



Historical building adaptation to modern function



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Historical building adaptation to modern function

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- 14 Illumination: artificial lighting**
- 15 Illumination: lighting systems

Historical building adaptation to modern function

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LESSON 14: ILLUMINATION – ARTIFICIAL LIGHTING

Types of lighting: function

General lighting

It consists of direct component luminaires mounted on the ceiling, evenly spaced. It is a very used system due to the flexibility to distribute and modify the work zones. Since the lighting is substantially the same everywhere, the location of the furniture is facilitated. Energy efficiency is normally low because the secondary work areas receive as much light as the main ones. The quality of light, especially reflections, is also a problem, because it is difficult to find a work area outside the glare zone.



Localized lighting

It is a non-uniform arrangement, in which the luminaires are concentrated on the work areas. It has greater efficiency, because the areas where you do not work are not illuminated in the same way as the work ones. The direct glare and reflections can be minimized, since the system allows a wide degree of freedom when distributing the luminaires. However, flexibility in the distribution of furniture is less, unless electric lanes or other modifiable systems are used.



Focused lighting (direct)

Focused lighting illuminates the area of the visual task and its immediate surroundings are illuminated. It achieves the maximum versatility, quality and energy efficiency, as it uses direct lighting, located on the furniture or directed towards it. Direct glare and reflections can be avoided when the luminaires are properly positioned. To avoid excessive contrasts, complementary ambient lighting is recommended.



Types of lighting: expression

Ambient lighting

It is indirect lighting reflected on the ceiling and walls. Provides a low intensity diffuse lighting, sufficient for simple visual tasks and circulations. It is often used together with direct or focused lighting. Direct glare and reflections can be almost completely avoided with this strategy. Areas of intense clarity in the ceiling should be avoided and, to prevent direct glare, luminaires should be above eye level.



Accentuation lighting

It is used when you want to highlight an object or a part of a building. This lighting should be about ten times higher than the level of surrounding lighting. As this type of lighting is very subjective and has a great visual impact, the designers must take extreme care when using it.



Decorative lighting

Here, the object to highlight are the lamps and luminaires themselves. Although the glare here is called a flash, it can also be annoying if it is too bright or a complicated visual task must be performed. In most cases, decorative lighting also provides part of the strictly functional lighting.



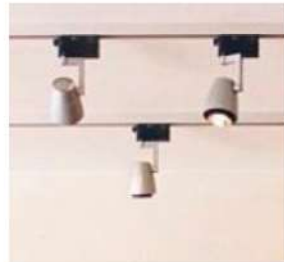
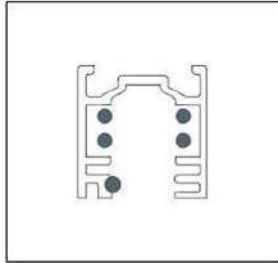
Orientation lighting

Orientation lighting improves perception by adding light points and lines, e.g. along pathways and on stairs. The light must function as a signal. Illuminating the room is of secondary importance here. Low illumination levels are sufficient for orientation purposes. Small luminaires with high luminance clearly set themselves apart from their surroundings.

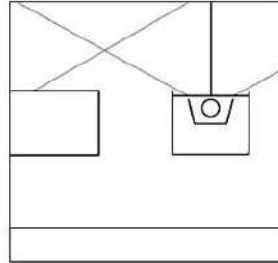


Luminaire groups

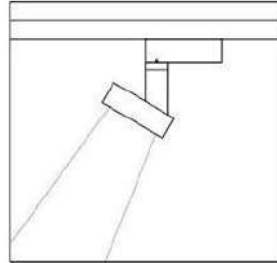
Track



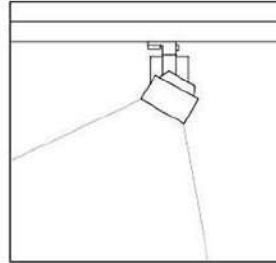
Light structures



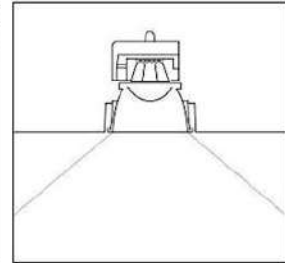
Spotlights



Floodlights

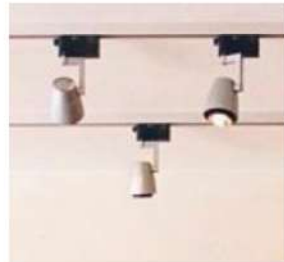
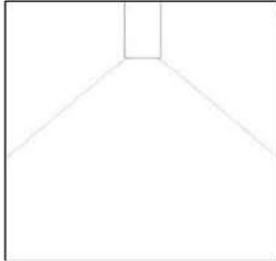


Recessed
luminaires

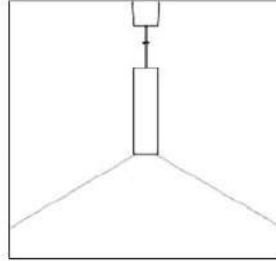


Luminaire groups

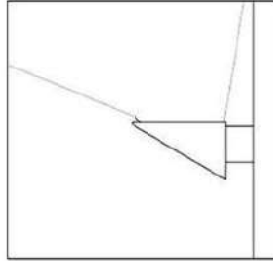
Surface-mounted
luminaires



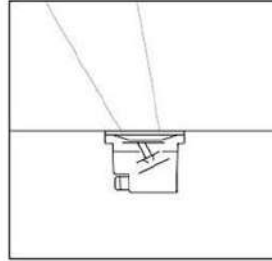
Pendant
luminaires



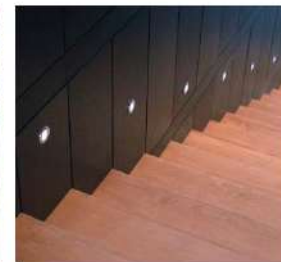
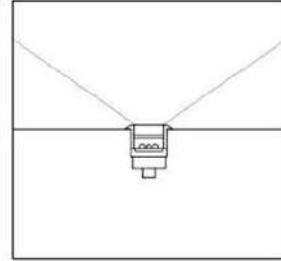
Wall-mounted
luminaires



