INTRO

In October of 2016, David Raver with MODUS Engineering did an assessment of the existing dimming system and lighting controls in the auditorium. At that time, only the lighting control console in the lighting booth needed to be upgraded/ replaced to continue to provide the school with a working auditorium. A gently used lighting console was located and purchased by the school and continues to remain in operation.

Subsequently, this past spring the auditorium fell victim to several electrical surges – either from lightning or from the local utility that knocked one of the memory cards in the dimming system. MODUS analyzed this problem and was able to determine a replacement option. The school ordered a new memory card (CARD "C") for the dimming rack and was successfully installed by MODUS. As a result, all of the lights continue to work normally – dimming by either the lighting control system or the house light controls.

In testing the dimming system, however, MODUS observed many deficiencies in the existing lighting systems. Some are just maintenance issues, however, there were multiple safety concerns as well that are documented within this report. With the dimming and controls now appearing to be operating satisfactorily, the focus now needs to be on the lighting fixtures themselves in hopes of providing a better illuminated performance area that is also safe to maintain and adjust as the needs of the auditorium change in the future.

SECTION 1: THEATRICAL LIGHTING

There are multiple generations and types of theatrical lighting fixtures currently in use in the auditorium. The following is a general assessment of each type:

TYPE #1 - FRONT LIGHT (located above the ceiling clouds over the audience) – QTY=12

- - FIXTURES:
  - 1950s era ellipsoidal. 1000w/ ea. Very narrow spot distribution.

- - CONCERNS:
  - Several fixtures "out of commission" due to missing pieces
  - Fixtures still using asbestos insulated cords
  - Focus (beam spread) is too narrow for the location of the fixtures

1. Several Fixtures unusable

2. Asbestos

3. Mounting condition

Image shows front light mounting location and only one of every six fixtures working.

TYPE #2 - FRONT LIGHT (located on the side torm locations near the rear of the auditorium) – QTY = 8

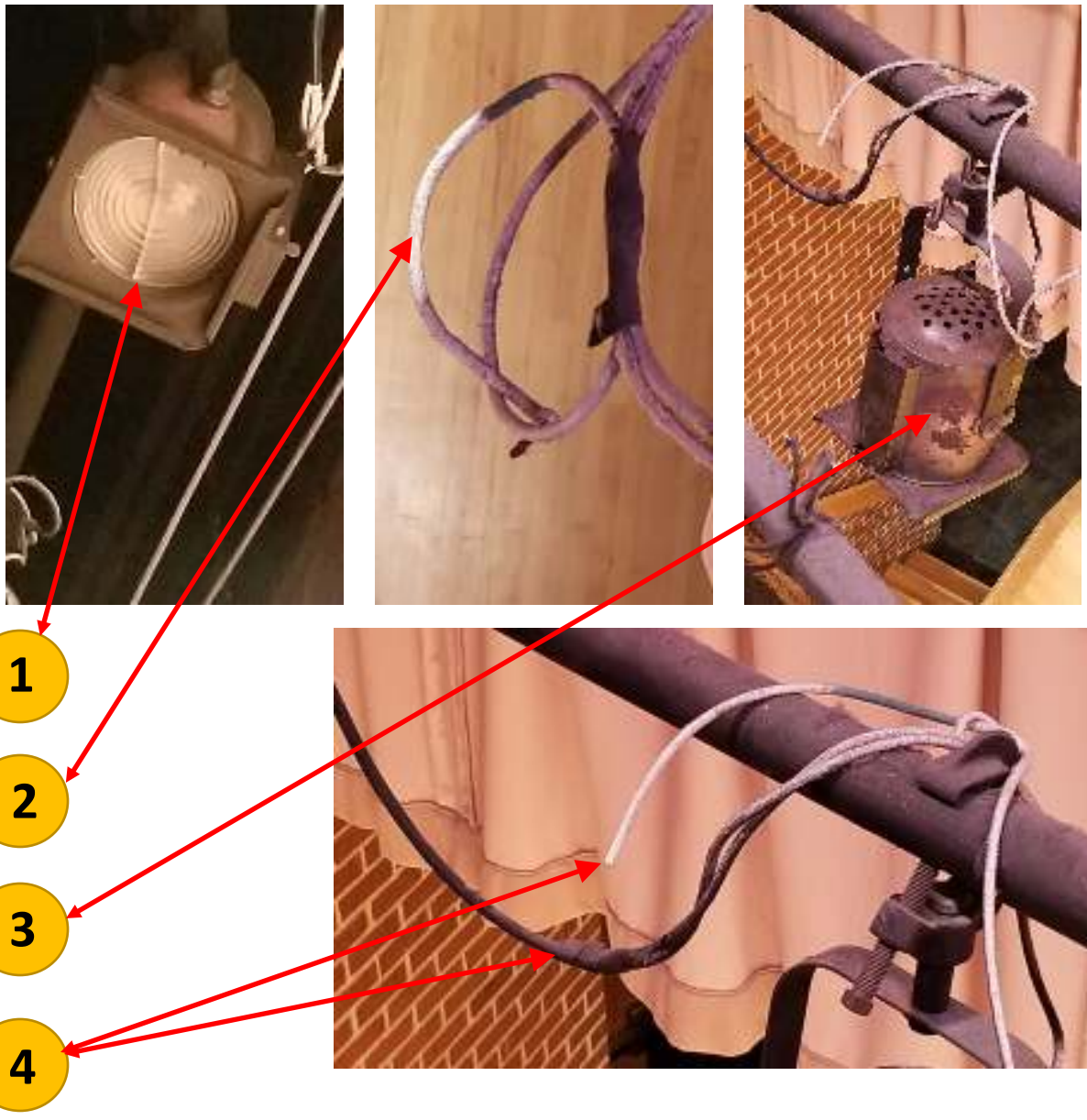
- - FIXTURES:
    - 1980s era ellipsoidal. 1000w/ ea. Variable focus (zoom) distribution.

