

Part 3b: Redesign of Corner Dance Studio 248

Corner Dance Studio 248

General Description: See Fig

- Corner studio, 20ft ceiling
- Space is used for dance classes and small recital performances

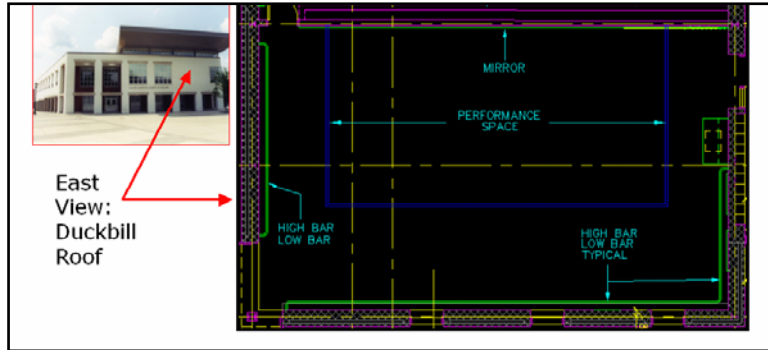


Figure 44: Plan View of Dance Area and Facade



Figure 45: Picture of Dance room from entrance looking East

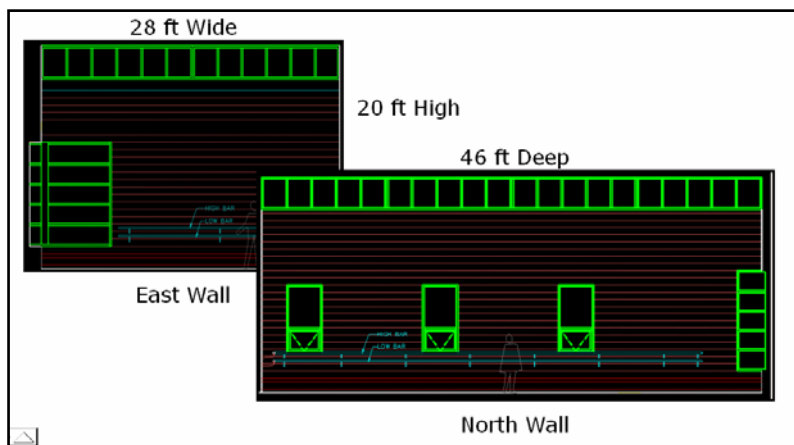


Figure 46: Elevations of North and East Walls

There are two different types of lighting systems that will be needed in the dance studio space. There are several dance rooms on this floor, and this is the only space used for small recitals, so it will be assumed that the performance lighting is a main use of the space. This recital performance lighting will be the central focus of the lighting design, but there also must be a secondary lighting design that will cater to the dance classes that also use the space.

The general lighting design for the studio must provide high visual clarity and a comfortable contrast for dance lessons and the performance of other visual tasks. Also, the lighting design must be sensitive to the amount of glare in the room due to the many specular and reflective surfaces such as the wall of mirrors and windows.

Design Criteria:

- Create two possible lighting systems
 - Performance lighting: small recitals
 - General lighting: dance classes
- Performance Lighting
 - High visual clarity: 50fc min for horizontal surfaces (dance floor), 30 fc min for vertical surfaces (dancers)
 - Good facial rendering
- Dance Class Lighting
 - Visual clarity: 30-40 fc min for horizontal surfaces (dance floor), 30 fc min for vertical surfaces (walls and dancers)
 - Provide necessary daylight controls to integrate daylight with electric light

Design criteria based on suggested quality and systems performance:
IESNA Lighting Design Guide in IESNA Lighting Handbook

Design Concepts:

1. Performance lighting created with direct/indirect lighting system to give good facial rendering and also blend into the architecture of the space (system of recessed fixtures and coves).
2. Dance class lighting created with a combination of daylight and switching capabilities of performance lighting.

Fixture Schedules and Light Loss Factors:

Corner Dance Studio 248

Fixture Type	Description	Manuf.	Cat #	Lamp	Ballast	Controls	Qty	Watts Fixture	Total Watts
G1	Recessed 4ft 32W T8 Linear Fluorescent.	Selux	M1R1-1T8-RW- SG-004-WH-120	(1)F32T8/T L835/ALTO PLZ	RCN-132- MC@120V	1-way switching.	37	30	1110
H1	Recessed 4ft 32W T8 Cove.	Elliptipar	F-305-T32-S-00- 1-00-0	(1)F32T8/T L835/ALTO PLZ	RCN-132- MC@120V	1-way switching.	18	30	540
								TOTAL WATTS	1650
								POWER DENSITY	1.2 W/ft²

Luminaire LLF Table							
Label	BF	LLD	LDD	Cleaning Interval	Maint. Category	RSDD	Total LLF
G1	0.98	0.95	0.92	9 months	4	0.97	0.83
H1	0.98	0.95	0.88	9 months	6	0.89	0.73