Recessed floor
luminaires



Orientation
lighting



ILLUMINATION - ARTIFICIAL LIGHTING

Lighting for use:

- General lighting
- Localized lighting
- Focused lighting (direct)
- Ambient lighting



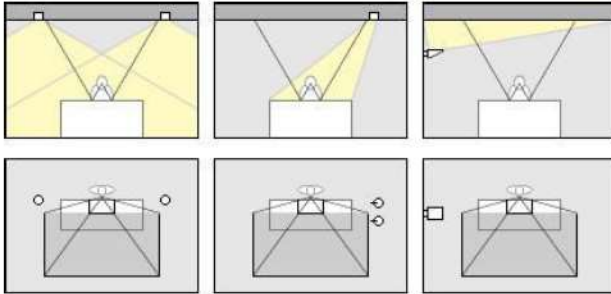
Bibliothek 21, Yi Architects Cologne/Seoul

Illuminating spaces dedicated to a functional purpose is one of the most common lighting tasks. Requires the illumination two elements, the general environment and the working station. This is achieved by different combinations of general/localized lighting, focused (direct) lighting and ambient (indirect) lighting. Most of the lighting tasks governed by work place standards and standards for pedestrian traffic routes come under this category, whether these be the illumination of work surfaces or the actual floor.

Lighting criteria for task lighting

- illuminance level dependent on activity
- illuminance distribution for avoiding direct and secondary glare
- cut-off angle and position of the luminaire restrict glare and increase visual comfort
- the choice of luminaire determines the light colour and colour rendition

Lighting for use: work station



Demanding visual tasks not only require general lighting but also additional lighting for the workstation. With task lights the light can be directed to the task in hand.

- Light structures with fluorescent lamps emit diffuse light.
- Directional luminaires emit an accentuating light onto the workstation.
- Indirect light with up-lights lends the room general background lighting.

Combined lighting with direct and indirect components provides good visual comfort both in the room and on the work surface.



Lighting scheme

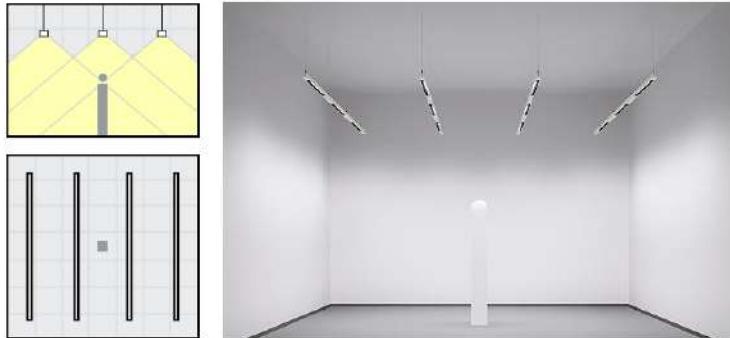


Shanghai Museum



Palacio de la Aljaferia, Zaragoza

Lighting for use: small room



Usable areas can be illuminated directly and indirectly: downlights and pendant downlights emit direct illumination into the room. Light structures have a diffuse light distribution. Up-lights illuminate the room indirectly with a diffuse, uniform light. Compared to indirect lighting with diffuse light, the direct aimed light results in better modelling capability. Combined lighting with direct and indirect components ensures good visual comfort both in the room and on the work surface.



Medialab-Prado, Madrid

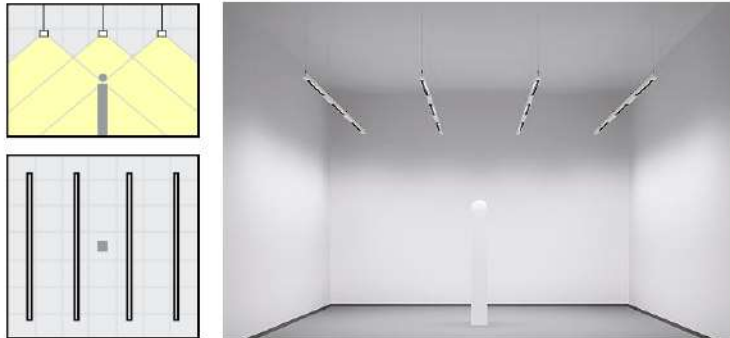


Medialab-Prado, Madrid



Dansk Design Center, Copenhagen

Lighting for use: large rooms



Under consideration of the energy aspects, direct lighting with permanently mounted downlights are the most suitable for large rooms.

Whereas downlights represent fixed-location general lighting, spotlights can be used flexibly in the area of exhibitions and presentations. Due to their narrow-beam light distribution, spotlights have high glare control. Directed light results in good modelling capabilities.



Ständehaus Kunsthalle, Düsseldorf



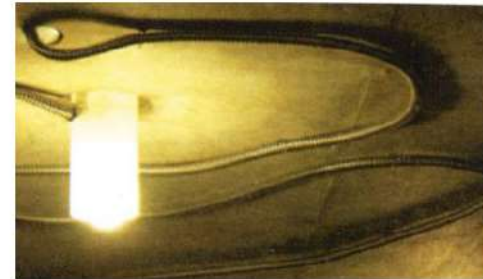
Bank of China, Beijing



Reichstag, Berlin

Tips: functional lighting in building adaptation

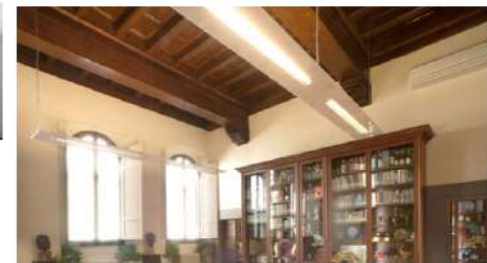
- The preservation and exhibition of historical architectonic elements could require to avoid false ceiling and recessed luminaires.
- It is recommended the use of pendant and surface mounted luminaires. Tracks allow a flexible illumination, while light structures will produce an homogeneous lighting. (both direct and indirect)
- There is an opportunity to emphasize structural element with the use of general lighting.