- - CONCERNS:
    - Fixtures haven't been maintained.
    - Lamps have been replaced – but not put into correct focal point locations for the brightest results/ focus of the instrument

TYPE #3a – TOP/ AREA LIGHT (located on the battens mounted above the stage) – QTY = 10

- - FIXTURES:
    - 1970s era Fresnel's. 500w/ ea. Variable focus distribution.

- - CONCERNS:
    - Multiple fixtures observed with broken glass lenses (1)
    - Fixtures use asbestos insulated cords (2)
    - Many housings showing significant corrosion (3)
    - Ground wires have been cut and taped back together (4)



TYPE #3b – TOP/ AREA LIGHT (located on the mid-stage batten mounted above the stage) – QTY=16

- - FIXTURES:
    - 1980s era Fresnel's. 500w/ ea. Variable focus distribution.

- - CONCERNS:
    - None. Still in decent condition.
    - Fixtures have rubberized insulation and tight connectors.

TYPE #4– BORDER LIGHTS (located on the downstage batten mounted (high) above the stage)

- - FIXTURES:
    - 1950s era 4-color border lights w/ glass rondel lenses (red, green, blue, white)

- - CONCERNS:
    - Fixtures are of minimal use (very dim – mounted above curtains)
    - Utilize "A" style lamps that have very short life
    - Permanently wired into conduit system back to dimmers.
    - Rigging needs to be inspected/ reviewed. Several jack-chain loops seem to be opening or have been damaged.
    - At least (21) lamps were burned out during inspection period



TYPE #4– BACKDROP LIGHTS (located on the upstage batten mounted above the stage) – QTY =16

- - FIXTURES:
    - 1960s era “scoop” style floodlight. 1000w/ ea.

- - CONCERNS:
    - Fixture condition is ok.
    - Not a useful fixture.
    - 1000w lamps create a lot of heat and waste energy

