

Solano College Theatre Renovation

Theatre Production and Performing Arts Education Technology

The following narrative describes our recommended approach for the technical systems related to the education facilities for the performing arts at Solano College. With the emergence of broadly accessible media creation, and its inherent nature of merging the arts, it becomes more necessary than ever to provide students with the resources to experiment with the tangible and live arts foundations. The dramatist, musician and their audiences are aided and supported by the facilities in which they work. The performers are always accompanied by allied design and technical functions that are fields unto their own. The ultimate goal is to focus on the architectural design, technical operation and what it takes for audiences to have rich and captivating experiences, what it takes to inspire and support artists and theatre makers, what it takes to maintain financial viability for the project and the working facility, and what it takes to design and build a successful arts education and performance venue.

These recommendations are based on two site surveys, conversations with the facility users, our interpretations made from experience on similar projects of this type, and incorporating new directions in theatre technology.

1. Theatre

General Approach to Systems

The theatre facilities referenced in this report were originally built over 40 years ago. Many of the production systems have not been significantly updated since their original installation. This report prioritizes components of the theatrical production systems that can be selectively repaired or replaced.

The items marked "First" priority in this report represent potential life/safety issues, and should receive the focus of the initial renovation effort.

First Priority

Stage Rigging Replacement

The single most physically complicated and expansive system in most theatres is the counterweight rigging system. This system involves a series of pipes running across the stage that are suspended with aircraft cable (a "line set") and rigged over pulleys ("blocks") to counterweight "arbors" at one side of the stage. As a pipe is loaded with scenery, an equivalent quantity of counterweight in the form of steel bricks is added to an arbor, thus balancing it and making the heavy loads easily manipulated by a manual "operating line".

The existing stage rigging system does not operate smoothly, was constructed with older equipment that can no longer be properly serviced/lubricated, and as a result, **the stage rigging system no longer conforms to current safety standards.** We recommend that all of the moving parts of the existing stage rigging system be entirely replaced with new equipment. The existing T-bar and rigging locking rails are still in serviceable condition.

Items included in a full counterweight rigging system replacement typically include:

- Stage battens
- Lift Lines
- Rigging Blocks (loft & head)
- Arbors

We do not anticipate increasing the structural loading capacity of the rigging system. The rigging system renovation will be designed to respond to the existing structural capacity of the building as determined by a structural engineer. We will provide stage rigging loading criteria to the structural engineer and they will review the existing structure to confirm that it is adequately designed to accommodate these loads (no concrete stress cracks, etc) and that critical connection details have been properly executed. The structural engineer will determine if remediation to the building structure is required.

Motorized Counterweight Assist Arbors

Currently, all linesets are manually-operated counterweight type which requires manually loading loose weights onto the counterweight arbors. The arbors used for production lighting fixtures require frequent loading and unloading of loose weights. We recommend providing a small motor assist unit on these four arbors to minimize the handling of loose weights. Three (3) of these units would be located over the stage area, and the fourth unit would replace a lighting batten currently dead-hung over the orchestra pit area. Currently, this batten must be accessed via ladder or man lift at the edge of the stage, which presents safety concerns.

Production Lighting System

The original production lighting system must be entirely replaced. The original system is a "telephone-style" 120V patchbay system in which technicians must patch electrically hot plugs. Due to age, the system is very unreliable, and is a safety concern.

A new production lighting system would consist of a computer control console, control electronics, dimmers and circuit outlet boxes ("distribution").

The computer control console is the user interface for programming cues. These consoles allow for channel patching, programmable cues and advanced control for lighting effects such as color changers and moving lights, it would interface with the sound system, and would include peripherals such as a video monitor, handheld focus remote and printer, and output via Ethernet and DMX protocol.

The control electronics consist of a data network that provides the means to run theatrical lighting effects as well as providing control integration of the house lights. Lighting control data output and constant power will be provided at all lighting positions for advanced lighting effects such as color scrollers and moving lights. House light control would be both at the console and with simple wall stations. Simple presentations could be run through use of presets controlled at the wall stations without the use of the console.

The system would include all of the control elements described above and the following approximate quantities of 20A, 2.4kw dimmers for the following purposes:

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| (180) dimmers for production |
| (12) dimmers for house lighting |
| <hr/> |
| (192) dimmers total |

The dimmers are housed in racks of (96) dimmers each, and would be located in place of the current dimming racks. An enclosure around the dimming racks would need to be constructed, complete with air conditioning.