Parliament of Scotland. (EMBT, 2004)



Track illumination.

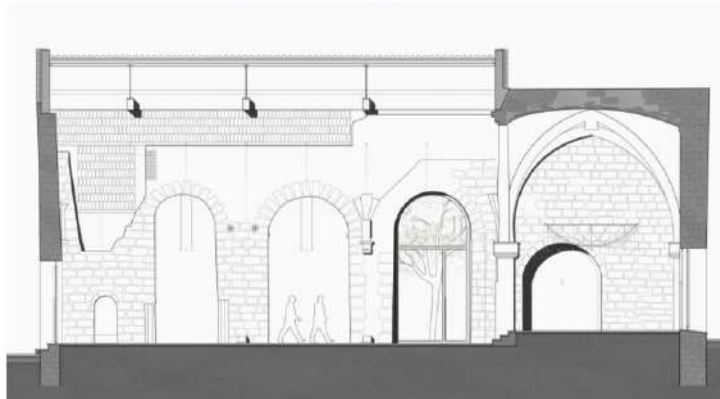
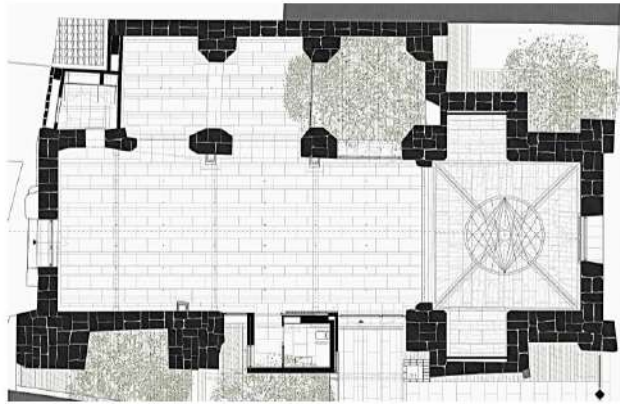


Palazzo Coppini

ILLUMINATION - ARTIFICIAL LIGHTING

Lighting for use. Project

Santa María de Vilanova de la Barca
Alea Olea

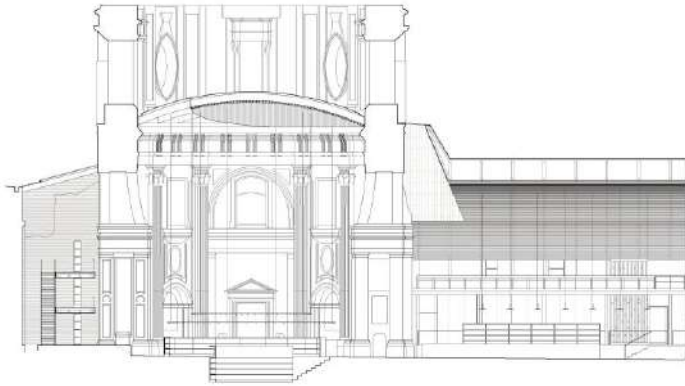


ILLUMINATION - ARTIFICIAL LIGHTING

Lighting for use. Project

Escuelas Pías de San Fernando, Madrid

José Ignacio Linazasoro & Ricardo Sánchez



Architectural lighting

- Ambient lighting
- Accentuation lighting
- Decorative lighting



Saint Anne Cathedral. Las Palmas, Spain

For the first time, the role of actively participating in the transmission of information was expressly entrusted. The fact that clearly illuminated areas involuntarily attract attention was taken into account. The adequate distribution of the luminosity allowed ordering the abundance of information of the environment. The areas with essential information could be enhanced by accentuated lighting, while secondary or disturbing information could be attenuated by a lower level of illumination. The visual environment was appreciated in its structures and in the importance of its objects.

The same principle applied to orientation in space, p. ex. the rapid differentiation between a main entrance and a secondary entrance, as well as the accentuation of objects, as in the case of the presentation of products or the enhancement of a sculpture.

Architectural lighting: wallwashing



Wall lighting can be performed using point-form or linear luminaires. Wallwashers are characterised by the even progression of brightness along the wall. Washlights project the light evenly onto the wall surface, while maintaining the downlight effect on the room. Linear light sources for wallwashing with fluorescent lamps provide a perfectly even brightening of the wall.

The perimeter illumination out of a haunch is positioned directly on the wall. It produces a grazing light effect and emphasises the surface texture.



