LIGHTING DESIGN - WEEKLY BLOG

07/02/23

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SCOTTISH NATIONAL PORTRAIT GALLERY

Museum Lighting Techniques

Street View of Scottish National Portrait Gallery, 1 Queen Street

Mary, Queen of Scots (1542-1586), Unknown Artist (right)

The Scottish National Portrait Gallery houses collections of portraits in the form of paintings, sculptures, and photos. The building was designed by Robert Rowand Anderson in a Gothic style with red sandstone. The construction took place between 1885 and 1890, and the museum opened its doors in 1889.

The collection ranges from exhibitions from the Victorian Age, the Jacobites in the 1680s, and, 1760s Globalisation to more modern and abstract pieces by Ken Currie, Michael Youds, and Alexander Moffat.

Jacob's Ladder by Simon Rivett (right)

LIGHTING GALLERIES

Protection

Museums Galleries Scotland is the National Development Body for the Scottish museums sector. They have established several techniques that both provide proper lighting and protect the paintings from damage.

One of their primary objectives is to provide the appropriate lux levels to each piece of art. Sensitive work like watercolours, drawings, and old photographs are kept at 50 lux.. Moderately sensitive pieces like old and tempera paintings, modern photographs, and wood are kept at 200 lux. Insensitive sculptures made from ceramic, metal, stone, and glass can be displayed at 300 lux.

Some of their other suggested techniques include eliminating all direct sunlight, applying solar control films, low-wattage bulbs, and dimmers. Non-visible radiation can also be extremely damaging and should be considered. Laminated glass, white paints (less UV radiation in its reflection), and keeping lights a safe distance from the piece can be vital in protecting the work.

Light measurements were taken in several spaces to investigate these levels. A pencil drawing (left) received 15 lux. An old painting (middle) received 210 lux. A ceramic sculpture (right) received 200 lux. Measurements were taken in the centre of the piece. The light levels on the sketch were very low, and it was very difficult to see the details. Light levels on the painting were bright and without glare The high levels on the sculpture creating an accent piece amongst the surrounding areas and within the larger room.

Museums Galleries Scotland
Supporting Scotland's Museums

Charles I (1600-1694) by Salomon Savery

Irene Young (1919-2017) by John Dudley

Pulcinella, Coney Ostara by Iain Somemrville

DIRECT DAYLIGHTING

In galleries with paintings, windows were covered in blackout shades, with only the top portion allowing natural light to enter through a protected screen. If the gallery required daylighting, these conditions can be altered by removing the devices.

The entrance hall has a plethora of natural light; the south wall is made up of stained glass panels. They act as stand alone art pieces, while allowing hues of red and orange to enter the space to compliment the muted wall paintings. Surrounding buildings prevent glare and rays.

Limiting Light

Entrance Hall

LIGHTING GALLERIES

Fixtures and Orientation

CYLINDRICAL FIXTURES

The majority of the works throughout the museum are lit by overhead, cylindrical spotlights that are on an adjustable track. The diameter ranges from anywhere between 3-5cm to 10-15cm .

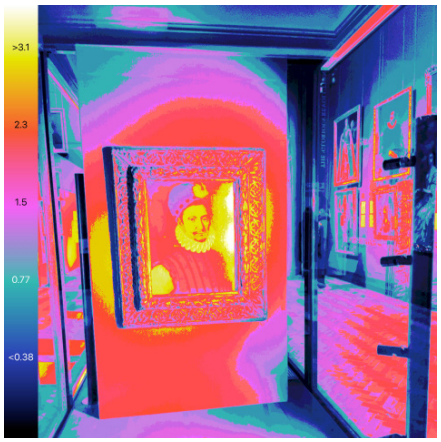
Fixtures like these have a high illuminance that directs the viewer's attention to the work. This occurs when a narrow beam is directed towards a piece for accent lighting.

They can also be used for wall washing by intersecting wide-beam sources to shine along the length of a vertical space. It can bring a spacial component to the space and allow the visitor to contemplate the piece.

According to lighting designer Ralph Peake, "A space can be made to appear welcoming and interesting by illumination of the perimeter walls or by highlighting a textured surface."

The images to the left shows an example of the cylindrical fixtures on an adjustable track. Some of the beams are pointed directly at the pieces, while some are used for wall washing. This combination can create emphasis on some pieces and less on others depending on the curator's intent.