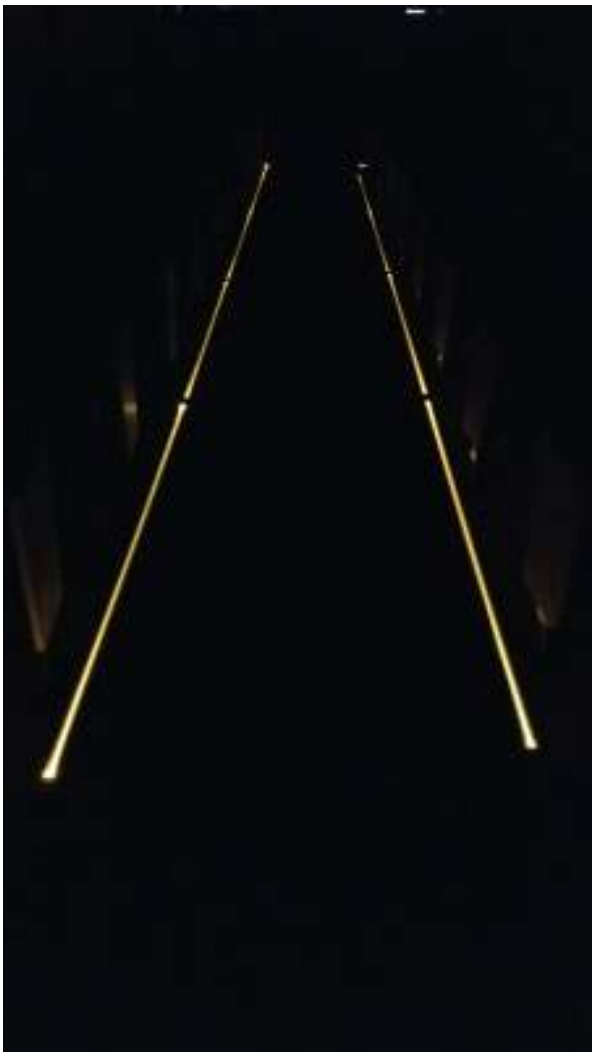
SECTION 2: AISLE LIGHTING

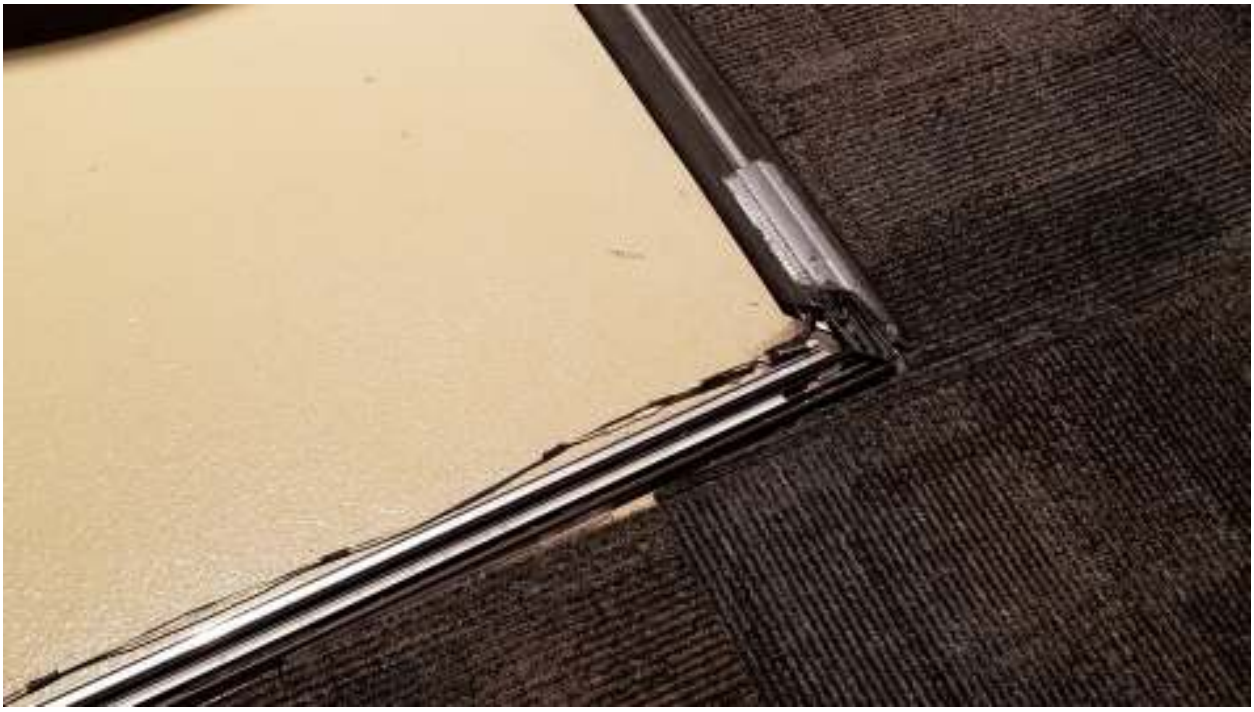
Aisle lighting has been in dis-repair for some time. The existing lighting is a low-voltage fiberoptic type system w/ a single amber colored LED at the end of each section. Low-voltage transformers are shown to be located under the stage and in a back-storage room according to drawings created when the product was installed in 2005.