British Museum, London



BMW factory, Leipzig

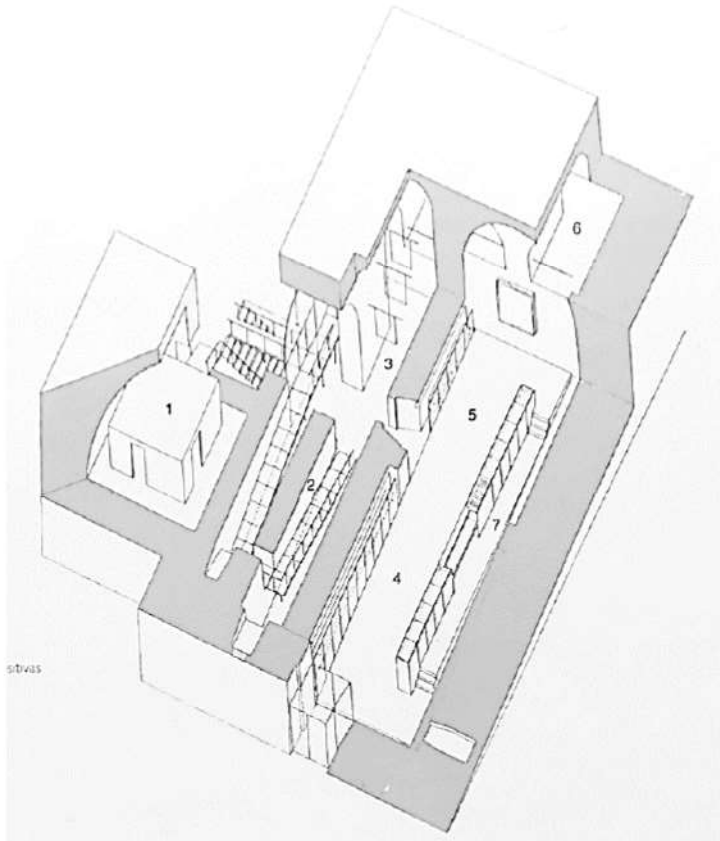


ABN AMRO, Sydney

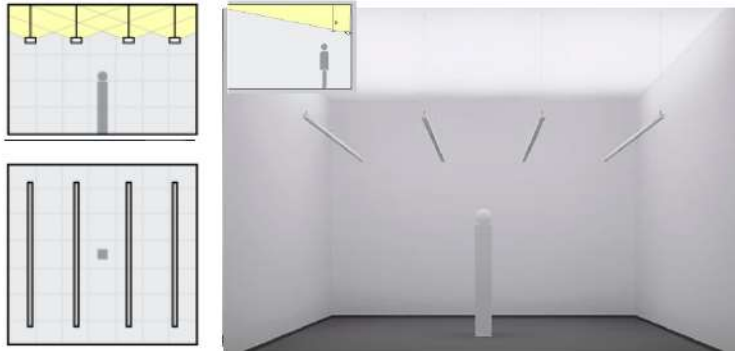
Architectural lighting: wallwashers. Example

Abbaye de Montmajour. Arles, France

Rudy Rocciotti



Architectural lighting: wash lighting



The luminaires for ceiling washlighting can be suspended from the ceiling or mounted on the walls. As linear luminaires, light structures act as independent architectural elements, whereas ceiling washlights are more secondary to the architecture. Light structures emit diffuse light with low brilliance.

The choice of luminaire type is dependent on the ratio of room area to room height. In low rooms with large floor areas an even illumination of the ceiling using light structures presents itself as the best option. Ceiling washlights require a large distance from the ceiling due to their asymmetric light distribution.



Saint Anne Cathedral. Las Palmas



Palacio de la Aljaferia, Zaragoza

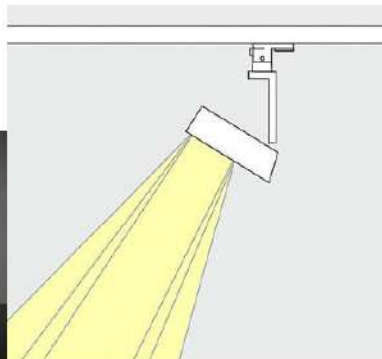
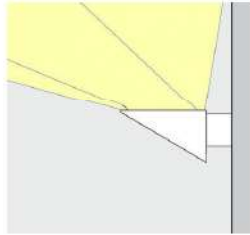
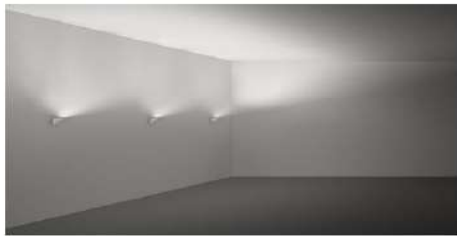


Shanghai Museum

Architectural lighting. Wash lighting. Example

Art museum in Ravenburg

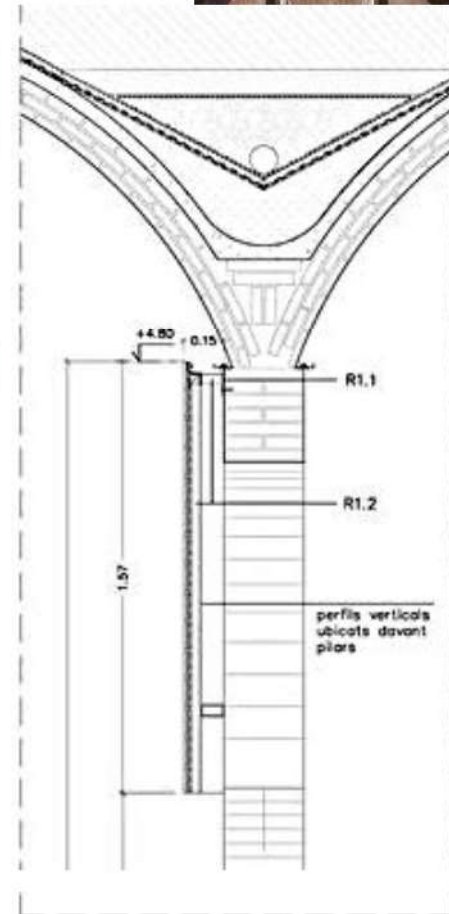
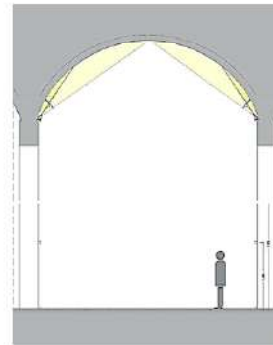
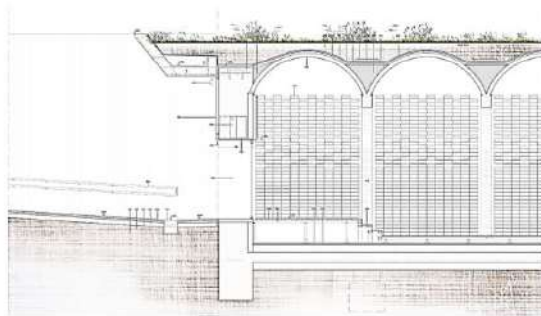
Lederer + Ragnarsdottir + Oei, Stuttgart



Architectural lighting. Wash lighting. Example

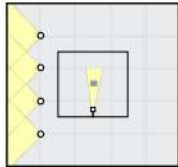
Rei Martí water tank. Barcelona, Spain, 2015.

Marc Chalamanch, Miquel Lacasta, Carmen Santana



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Architectural lighting: Accentuation



Object in the room

Objects in the room can be illuminated flexibly using track-mounted spotlights or floodlights. When illuminating an object with one spotlight in the direction of vision, the modelling effect is weak. Two spotlights with a spot or an oval flood lens shining from different directions create a balanced, three-dimensional effect.

