

# Track Lighting in Museums

## Part 1: Selection and Design

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### Introduction

Light is arguably the single greatest cause of deterioration in museum collections. Several factors contribute to its damaging effects: the materials from which objects are made, the type and intensity of light they are exposed to and the duration of the exposure.

Especially sensitive to light are objects made of organic material – documents and letters, photographs, works of art on paper, textiles, clothing and accessories. Yet these items, when featured in museum exhibits, spend a great deal of time exposed to light. And because exhibits take so much time and money to develop, displays often remain up for years – far longer than is ideal for the preservation of the items exhibited. The result can be irreparable damage to museum artifacts – damage that is cumulative over the life of the objects and usually irreversible.

This two-part Tech Talk will help you understand the nature of light and its damaging effects and offers guidance for the safe lighting of museum collections. Part 1 discusses the decisions you'll need to make when planning a lighting system. Part 2, to appear in the January-February 2007 issue of the *Interpreter*, will discuss how to control museum lighting.

### Understanding light

The light to which museum collections are exposed is made up of three parts: ultraviolet (UV) radiation at one end of the spectrum, visible light in the middle and infrared radiation at the other end.

A common misconception is that eliminating UV light solves the problem of deterioration. But all light, wherever it falls on the spectrum, is energy. And it is energy that drives the chemical reactions that result in damage to objects from fading (fig. 1), yellowing and embrittlement.

High-energy UV light falls outside the range of human vision and so is not necessary for viewing a museum exhibit. It can be removed using filters (to be discussed in Part 2). At the other end of the spectrum is infrared light, which produces heat (think of the infrared bulbs used in restaurants to keep food warm). Damage from infrared light can be minimized or largely eliminated by ensuring that there is sufficient distance between the light source and the object being lit.

### Track lighting: The museum standard

Our challenge in museums is to use only as much light of the right type as is necessary to make exhibits comfortably visible for visitors while protecting the collections from damage. One of the most common and effective ways of lighting museum exhibits is with track lighting.



Minnesota Historical Society photos

*Fig. 1: A look at the back of this silk banner reveals how the front has faded from years of exposure to light.*

Because it is so versatile, track lighting has become the standard for museums. Track lights are available in a variety of fixtures and lamps to suit a wide range of applications. Track lighting systems are also highly flexible: the lights can easily be moved, added or removed as changing exhibits warrant. Whereas overhead fluorescent fixtures bathe an entire room in an even, flat light (see fig. 2), track lighting can be used to highlight discrete areas such as signage or a featured artifact (see fig. 3).

# Tech Talk

What are the factors to consider when planning track lighting for your museum? The purchase of any system should take into account the following:

- quality of the product,
- number of circuits used to power the track,
- location or layout of the track,
- type of lamps and fixtures used, and
- control of the circuits.

## Buy museum-quality systems

The phrase “museum quality” means something when it comes to track lighting. Track of standard commercial grade – usually a static system designed for one-time installation – is not well suited to museum use. The fixtures and fittings, designed to last only about five years, do not hold up under the repeated installation and relocation required for changing exhibits.

Four brands of track lighting are generally considered to be museum-quality grade:

- Edison Price Lighting
- ERCO
- Lighting Services Inc. (LSI)
- Lightolier: ProSpec Track

Each manufacturer makes durable, two-circuit track and a variety of fixtures designed for long-term museum lighting. They must be special-ordered; work with a local manufacturer’s representative to view samples, then arrange orders through your electrical contractor or supply house. These brands are more expensive than standard commercial track or retail-grade track, but you get the quality you pay for. For contact information, go to [www.mnhs.org/techtalkresources](http://www.mnhs.org/techtalkresources).



*Fig. 2: Overhead fluorescent fixtures create a flat, even light. The track lighting used here provides more light but adds little visual impact.*



*Fig. 3: Used effectively, track lighting creates visual interest by varying light levels throughout the exhibit.*

## Create lighting zones

To light your museum exhibits most effectively, it's helpful to divide your exhibition space into lighting zones. The number of zones will depend on the size of your exhibit area but a good starting point for planning is four to six zones.