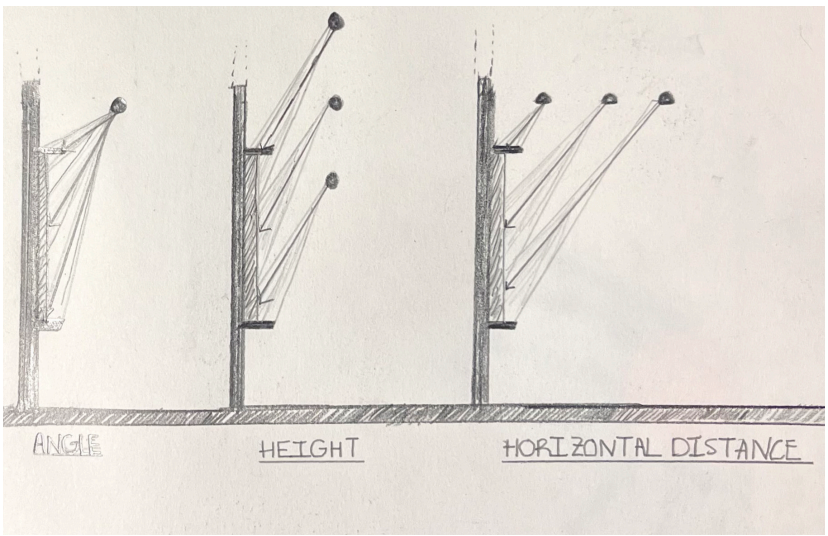
The top right image shows the luminance levels on a painting that uses a series of smaller fixtures in a vertical formation. The painting is in a display case, and the spotlight creates more of a focus for the visitor. The luminance levels reach up to 3.1 lux. The bottom image to the right shows the original photo. There is a small amount of glare from were the light hits the painting on the right, but other features are clear and visible.



ORIENTATION OF BEAM

The fixture's orientation (angle and distance from the work) depends on the desired effect. Spotlights are angled at a steep 10-20° and used mostly for 3D objects to highlight its form. Flood lights are angled at 25-35°, and angles greater than 45 degrees create uniform lighting across the space.

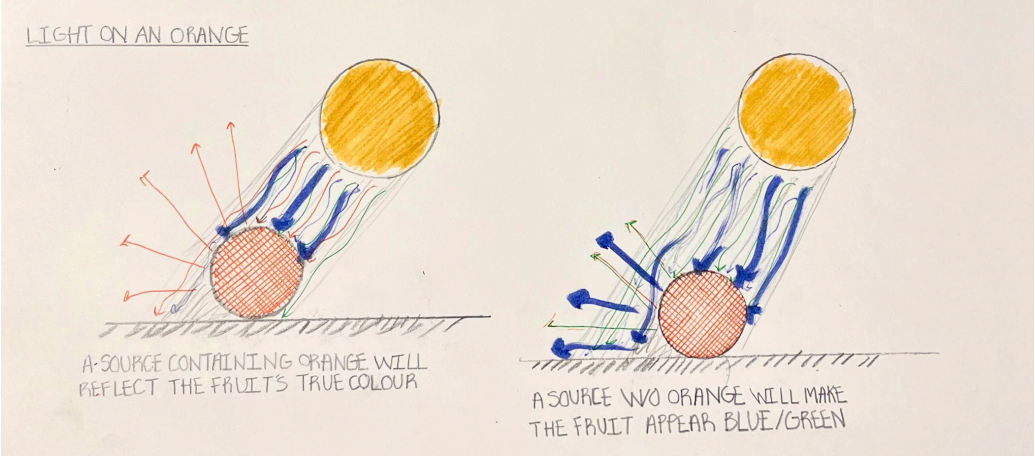
The vertical and horizontal distance from the work influences the viewer's perception. The farther is it, the less luminance it will receive and the wider the beam will be.



LIGHTING GALLERIES

Wall Colour

The wall colour has a large impact on how viewers interpret the piece. While colours can be employed to interpret a particular time, place, or culture, it has a tremendous influence on how the work is lit.



When light strikes a surface, some energy is absorbed and some is reflected. The wavelength that is reflected is what the eye interprets as colour. This is dependent on the length of the wavelength and the amount of energy being reflected. Therefore, the colour we see is reflected light. This is also dependent on the colour of the light source. To see an object for its true colour, the source light must include all wavelengths that the object will reflect. The sketch below shows this concept.