Narrow beam spotlights accentuate the object, while luminaires with a wide-beam light distribution show the object in the context of its surroundings. This reduces the modelling effect.



Ermitage, Sankt Petersburg

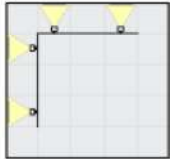
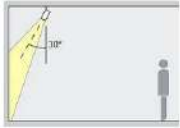


Gottorf Palace Riding Hall



Boutique in Paris

Architectural lighting: Accentuation



Object on the wall

Objects on the wall can be flexibly illuminated with track-mounted spotlights or floodlights.

- Spotlights highlight the picture, while the surroundings seem to recede into the background.
- Contour spotlights ensure very strong, effective emphasis of the picture.
- Individual wallwashers accentuate the picture more discretely than spotlights.
- Several wallwashers illuminate the wall evenly. The picture is not emphasised.



MACBA, Barcelona



Flower installation



Siena Cathedral

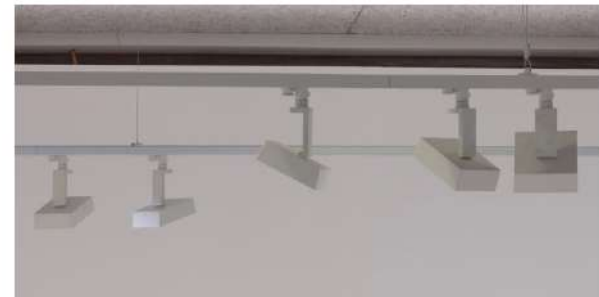
Architectural lighting. Accentuation. Example

Gottorf Palace Riding Hall at the State Museum of Art and Cultural History, Schleswig

Tracks

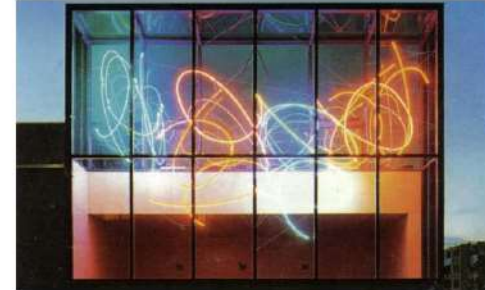


Spotlights



Architectural lighting: decorative lighting

Here, the object to highlight are the lamps and luminaries themselves. Although the glare here is called a flash, it can also be annoying if it is too bright or a complicated visual task must be performed. In most cases, decorative lighting also provides part of the strictly functional lighting.



St. Franziskus Church. Keith Sonnier



Sony Style Flagship Store



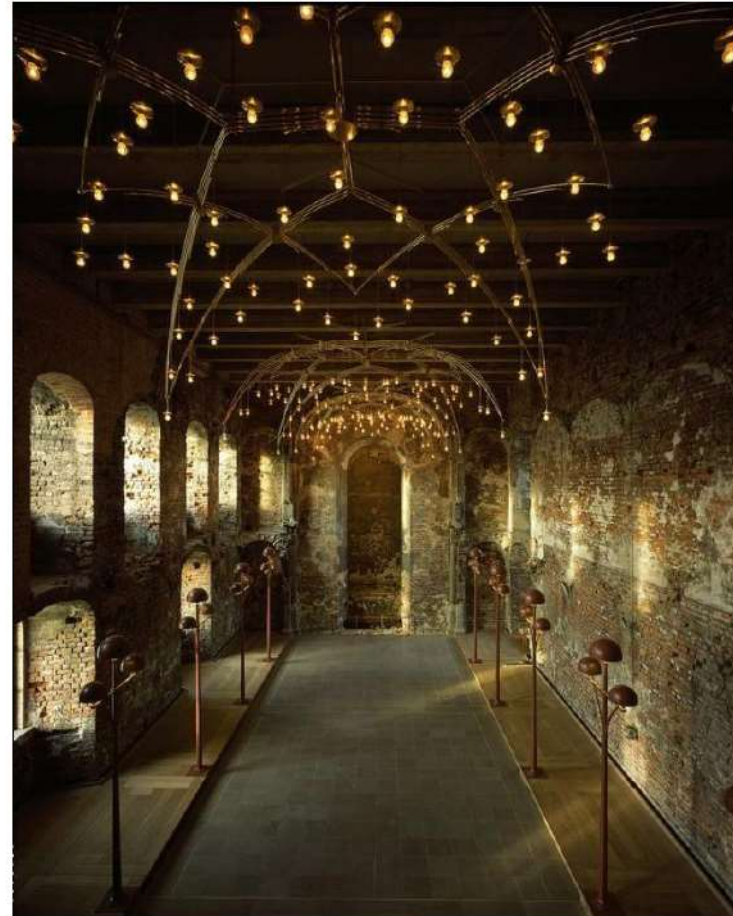
BruumRuum! Interactive space, Barcelona

ILLUMINATION - ARTIFICIAL LIGHTING

Architectural lighting: Architectural shapes with light

Koldinghus - Old castle in Kolding – Denmark

Pendant luminaires



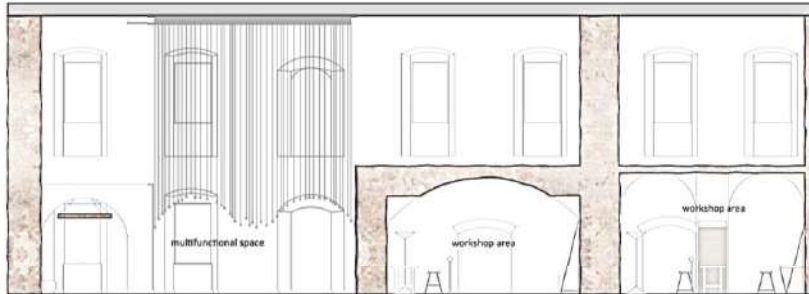
<https://kirstenstabler.wordpress.com/2011/09/13/wandering-through-the-west/>

ILLUMINATION - ARTIFICIAL LIGHTING

Architectural lighting: Architectural shapes with light

Reframe, Castle in Bonțida, Rumania

Alexandru Fleșeriu + Péter Eszter



ILLUMINATION - ARTIFICIAL LIGHTING

Architectural lighting: 'Lightened glass box'

Louvre's pyramid. New access to the art museum.