CONCERNS –

1. Fixtures all have to be replaced. Re-wiring may be difficult.

2. "Runway" lighting systems do not meet current code. NFPA 101 Section 7.8.1.3(3) states that *"In assembly occupancies, the illumination of the walking surfaces of exit access shall be at least 0.2 foot-candles during periods of performances or projections involving directed light."* The "runway" type lighting systems do not provide ANY useable light on the floor surface – only identifying a path.





SECTION 3: HOUSE LIGHTING

House lighting, in general, appears to be in good condition. Ignoring the fact that multiple fixtures were burned out at the time of MODUS' visit, all of the fixtures that were on responded to the dimming system and were observed dimming up and down with the use of the slider station in the control room.

Future maintenance on the fixtures needs to include verification that the correct lamps are being used. Clear shielded lamps appear to have been used in several locations resulting in "hot spots" directly below the fixtures. All of these lights should use a frosted outer envelope to smooth out the light so that the auditorium in general is more uniformly lit.

Other light sources – like the wall sconces, also appear to be in good operating condition. Again, these lamps should be checked to ensure that the desired wattage and effect is being utilized as originally intended.

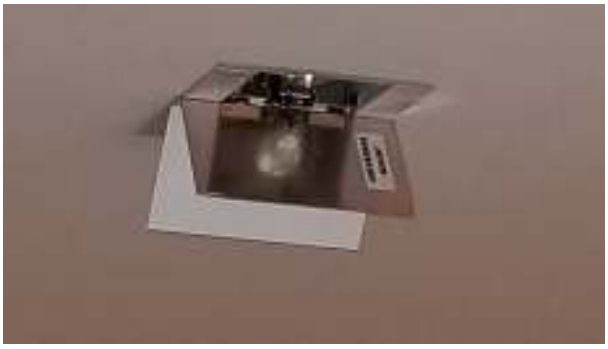
SECTION 4: DIMMING AND DISTRIBUTION

The distribution (plugs and outlets) currently in use appear to be mostly original components dating from the 1950s. Although, most appear to be in working order, MODUS recommends that a trained electrician open several receptacles and review the condition of the wiring inside of the raceways back to the dimming panel. The connectors are all LM-20 twist-lock style plugs and receptacles that are not widely used any more in theatrical systems.

Although the dimmers are mostly still operating, they are an antiquated style and may not be capable of operating new LED fixtures should the existing fixture inventory be replaced in the future.

SECTION 5: EMERGENCY/ EGRESS LIGHTING

The aisles currently appear to be lit with a "conceal light" style fixture that utilizes small MR16 type lamps concealed behind a fixture w/ (2) spring loaded doors. Once a fire-alarm is activated, these fixtures "pop" open to illuminate the path of egress. Based on our observations, either someone never reset the fixtures after the last fire alarm (shut the doors) – or there are two fixtures that malfunctioned and never opened. It is highly recommended that this system be tested to ensure compliance with codes in case of a real emergency.



Emergency Light w/ doors open

Emergency Light w/ doors closed

There are other emergency lights in the auditorium which appear to be connected to a remote battery system. One (1) exit sign (house left entry) was also observed to not be functioning which is a code violation. Again, these systems should be tested regularly as required by the code.

SECTION 6: OTHER SYSTEMS

Other systems were observed to be in need of replacement as well:

1) **CURTAINS** – Most of the curtains were covered in dust and appeared to have not been replaced in sometime. Original fireproofing applied to these fabrics will have worn off- creating a fire hazard on the stage. Webbing is frayed and tie lines are disintegrating as the ropes dry out. Curtains should get new fireproofing applied by a licensed professional or replaced completely.

2) **STRUCTURAL/ RIGGING** – Many of the existing pipes, electrics and other stage mechanics are all supported by chain and clamps. Considerable drift, tilting and movement can be seen as referenced by the images below. A certified rigging inspector needs to be retained to inspect all of this to ensure a safe area over the stage.

3) **FOLLOW SPOTS** – Follow spots should be replaced with a newer/ quieter version due to their location in the auditorium and proximity to the audience.