DARK COLOURS

The wall colour could create or mitigate focus on the painting by creating contrast.

Dark colours reflect much less energy than lighter colours. A dark wall can either emphasise a light-coloured painting, or create a dark and mysterious room to influence the viewer's interpretation, like the image on the right.

The painting uses dark shades of brown, black, and blue. The wall colour in the painting it also dark. Placing the painting on a wall like this helps to contextualise the viewer to understand the piece and the artist's intensions.

Dark Wall Painting Name, Artist, Year

LIGHT COLOURS

Light Wall Painting Name, Artist, Year

Many museums like EXAMPLE, EXAMPLE, EXAMPLE refuse to use white walls because EXPLAIN.

Many of the modern pieces in the Portrait Gallery are placed on white walls. One reason for this could be to create a contrast between the older pieces and the newer items.

The painting on the left is a contemporary landscape; different than the older portraits. The colours are muted with grays and blacks. The white wall creates emphasis on the painting itself and the uniqueness in the museum

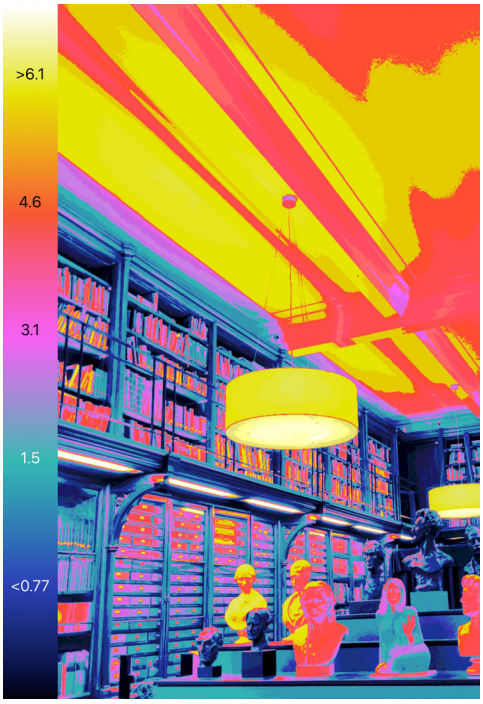
SPACE ANALYSIS

Library

A photo of the museum's library is on the right. It is tucked away from other exhibits and offers a more intimate, clustered space than the isolated, refined galleries. The walls are covered floor-to-ceiling with dark brown bookshelves. The centre is occupied with tables, desks, and leather chairs.

The space has warm and cosy atmosphere. The wall colour is dark; hardly any light is being reflected, less than 0.5 lux. The bookshelves have glass coverings that create a small reflection of the strip lights above the cases, but do not cause uncomfortable glare; at most, 6.0 lux is reflected.

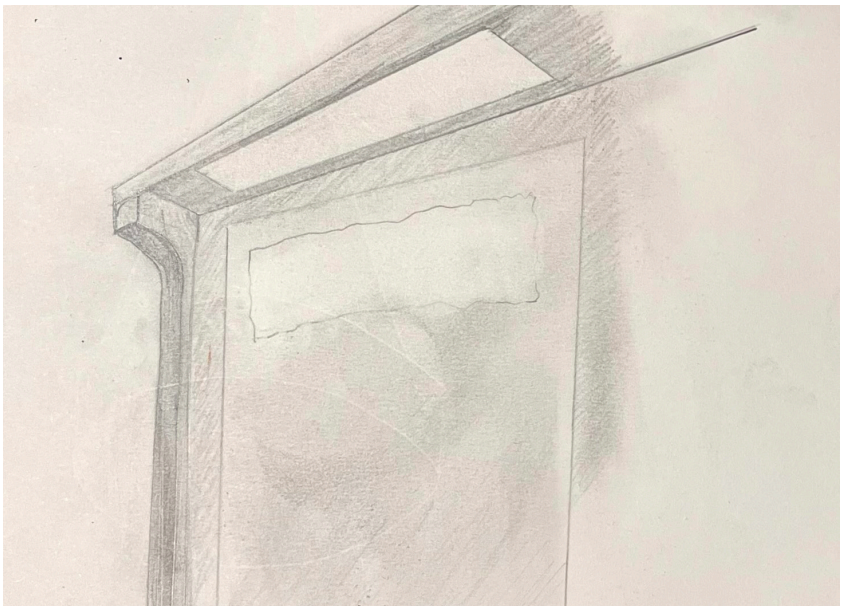
The ceilings are a creamy white with exposed framing details. This creates dimensionality through shadows. About 6.0 lux are reflected in the brightest spots.