Equipment Used: See Appendix 1—Cut Sheets

Layout:

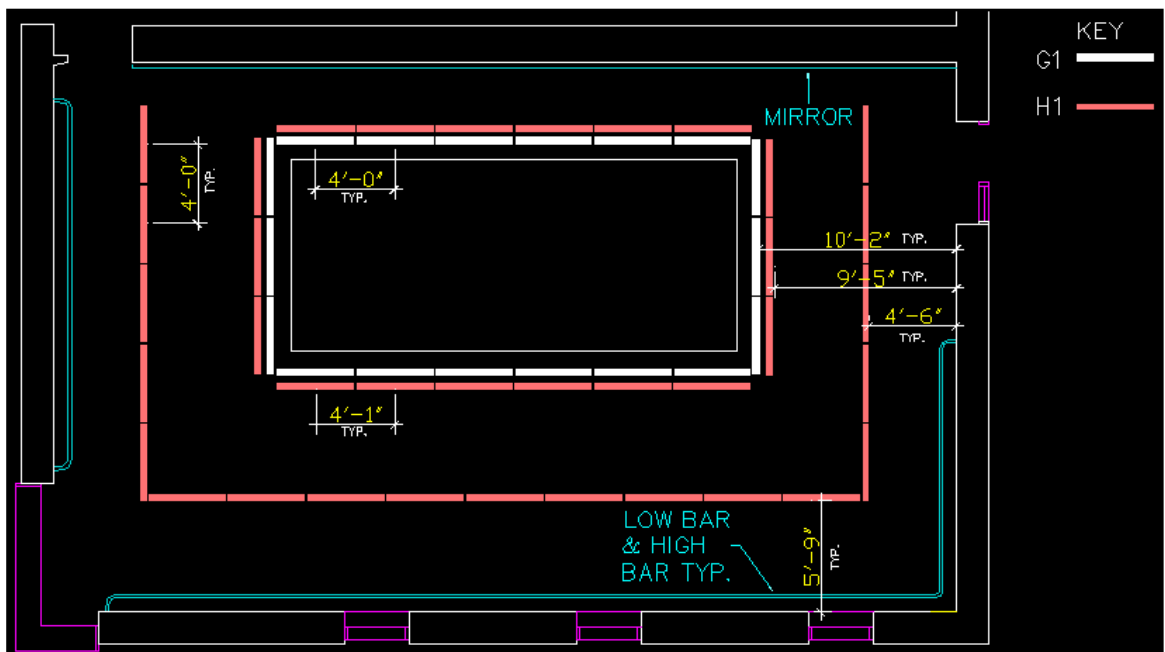
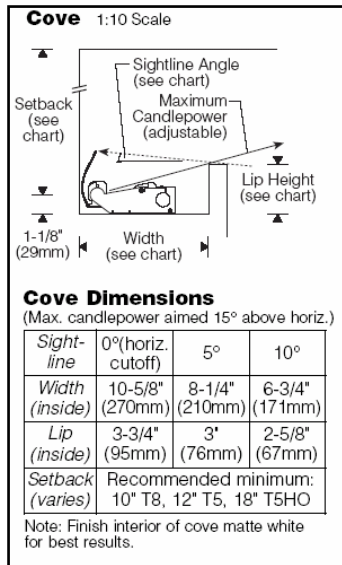


Figure 47: Plan View of Dance Room

Cove Details



The inner cove measures 23ft x 10ft (length and width). The cove details were sized based on the fixture manufacturers recommended dimensions. The sight-line angle of 5 degrees was assumed to be conservative so therefore the cove width was made to be 8-1/4" and the lip was made to be 3" in height. The setback used was 18" with a minimum of 10" recommended.

