

Snapshots

LIGHTING FOR MULTIMEDIA AUDITORIUMS

Demonstration and Evaluation of Lighting Technologies and Applications ▲ Lighting Case Studies

Multimedia auditoriums in schools are designed to support many activities. This publication evaluates two basic lighting strategies for these spaces.

Application Profile

The Farnsworth Technology Center (FTC) is the pride of Mohonasen High School in Rotterdam, NY. Completed in January 2000, this 4350 ft² (404 m²) auditorium can accommodate an audience of up to 180 people and can be set up for community meetings, videoconferencing, and multi-media training classes.

When used for community meetings the audience in the FTC directs their attention to a panel of speakers seated at tables arranged as required in the front of the room.

When used for video presentations, the audience typically directs their attention to either a single speaker at the podium, a large rear-projection screen, or one of three video monitors located beside the projection screen. The screen and monitors can show the audience images from multiple video sources, including three aimable cameras located in different parts of the auditorium. The speaker can view two additional monitors that hang from the center of the ceiling. These monitors are concealed from the audience by a wedge of acoustic ceiling material.

This windowless auditorium has mostly medium- to light-colored surfaces in order to minimize luminance contrast between speakers and background. DELTA measured surface reflectances as ceiling (90%), tables (50%), walls (30-60%), seats (8%), and carpet (20%).

The lighting system in the FTC provides considerable flexibility in light levels and distribution. Of the many different lighting conditions that could have been set up in the FTC auditorium, DELTA chose to



Farnsworth Technology Center
Mohonasen High School
Rotterdam, NY

evaluate two basic strategies for lighting multimedia auditoriums, as well as demonstrate how these basic strategies might need to be modified to meet the objectives below.

Lighting Objectives

- Render speakers' facial features in a flattering manner.
- Make the space look pleasant.
- Provide illumination for audience members to read and take notes.
- Provide illumination for speakers to see their audience.
- Minimize illuminance and reflections on the FTC's projection screen and monitors so both audience and speaker can see the displayed images.

Strategy 1: Direct Lighting

Some specifiers may consider using direct lighting as a basis for lighting a multimedia space. One benefit of this approach is that light is delivered efficiently to horizontal planes such as work surfaces and tables to allow the audience to take notes. Another benefit is that the downward light distribution does not spill onto the projection screens and monitors and wash out images.

However, in order to meet all the lighting objectives, additional vertical illumination may be necessary on peripheral walls to prevent a cave-like appearance.



**Direct lighting
(looking toward front)**



**Direct lighting, without wallwashing
(looking toward rear)**



**Direct lighting, with wallwashing
(looking toward rear)**



**Direct lighting,
without accent lights
(speaker at podium)**



**Direct lighting,
with accent lights
(speaker at podium)**

Additional accent lighting on the speaker may also be necessary to highlight the speaker's face. Care should be taken with the positioning and aiming of this accent lighting to avoid reflections from projection screens and monitors, as well as glare in the speaker's eyes.

Strategy 2: Indirect Lighting

Other specifiers might consider using indirect lighting as a basis for lighting a multimedia space. One benefit of this approach is that it minimizes shadows on people's faces and makes the space look less cave-like than direct lighting. However, light reflected diffusely from the ceiling tends to wash out images on projection screens and monitors. Specifiers should avoid indirect lighting in areas near projection screens and monitors, either by controlling these luminaires separately or by excluding them from the design entirely.



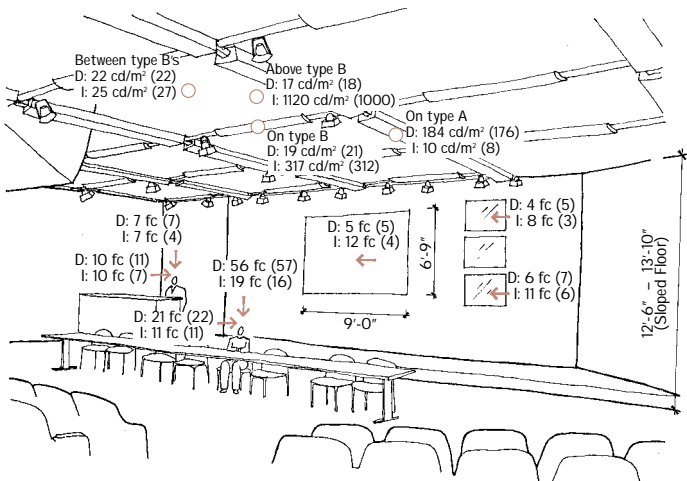
Indirect lighting
(looking toward rear)