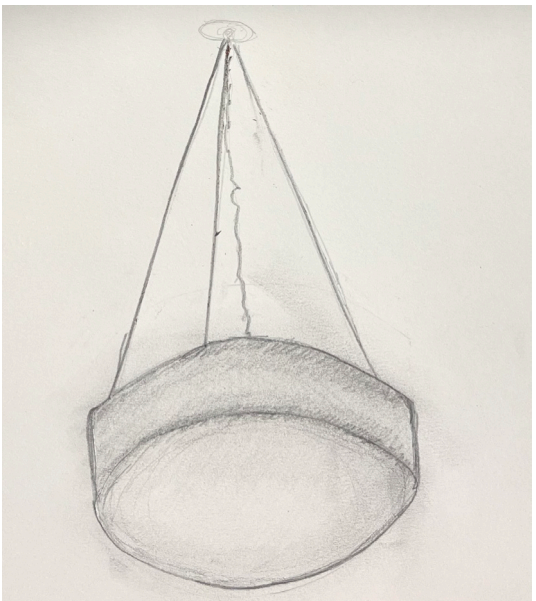


There are 3x2 rows of evenly-spaced, cylindrical, hanging light fixtures. They appear to be wrapped in a opaque, rice paper-like covering that distributes the light around the room. They do not provide much task lighting, and I found that it was slightly uncomfortable to read in these conditions.

There is a walking-path for employees to access the top-shelf books. Below this path, strip lights light the lower cases. They appear to be LEDs or florescent, and their colour is much warmer (i.e. colder feelings, more blue than yellow) than the central hanging fixtures that give off a more comfortable temperature. These conditions provide sufficient task lighting.

The light levels in the centre of the room in the chairs were 70 lux and were insufficient task lighting levels. Even though the bookshelf lighting was ideal for reading (200 lux), it suggests that the museum does not want visitors spending much time reading the collection in the chairs they provide.

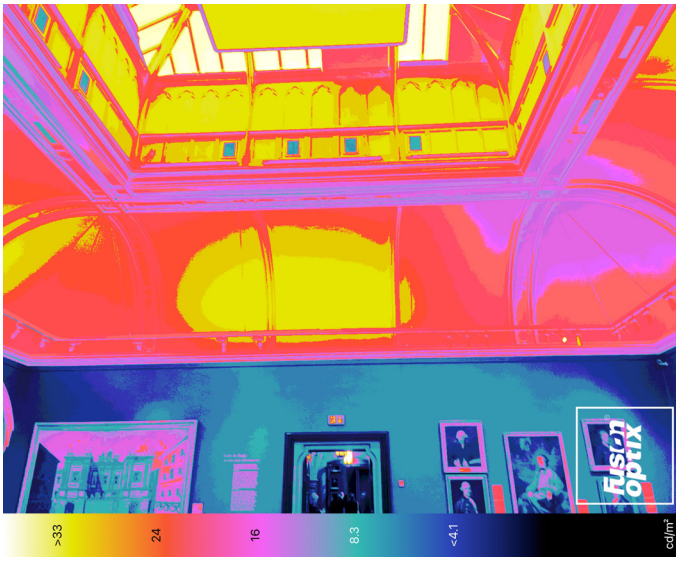




SPACE ANALYSIS

Top Floor Gallery

Many of the top floor galleries have skylights with opaque window covering to allow natural diffused light to enter the space. One of the rooms is shown in the following pictures and diagrams. The skylight is in the centre of the room and is extruded higher than the surrounding ceiling. This lengthens the path the light must travel, so it is less intense once it reached the paintings. There are also adjustable, cylindrical fixtures on a rail to spotlight the individual pieces. The walls are a dark navy, with little light reflecting from them. This contrasts the white ceilings that, combined with the curvature of the room, make a bright ambiance. The combination of dark blue, cream, and natural light create a comforting environment



In this gallery, there are opaque, rectangular screens that direct the light towards the edges of the space. This directs light both towards and edges of the room, as well as creating a spotlight in the centre. The extruded nature of the skylight also adds to this impact. Overall, there is a slight variation of lighting conditions throughout the room. The centre is much “whiter”, while the spaces close to the paintings are more dark and intimate.