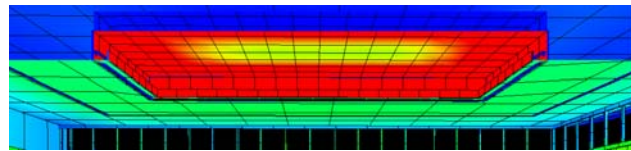


Figure 48: Section of Cove in AGI32

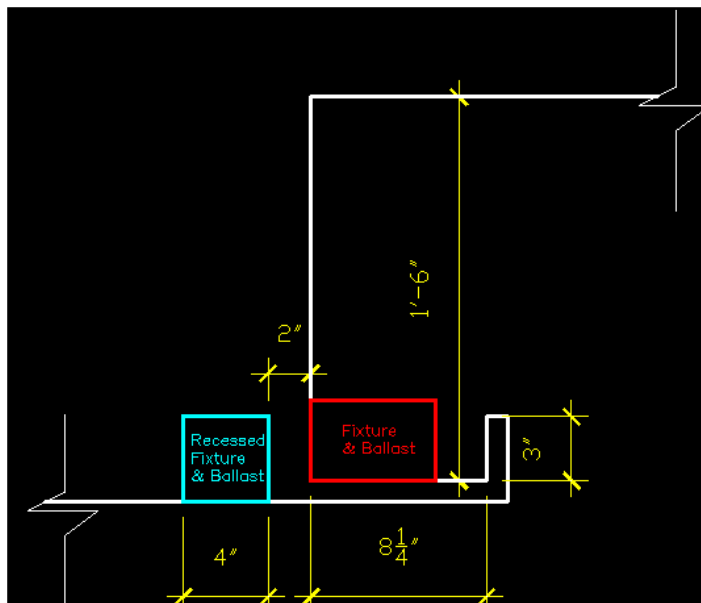


Figure 49: Cross section of Cove

Circuiting and Controls:

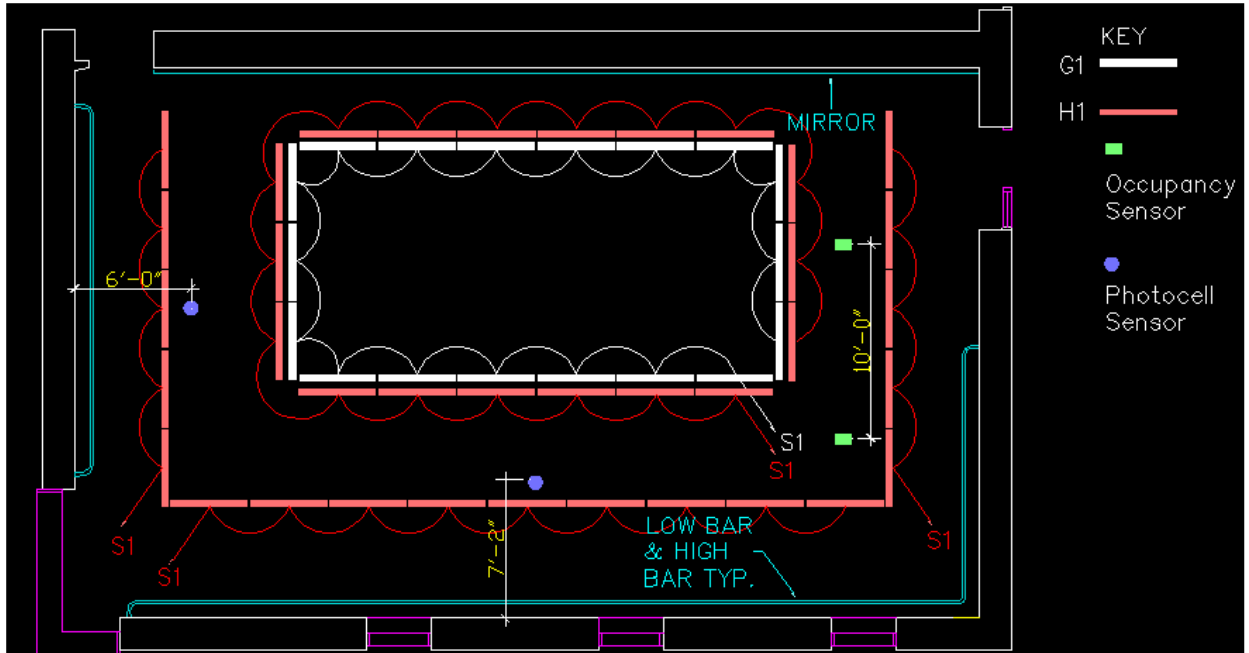


Figure 50: Plan View of Dance Room with Circuiting

Switch 1: Outer Recessed 32W T8
 5 Fixtures * 0.25 Input Amps/Fixture = 1.25 A Total on LP4E, 24

Switch 2: Outer Recessed 32W T8
 5 Fixtures * 0.25 Input Amps/Fixture = 1.25 A Total on LP4E, 26

Switch 3: Outer Recessed 32W T8
 9 Fixtures * 0.25 Input Amps/Fixture = 2.25 A Total on LP4E, 28

Switch 4: Inner Recessed 32W T8 (Right beneath cove)
 18 Fixtures * 0.25 Input Amps/Fixture = 4.5 A Total on LP4E, 29

Switch 1: Inner Cove 32W T8
 18 Fixtures * 0.25 Input Amps/Fixture = 4.5 A Total on LP4E, 30

In order to comply with ASHRAE 90.1, placing 2 occupancy sensors on the ceiling will provide an automatic shut-off for all lights in the room. Novitas Two-Way Room Sensor Model # 01-BAS320 is used. A relay and transformer is required. 1VA max for each sensor. 8 VA max for each relay. See Appendix 1 for cut sheet.

In order to provide control of daylighting systems in the space, 2 photocell sensors were mounted on the ceiling (recessed to avoid direct view of electric light). When the daylight

levels lower enough to darken the outer area, the outer rows of recessed lights will automatically switch on. A controller and switchpack is required. Switchpack is 15VDC and controller is powered by the switchpack. Novitas 01-PCI sensor is used with Controller 02-PCC.