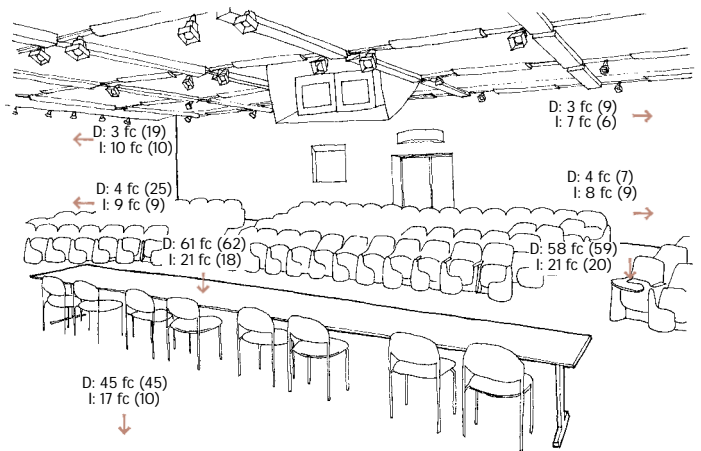
Indirect lighting, with washed out images
(looking toward front)



Indirect lighting, luminaires nearest to screen turned off
(looking toward front)

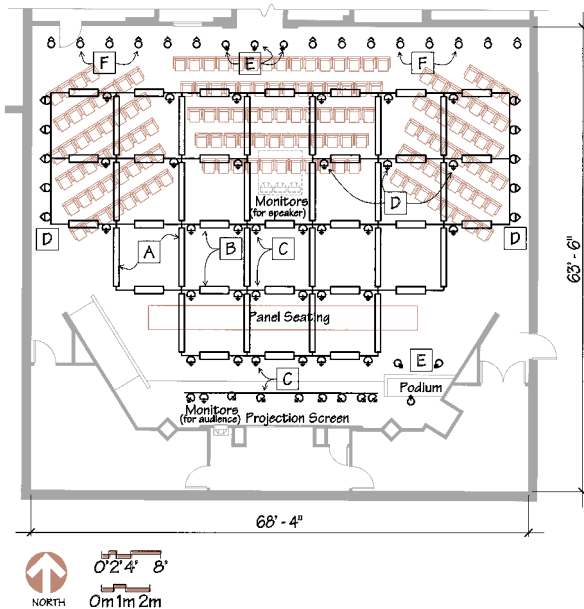


Perspective of FTC, looking towards front
(Photometric measurements under direct lighting indicated with "D" and indirect with "I"; Improvement options indicated in parentheses)



Perspective of FTC, looking towards rear
(Photometric measurements under direct lighting indicated with "D" and indirect with "I"; Improvement options indicated in parentheses)

Either of these two basic strategies can work, but each may require modifications in order to meet all the lighting objectives of the project. As implemented at the FTC, a combination of indirect and direct lighting strategies may be most appropriate for multimedia auditoriums, particularly when used with a control system that allows lighting in different areas to be dimmed or switched over a wide range. Preset scenes with different lighting configurations make controls simple to use.



Specifications

- A** Track-mounted direct light, 8' (2.4 m) long, with two linear fluorescent lamps in cross section.
Lamps: (4) F32T8XL/735 per luminaire
- B** Track-mounted indirect light, 4' (1.2 m) long, with two linear fluorescent lamps in cross section.
Lamps: (2) F32T8XL/735 per luminaire
- C** Track-mounted adjustable incandescent accent luminaire with barn door glare shields.
Lamp: 250PAR38/FL/Halogen
- D** Track-mounted adjustable accent luminaire.
Lamp: 90PAR38/FL/Halogen
- E** Recessed adjustable accent luminaire.
Lamp: 75PAR30/FL/Halogen
- F** Recessed incandescent wallwasher.
Lamp: 100 W A19

Lessons Learned

- A direct lighting strategy requires additional treatment of vertical surfaces, such as walls and/or accent lighting on speakers.
- An indirect lighting strategy needs to be controlled in the vicinity of projection screens and shiny monitors.
- Accent lighting can cause reflected glare on projection screens and monitors when aimed forward unless care is taken with the location and shielding of the lighting and monitors.

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Issue 12

Lighting for Multimedia Auditoriums
Farnsworth Technology Center (FTC),
Mohonasen High School

Site Sponsor: New York State Energy
Research and Development Authority
(NYSERDA)

November 2001

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DELTA Snapshots are independent evaluations of
lighting applications designed to guide the effective
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ISSN 1075-3966

Printed on recycled paper