EXISTING DIMMING SYSTEM CONNECTIONS

DIMMER	FUNCTION	DIMMER	FUNCTION	DIMMER	FUNCTION
1	FRONT LIGHT	45	BORDER LIGHT – WHITE ½	89	HOUSE LIGHTS
2	FRONT LIGHT	46	SECOND ELECTRIC	90	HOUSE LIGHTS
3	FRONT LIGHT	47	SECOND ELECTRIC	91	HOUSE LIGHTS
4	FRONT LIGHT	48	SECOND ELECTRIC	92	HOUSE LIGHTS
5	FRONT LIGHT	49	SECOND ELECTRIC	93	HR – FRNT SCONCES
6	FRONT LIGHT	50	SECOND ELECTRIC	94	HOUSE LIGHTS
7	FRONT LIGHT	51	SECOND ELECTRIC	95	HOUSE LIGHTS
8	FRONT LIGHT	52	SECOND ELECTRIC	96	HOUSE LIGHTS
9	FRONT LIGHT	53	SECOND ELECTRIC		
10	FRONT LIGHT	54	THIRD ELECTRIC		
11	FRONT LIGHT	55	THIRD ELECTRIC		
12	FRONT LIGHT	56	THIRD ELECTRIC		
13	HOUSE LEFT TORM	57	THIRD ELECTRIC		
14	HOUSE LEFT TORM	58	THIRD ELECTRIC		
15	HOUSE LEFT TORM	59	THIRD ELECTRIC		
16	HOUSE LEFT TORM	60	THIRD ELECTRIC		
17	HOUSE RIGHT TORM	61	THIRD ELECTRIC		
18	HOUSE RIGHT TORM	62			
19	HOUSE RIGHT TORM	63			
20	HOUSE RIGHT TORM	64			
21	FIRST ELECTRIC	65			
22	FIRST ELECTRIC	66			
23	FIRST ELECTRIC	67			
24	FIRST ELECTRIC	68			
25	FIRST ELECTRIC	69			
26	FIRST ELECTRIC	70			
27	FIRST ELECTRIC	71			
28	FIRST ELECTRIC	72			
29	FIRST ELECTRIC	73			
30	FIRST ELECTRIC	74	HL – REAR SCONCES		
31	FIRST ELECTRIC	75	HOUSE LIGHTS		
32	FIRST ELECTRIC	76	HOUSE LIGHTS		
33	FIRST ELECTRIC	77	HR – REAR SCONCES		
34	FIRST ELECTRIC	78	HOUSE LIGHTS		
35	FIRST ELECTRIC	79	HOUSE LIGHTS		
36	FIRST ELECTRIC	80	HOUSE LIGHTS		
37	FIRST ELECTRIC	81	HOUSE LIGHTS		
38	BORDER LIGHT – RED ½	82	HOUSE LIGHTS		
39	BORDER LIGHT – RED ½	83	HOUSE LIGHTS		
40	BORDER LIGHT – BLUE ½	84	HOUSE LIGHTS		
41	BORDER LIGHT – BLUE ½	85	HL – FRONT SCONCES		
42	BORDER LIGHT – GREEN ½	86	HOUSE LIGHTS		
43	BORDER LIGHT – GREEN ½	87			
44	BORDER LIGHT – WHITE ½	88	HOUSE LIGHTS		

SUMMARY: MENU OF ESTIMATED COSTS

1. Replace most of the existing theatrical lighting fixture inventory with LED. At minimum, the dozen front lights and other existing fixtures that utilize asbestos wiring should be scrapped and carefully disposed of based on current regulations.

EST. COST (fixtures + installation) $ 22,000

2. Replace border lights with new LED light bars that will produce a brighter, more saturated type of color mix of light on the stage.

EST. COST (fixtures + installation) $ 8,000

3. Finetune and train staff on lamping and optics on remaining heritage products that are in need of service and/or repair. This would include both theatrical and house lighting systems.

EST. COST (labor fee) $ 1,400

4. Replace floor lighting system with one of two options:

- OP1 = One-for-one replacement with a similar "runway" lighting system. Since it's a one-for-one replacement, the code official may "grandfather" the system in and allow a similar system.

  EST. COST $ 14,000

- OP2 = Replace all linear aisle lighting with individual seat lights.

  EST. COST $ 10,000

5. Update dimmer rack with new panel capable of controlling new LED light fixtures.

EST. COST $ 23,000

6. Update (2) follow-spots to fan-less LED type spots

EST. COST $ 5,600

7. Replace all curtains on the stage/ inspect rigging (by others)

EST. COST $ TBD

8. Additional Consulting

- OP1 - Selection of theatrical fixtures + installation and owner training **$ TBD**

- OP2 – OP1 + Electrical drawings for new steplight/ aisle light systems **$ TBD**

- OP3 – OP1 + OP2 + Electrical drawings for new dimming system **$ TBD**

** All estimates above are based on current manufacturer pricing. Other sources such as internet sites can also be researched to determine best overall value of products to be purchased. Electrical contractor labor is added to aisle lights and dimming system replacement.*