Analysis of Systems:

Scene 1: General Dance Class Lighting

This is the scene that will provide general dance class lighting. It will combine direct light (recessed 32W T8) and indirect light (cove) in order to get good facial rendering and reach the required light levels for the task of dancing. In order to provide the most even amount of light on the floor, the inside set of recessed direct fluorescents should be switched off.

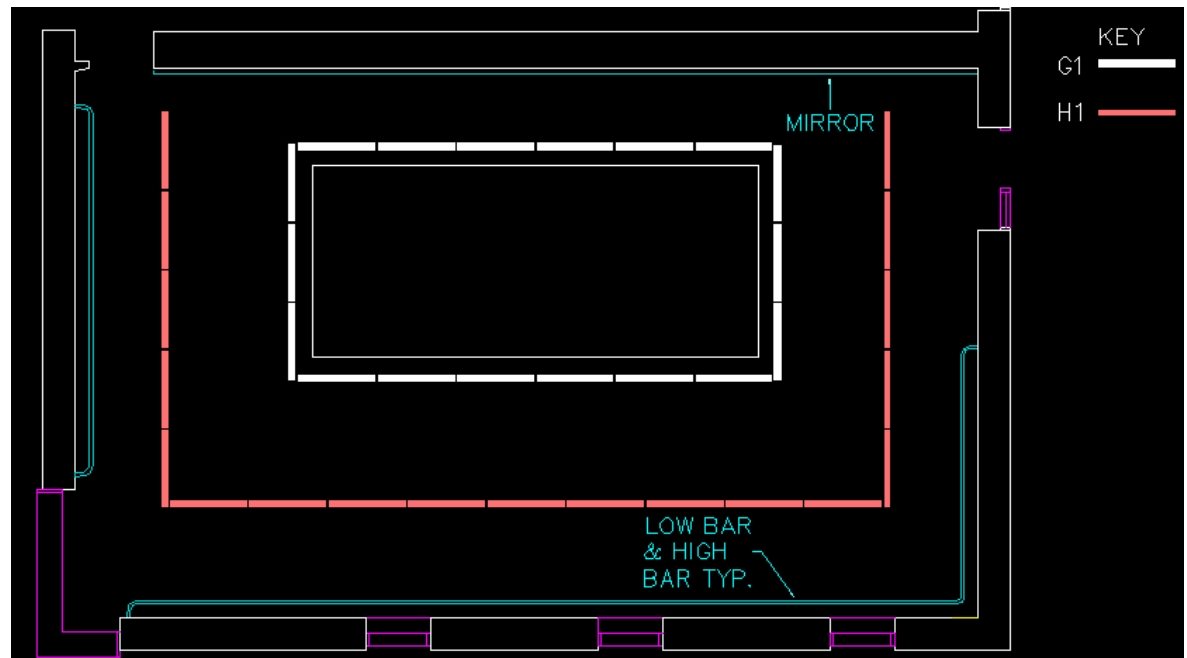


Figure 51: Scene 1 Plan View of Dance Room

Scene 2: Performance Lighting

Since this space has a primary purpose as a small recital space, the layout of the fixtures was based on flexibility to provide performance lighting. This lighting includes the cove (both direct and indirect component), which is off center towards the back of the space in order to create a pseudo "stage" which will allow parents and viewers to sit along the edges of the room during performances. The direct (recessed fluorescent) and indirect (fluorescent cove) lighting combines to provide good facial rendering and sufficient light levels for performances.