Paris, France, 1989.

Ieoh Ming Pei



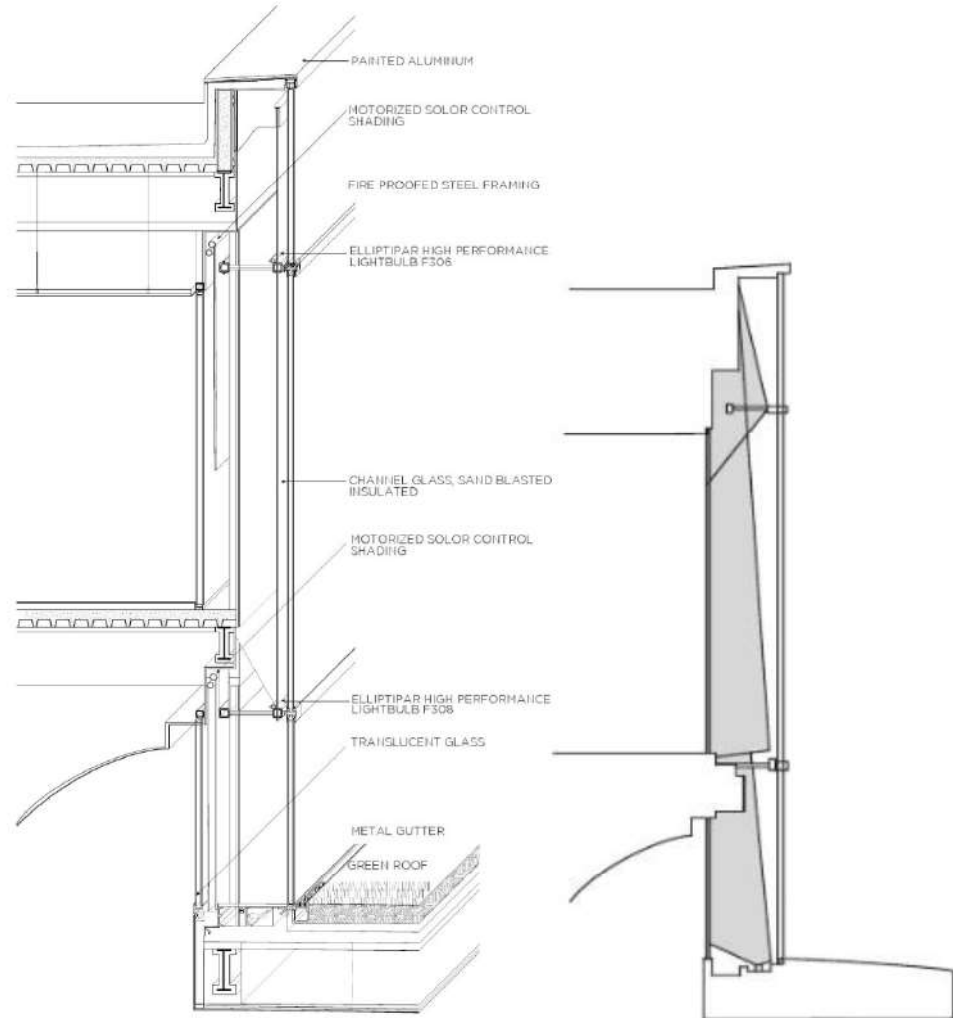
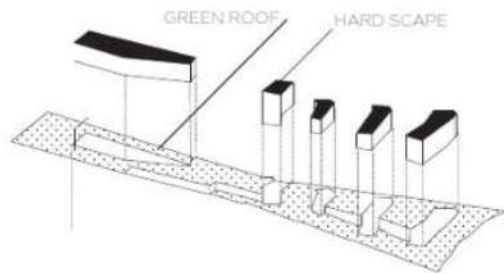
ILLUMINATION - ARTIFICIAL LIGHTING

Architectural lighting: 'Lightened glass box'

Nelson-Atkins Museum Extension

Kansas City, United States, 2007

Steven Holl

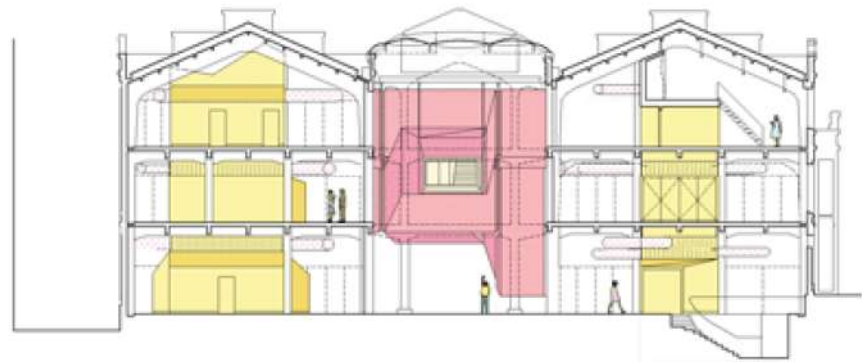


ILLUMINATION - ARTIFICIAL LIGHTING

Architectural lighting: 'Lightened glass box'

Medialab-Prado, digital creative centre, former dutch factory.