In museum lighting, the number of electrical circuits required is based on light control rather than load. Each zone should be fed by two circuits, one for artifact lighting and the other for general lighting. Those dual controls will enable you to limit light exposure for displayed artifacts and, at the same time, maintain a comfortable viewing environment for visitors.



Fig. 4: When light fixtures are angled improperly, museum visitors cast shadows on the displays.

## Determine proper location of tracks

Proper location of the lighting track is key to ensuring your visitors a pleasant museum experience. To light objects, interpretive panels and text mounted on a wall, install track around the perimeter of your exhibition space. Prevent glare and shadows by determining the best angle for each light fixture.

The optimum angle for lighting flat displays on vertical surfaces is 30 degrees. This angle produces a minimum amount of glare and allows visitors to view the artwork or artifact closely without casting a shadow (see fig. 4). Lights should not be positioned at angles greater than 45 degrees. Light from

fixtures angled between 45 and 90 degrees will shine into the eyes of visitors, either directly or as a reflection off a display case or frame. Fig. 5 illustrates the optimum distances from a wall to mount lighting track for various ceiling heights.

If you are designing a new exhibit space, consider installing a ceiling grid of track to maximize lighting possibilities. This way, lights can be not only mounted around the perimeter of the room, as described above, but also suspended from the ceiling in the middle of the room. Such a grid system enables you to light artifact cases or platforms anywhere on the floor of the exhibit gallery without shadows or glare.

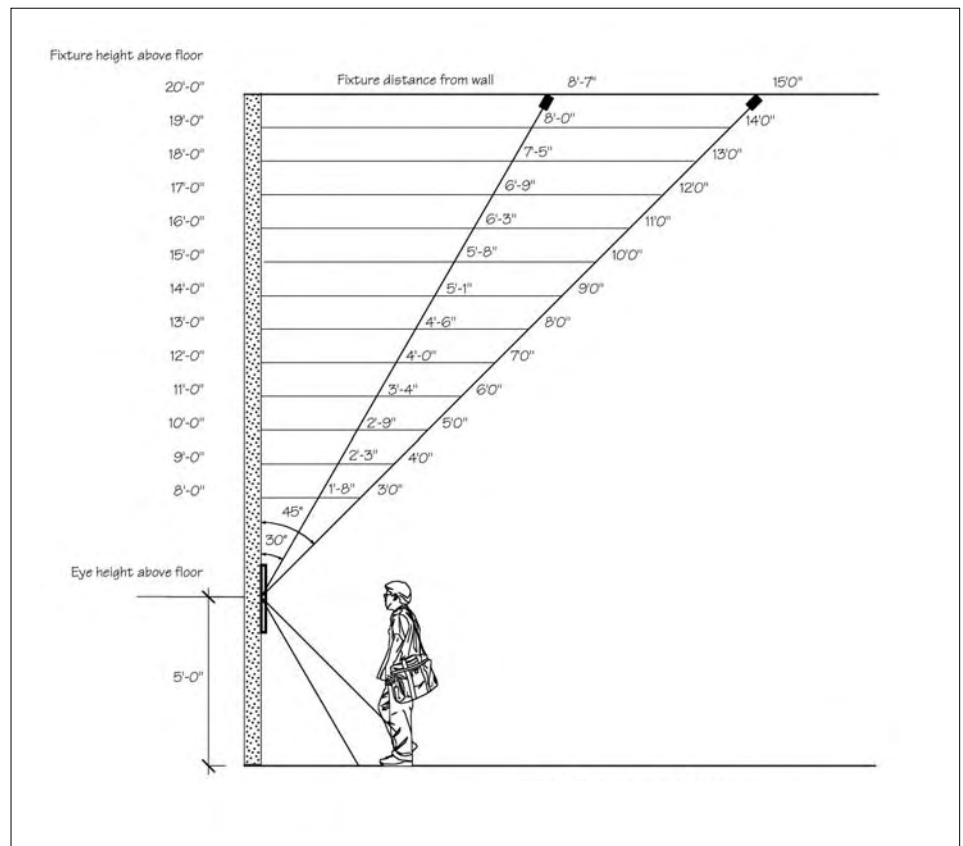


Fig. 5: The optimum distance from a wall for mounting track lights depends on ceiling height. To avoid glare and shadows, angle lights between 30 and 45 degrees.