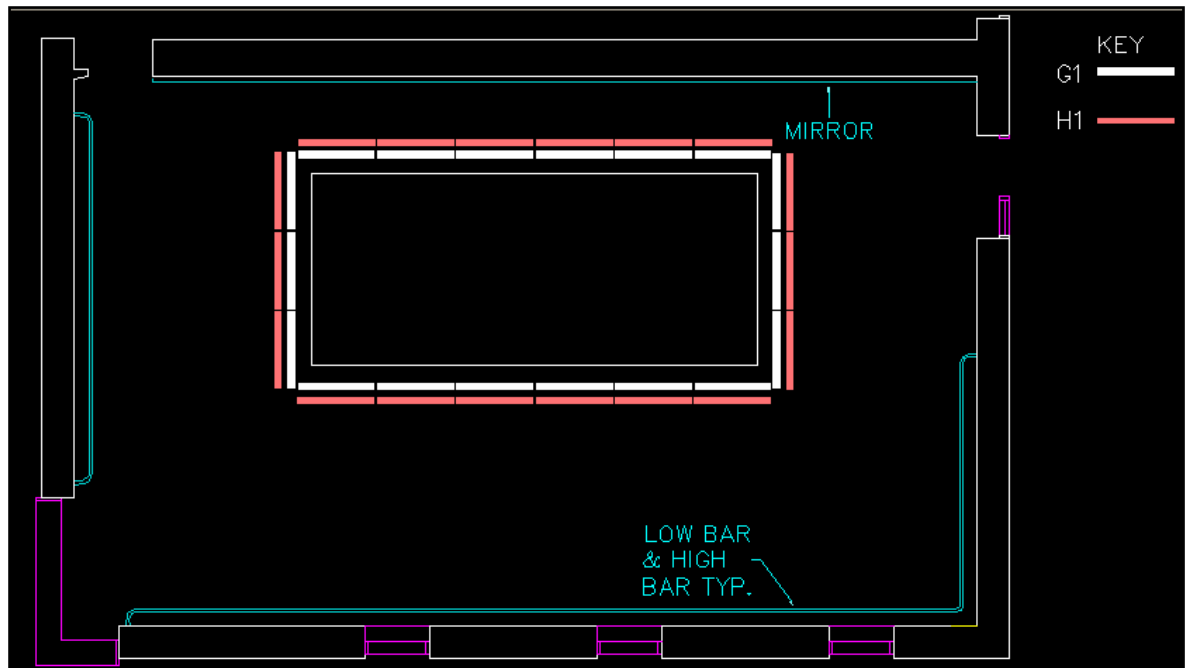


Figure 52: Scene 2 Plan View of Dance Room

Other Scenes:

The recessed fluorescent fixtures on the outer part of the room are placed such that they will be able to switch on as the daylight levels in the space decrease below sufficient light levels for the tasks. This will be done by automatically by use of photosensors in the space. All fixtures may also be switched on during dance classes if more light is desired in the space.

Scene 1 Renderings (Dance Class Lighting):
Inner recessed fluorescents turned off

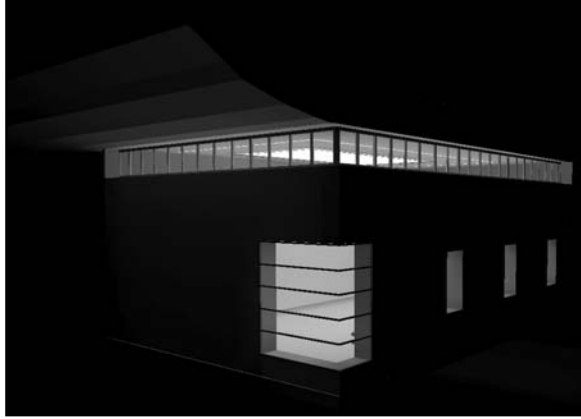


Figure 53: View from outside of glowing ceiling

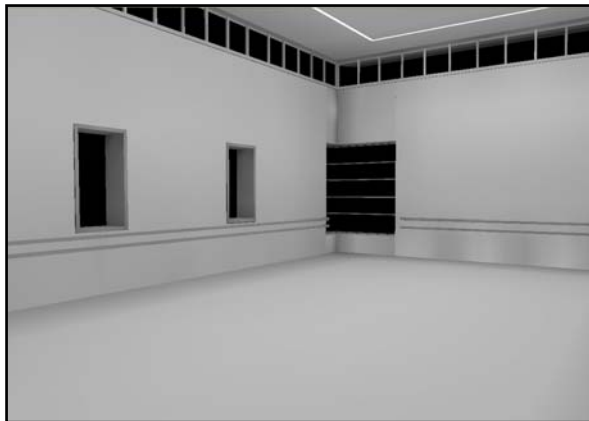


Figure 54: View at eye level entering room (N-E corner)

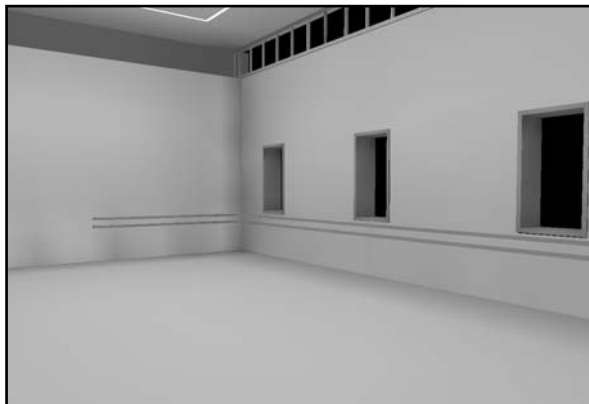


Figure 55: View from dancer's eyes at N-W corner of room

Cherise Rollins
Lighting/Electrical Option
The Learning Corridor, Hartford, CT
Faculty Consultant: Dr. Mistrick
Submission Date: April 2, 2004