Langarita-Navarro Arquitectos

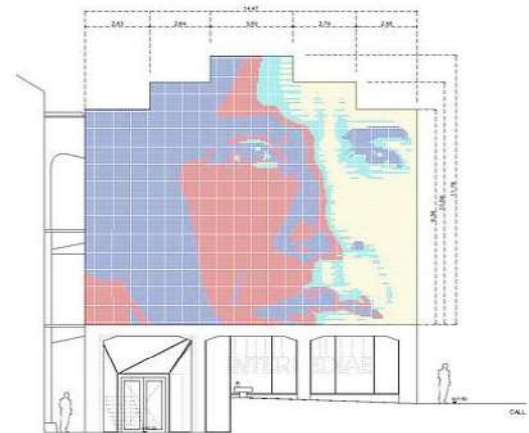
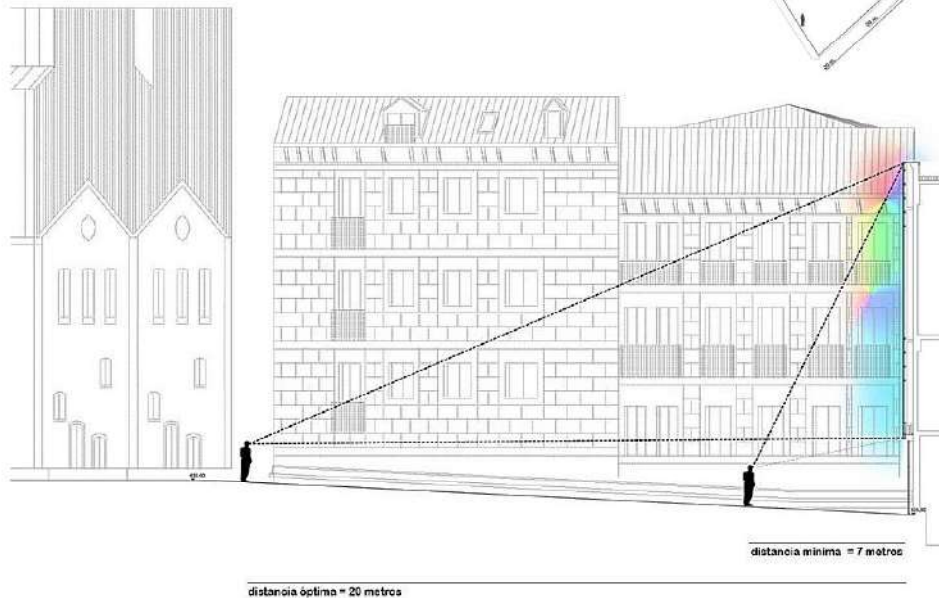
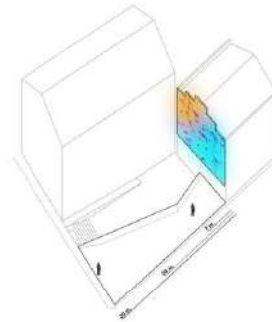


ILLUMINATION - ARTIFICIAL LIGHTING

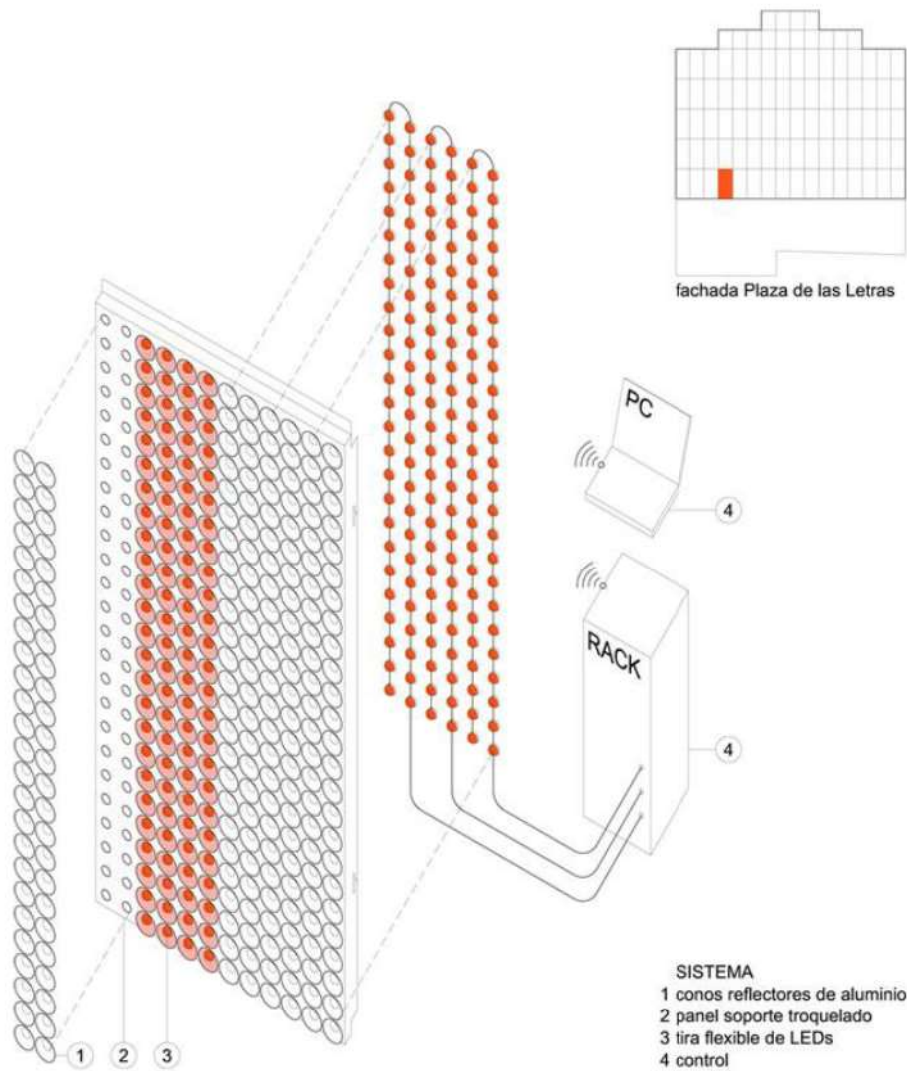
Architectural lighting: Interactive façade

'Templo de San Marcos' cultural centre and local
archive of Toledo

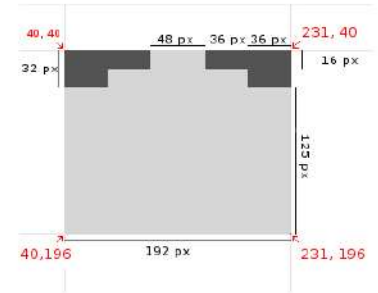
Ignacio Mendaro Corsini.



