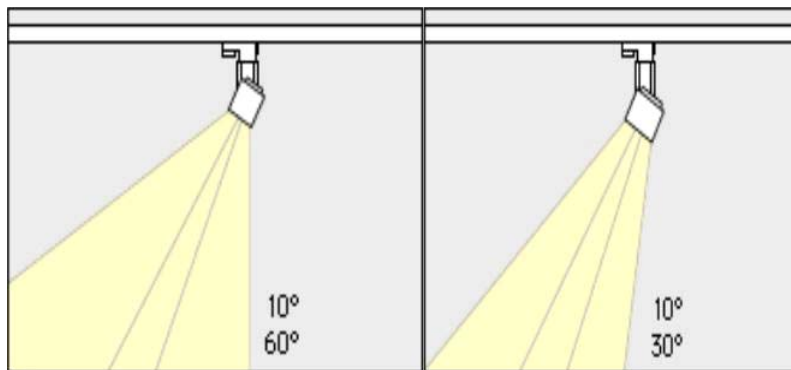


Fig.4 - spot = a narrow distribution lighting device - flood= a wide distribution lighting device

Partly this flexibility will be achieved by a good lighting design, but to realise its full potential, the design needs to include a dimming system. Since the essence of a visit to an Art Gallery or Museum is a visual experience, good quality lighting is of paramount importance. Too little or too much light could easily downgrade the individual's experience when viewing works of art or other exhibits [7]. A Scenio100 dimmer system provides the means to adjust overall levels throughout the gallery to balance light levels for the desired effect. In the example shown,

- There is a need to monitor daylight entering through the windows, so as to automatically adjust the level of the artificial light and maintain a balance between the two. As the natural light compensates, thus keeping the illumination level on the gallery walls as constant as possible. Such a scheme may be achieved with careful use of photocell units, which monitor daylight and pass appropriate signals to the dimmer racks.

The gallery illustrated below includes two Photocells at high level to monitor daylight. Track-light circuits 5 & 6 might be linked to respond to signals from Photocell number 2, whereas tracks electric light is subtly adjusted to near- 2

To remain flexible, a fully automated programme must not be the only option made available to the client. There will always be unforeseen circumstances to allow for. Usually a number of control plates and/or a LCD Touch Screen, which incorporates a 7 day time clock and can display up to 12 Control Plates, would also be installed. This will allow manual override throughout the building whenever necessary

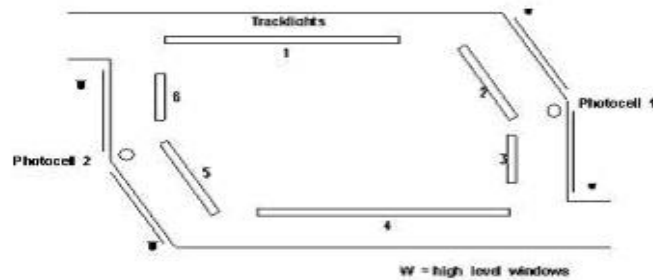


Fig.5 - Gallery scheme

For instance:

Day	Time	Event	
Every day	07.45	Scene 5 in all Galleries	"Functional"scene throughout galleries - sufficient for staff movements only
Every day	08.45	Scene 1 on Externals	Exterior floodlights and Foyer lighting on
Every day	08.50	Scene 3 in all galleries Enable Photocells	"Public viewing"scene for the present exhibition, backed up by daylight
Mondays	14.00	Scene 8 all Galleries	Half day closing
Every day	18.45	Scene 6 all Galleries	Cleaners scene
Every day	20.30	Scene 7 all areas	Security scene
Etc...			

5.CONCLUSIONS

The quality of the lighting is very important. The lighting system of the art galleries is designed by means of stripes or bright lines set on the contour and directed towards the display walls. The lighting system must be designed so as to quickly adjust to new situations without changing the draught. The lighting level of the art galleries must be decreased due to the degradation effects caused to the exhibits.

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