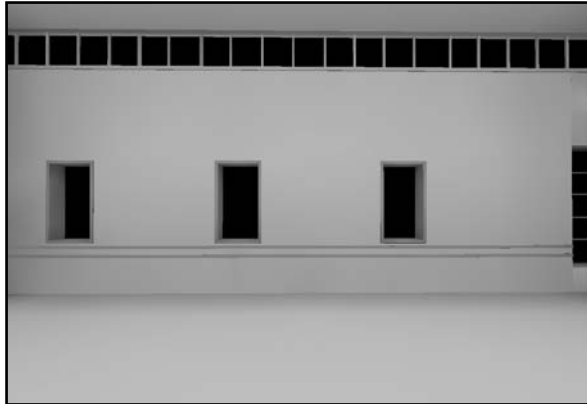
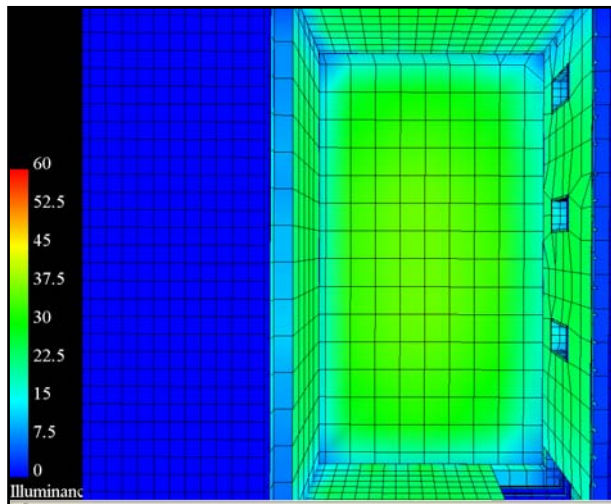
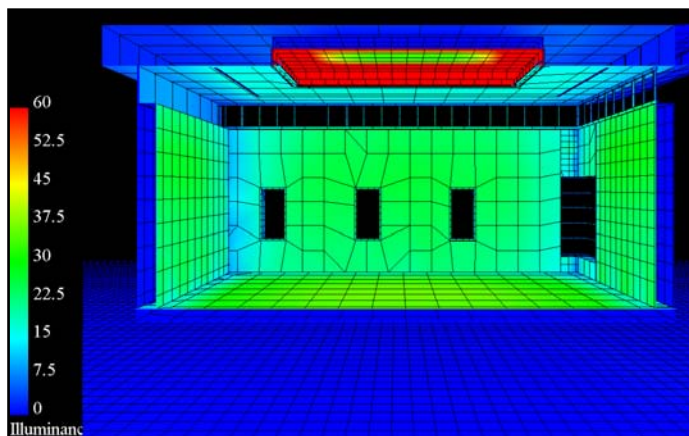


Figure 56: View from dancer's eyes standing at front of room (in front of mirror) looking at North wall

Scene 1 Light Levels (Dance Class Lighting):
Inner recessed fluorescents turned off



Floor: About 30-40 fc
Walls: About 20-30fc



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Walls: About 25 fc
Ceiling: About 15 fc

Scene 1 Renderings (General Dance Class Lighting): All Fixtures ON

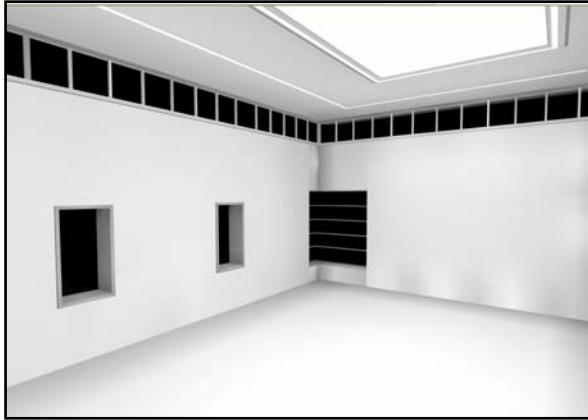
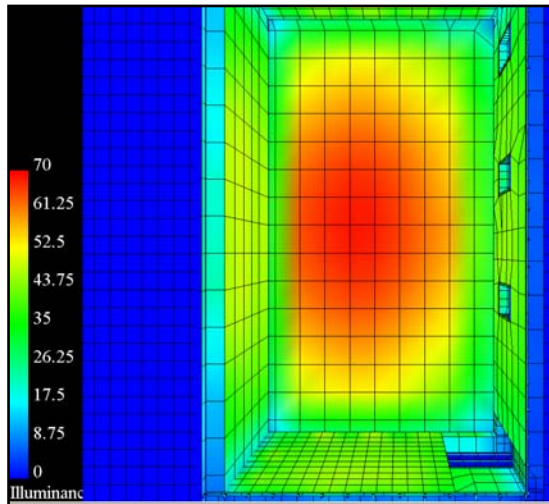