ILLUMINATION - ARTIFICIAL LIGHTING



componentes de la pantalla



ENTREVISTA A JUAN CARLOS ARNUNCIO REFLEXIONES SOBRE EL MUSEO DE ARTE CONTEMPORÁNEO ESPAÑOL DE VALLADOLID.

INTERVIEW TO JUAN CARLOS ARNUNCIO. REFLECTIONS ON THE
SPANISH CONTEMPORARY ART MUSEUM IN VALLADOLID.

Luis Bosch Reig
Departamento de Proyectos Arquitectónicos UPM
DOI's: <http://dx.doi.org/10.4995/eb.10166738>

INTRODUCCIÓN

Toda intervención sobre una arquitectura preexistente supone una transformación en la que se debe valorar la preexistencia y su contexto, empleando el proceso metodológico del proyecto arquitectónico, con la mayor sensibilidad por parte del arquitecto, tratando de establecer un diálogo entre pasado, presente y futuro.

La intervención proyectual es la única herramienta adecuada para establecer un diálogo entre la arquitectura del pasado y la del presente, pero para lograr una buena solución es fundamental que la capacidad del arquitecto esté a la altura del valor de las preexistencias sobre las que se actúa. Retomando las palabras del arquitecto italiano Savio Muratori, "el arquitecto restaurador debe ser todavía más arquitecto para poder tener la sensibilidad de dialogar con el pasado, hasta asumir la conciencia entre proyecto de arquitectura y proyecto de restauración".

La presente entrevista busca indagar en las reflexiones arquitectónicas de Juan Carlos Arnuncio, para tratar de entender las claves que le han permitido realizar obras de intervención de gran calidad. El texto hace hincapié en la actuación sobre los restos de la capilla gótica del *Patio Herreros*, una obra en la que el arquitecto demuestra su gran sensibilidad y su capacidad para establecer un interesante diálogo entre antiguo y nuevo, empleando para ello el hormigón visto blanco.

BREVE RESENA BIOGRÁFICA

Juan Carlos Arnuncio nació en Valladolid en 1951. Se graduó como arquitecto en la E.T.S.A. de Navarra, con la especialidad de Urbanismo, en el año 1978. Obtiene el título de Dr. Arquitecto en la E.T.S.A. de Navarra en el año 1984. Ocupa el cargo de Director de la E.T.S.A. de Valladolid entre los años 1986 y 1990, y de Director del Departamento de Teoría de la Arquitectura y Proyectos Arquitectónicos entre los años 1991 y 1994. Obtiene la Cátedra de Proyectos Arquitectónicos en la E.T.S.A. de Valladolid en 1997, y la Cátedra de Proyectos Arquitectónicos en la E.T.S.A. de Madrid en 2010.

Arnuncio es autor de numerosas obras arquitectónicas de las que destaca *la rehabilitación del Palacio del Licenciado Butrón* (1996-1999), *el Museo de Arte Contemporáneo Español Pablo Herreros* (1996-2002), *el Conservatorio Profesional de Música y Danza en Burgos* (2006), así como diversas intervenciones que vienen realizando en los últimos años en la Catedral de Segovia. Entre sus publicaciones se pueden destacar: *Peso y Levedad, notas*

INTRODUCTION

Every intervention on an existing architecture involves a transformation in which the pre-existence and its context should be considered, using the methodological process of the architectural project with utmost sensitivity of the architect, trying to establish a dialogue between past, present and future.

The project intervention is the only adequate tool to set a dialogue between the architecture of the past and of the present. But, in order to reach a good solution, it is fundamental that the architect's ability matches up to the value of the pre-existing architecture where he intervenes. In the words of the Italian architect Savio Muratori, 'the architect-restorer architect must be even more of an architect in order to have the sensitivity to dialogue with the past, to assume the overlap between the architectural design and the restoration project'.

This interview seeks to enquire into the architectural reflections of Juan Carlos Arnuncio, in order to try to understand the key factors that allowed him to carry out works of great quality. The text focuses on the work on the remains of the Gothic chapel of *Patio Herreros*. It is a work in which the architect shows his great sensitivity and ability to establish an interesting dialogue between the old and the new, using white exposed concrete for this.

SHORT BIOGRAPHY

Juan Carlos Arnuncio was born in Valladolid in 1951. He graduated as an architect at the School of Architecture of Navarra in 1978, majoring in Urbanism. He obtains his PhD in Architecture at the School of Architecture of Navarra in 1984. He holds the position of Headmaster of the School of Architecture of Valladolid between 1986 and 1990, and Head of the Architectural Theory and Architectural Design Department between 1991 and 1994. He is granted the Chair of Architectural Design at Valladolid's School of Architecture in 1997 and the Chair of Architectural Design at Madrid's in 2010.

Arnuncio is the author of numerous architectural works. Some of the most relevant are: the Rehabilitation of the Palace of *Licenciado Butrón* (1996-1999), the Museum of Spanish Contemporary Art *Pablo Herreros* (1996-2002), the Music and Dance Professional Conservatory in Burgos (2006), and various interventions made in recent years in the Cathedral of Segovia. Among his publications, the following can be highlighted: *Peso y Levedad, notas sobre la gravedad a partir del Danteano* (2007), *Incrusaciones arquitectónicas* (2009), *Cosas del Señor Francisco* (2009) and his latest book entitled *Colgado de una bandada de Ocas* published by ABADA (Madrid, 2015).

INTERVIEW

L.B.: In your extensive experience as an architect –a more than 35-year-long career– you have covered all kinds of fields within the discipline, from university research to architectural practice. It seems you've sought to have a complete experience of Architecture. Do you recognize a transfer of knowledge from theory to practice?

J.C.A.: The theoretical aspect of architecture is part of your personal view and affects architectural practice. Actually, I am not able to tell where one of them finishes and the other begins. The reflection on planning is essential and it requires some time, which is incompatible with the stressful rush of the construction business, which many times results



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