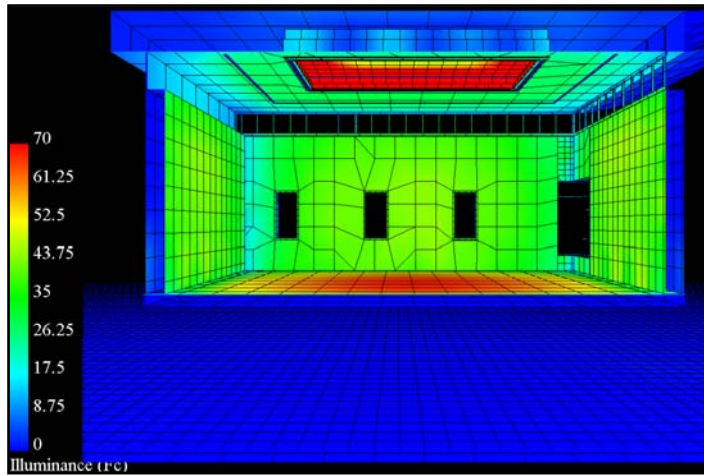
Figure 57: View from door entrance at eye level

Scene 1 (Dance Class Lighting) Light Levels: All Fixtures ON

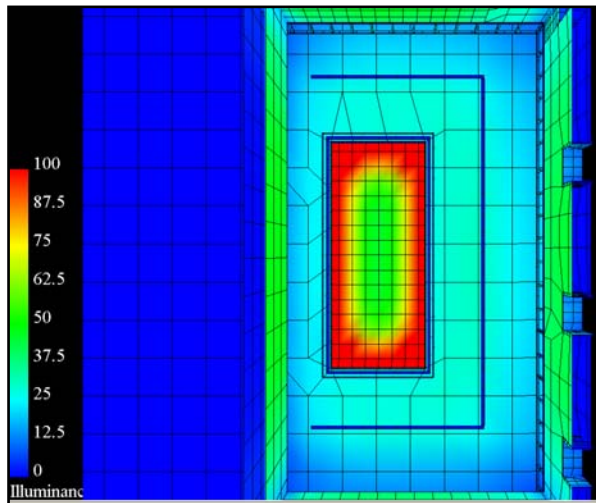


Performance area Floor: Ave of 50-60 fc in that area,
Floor: Minimum of 35 fc
Walls: Ave of 35 fc

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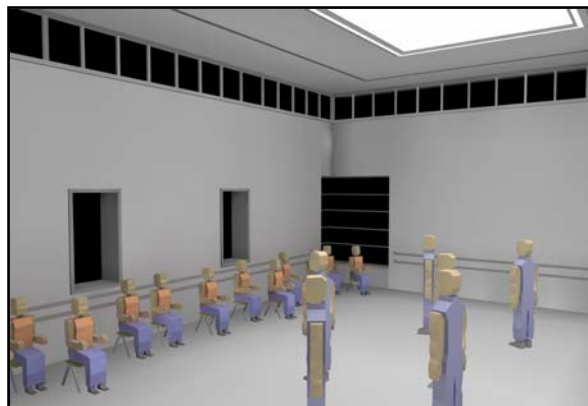


Walls: Ave of 25-35 fc



Cove: About 50-100 fc in coves
Ceiling: About 25 fc everywhere else on ceiling

Scene 2 Renderings (Performance Lighting):
Only inside recessed fluorescents and cove ON



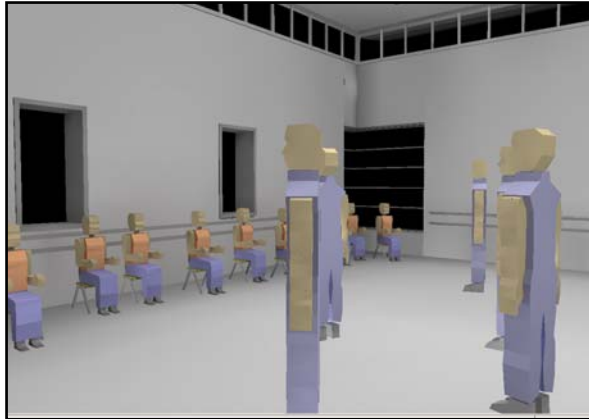


Figure 58: A Dancer's view during performance (eye level) looking N-E

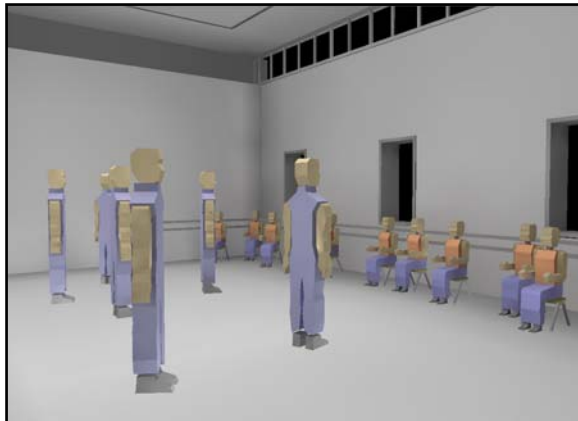


Figure 59: Dancer's view during performance (eye level) looking N-W

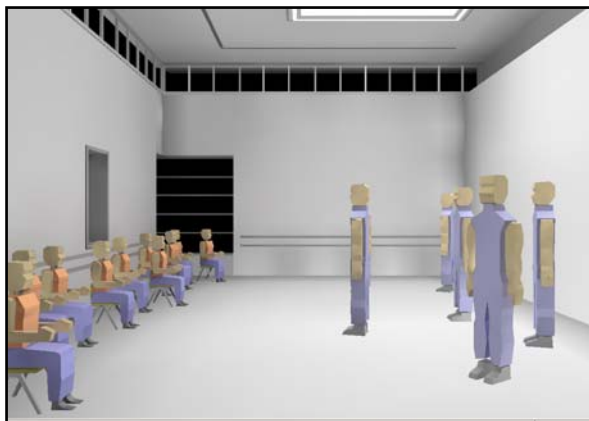


Figure 60: View at eye level looking East (performance area highlighted)

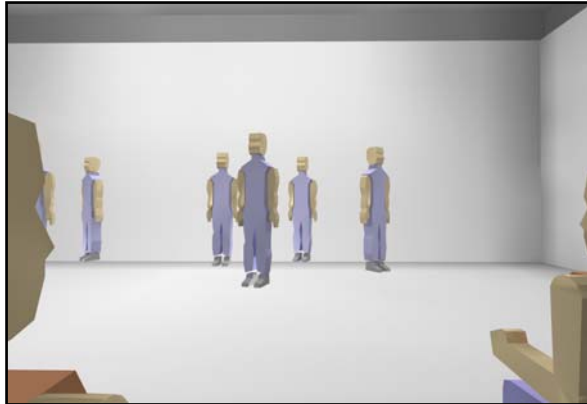
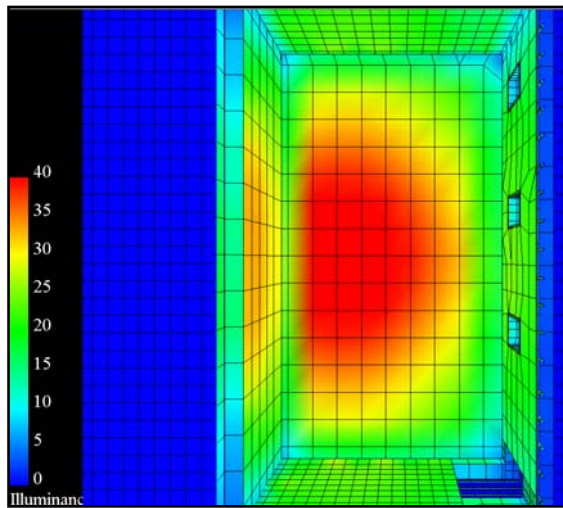
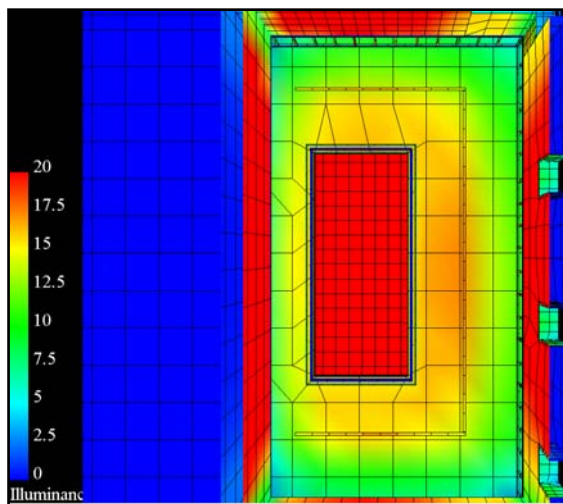


Figure 61: Performance view of parents sitting (eye-level)

Scene 2 (Performance Lighting): Only inside recessed fluorescents and cove ON



Floor: About 40 fc in performance area, 15 fc min around perimeter
Walls: About 20 fc



Ceiling: About 15 fc min above performance area (max of 100 fc),
About 10 fc on perimeter part of ceiling

Conclusions:

The proposed lighting design for the dance room satisfies the design goals and criteria established for the space. The designs create an atmosphere that will serve the needs of the space as a performance room for small recitals and also the needs for it to hold dance classes on a daily basis. The designs also integrate efficient daylight control with the use of stepped switching connected to photocell sensors. The design also supports the building metaphor because it makes a *connection* to the surrounding community at night by illuminating the ceiling with the cove and allowing that bright surface to be viewed through the clerestory windows.

The designs also satisfy the power density requirements established by ASHRAE/IESNA Standard 90.1. The dance space had about 1.2 W/ft² which is under the 1.4 W/ft² maximum for gymnasium and exercise rooms. The space also conforms to automatic control requirements by using occupancy sensors that will shut the lights off when the room isn't in use.