Circuit distribution would entail wiring in conduit from the dimmers to 3-pin wiring devices strategically placed at the lighting positions. The wiring device types will vary depending upon the

specific lighting position. Pigtail or flush receptacle boxes and connector strips will be used for catwalk and box boom positions.

For overhead lighting "electrics" on stage, motorized battens will be used. Each dedicated "electric" batten will have a circuit raceway, with pigtail extensions every 18"-24".

An inventory of multi-cable extensions, fan-outs and extension cable would be used to augment circuit distribution.

Electrical Remediation

The electrical systems providing power to production systems will need to be surveyed and assessed by an electrical engineer. We will design and specify the production lighting control system equipment and fixtures in dedicated drawings and in Division 11 specifications. The system will be installed in its entirety under Div. 16. Our documents will be oriented to show/specify the equipment and devices only. The infrastructure for the system such as conduit size and route, wire, back boxes, and all parts of the power systems must be designed by an Electrical Engineer and shown within their documents.

Performance Lighting

The existing service must be capable of providing approximately **140 kW** peak anticipated load from the new dimming system. A new dimmer room capable of accommodating the heat load generated by the dimmers will be required.

AV Electrical

All power to AV systems must be on a dedicated K-13 rated transformer, combined with an isolated ground system. The AV systems isolated ground (IG) system is of paramount importance in providing a clean power source for AV equipment. The existing service must be capable of providing approximately **40 kW** peak anticipated load from the new AV system.

Second Priority

In-House Audio Mix Position

In order for an audio operator to adequately perform their job, they must be in the same "acoustic volume" as the audience. In order to accomplish this, we recommend minor remodeling at rear of house. This would involve placing a door in the rear wall of the theatre (from the lobby), as well as building a level platform and enclosed pony-wall area. Acoustically-transparent screens would be provided on the sides to shield light from the adjacent audience members. The area must be ADA-accessible. Space for a musical conductor would also be provided.

AV Systems

The existing AV system does not adequately meet the current technological needs of the theatre department. A new AV system that will meet the needs of the theatre and is suitable for a teaching environment is recommended.

Audio System

A well-designed audio reinforcement system is key to the enjoyment of theatrical events, and will allow students the opportunity to learn fundamental audio principals on a professional-grade system. A sound reinforcement system consists of loudspeakers, amplifiers, signal processing, a mixing console, and source equipment, such as microphones, CD players, computers, etc. For theatrical flexibility, a left/center/right loudspeaker system, using line array loudspeakers for left and right, will be designed

for the main system, with a multi-channel surround loudspeaker system covering the house. The surround system may be used for theatrical or cinematic presentations. A subwoofer will also be installed for low-frequency content, as well as delay and fill loudspeakers for locations where the main system cannot adequately reach. The sound system will be adequate for large events, including musicals, concerts, and other high-volume program.

A computer-based sound effects playback system should be provided to allow students to learn how to create multi-channel sound effects on a simple and widely-used platform.

For simple events not requiring an operator, an automixing system is necessary. This will allow a user to plug in a microphone and have a working system without assistance from an AV technician.

A separate cinema loudspeaker system *is not anticipated*. Cinematic presentations will utilize the reinforcement & effects Left/Center/Right/Sub and Surround loudspeaker system described above.

A system for making simple DVD and/or CD recordings of live presentations for archival purposes was requested by the college.

A two-channel wired production intercom system is necessary for technical communications between the control room, other production spaces, and the backstage areas.

Audio program from the theatre should be distributed to backstage support spaces, such as dressing rooms, offices and shop areas.

Production Video

A production video system consists of a video projector, video switcher and source equipment, such as DVD & VHS players, computer and camera. Video projection will be from the Control Booth with a single video projector. The video switcher will be located in the control booth, and will accept any video signal.

Film projection is not included in permanent equipment or room accommodations. The Control Booth is therefore not currently envisioned as a "projection room" as defined by code.

Computer video inputs will be provided on stage to allow for PowerPoint-style presentations from portable laptops.

A modulated TV system, similar to cable-TV will be provided, allowing for distribution of on-stage video to backstage and support spaces, such as dressing rooms, offices and shop areas.

Projection Screen

The projection screen will be a truss-frame lace-up type, and will be suspended from a batten in the rigging system. The screen will be sized appropriately to allow audience members at the back of the theatre to read text and spreadsheet content.

Assistive Listening System

As required by the building code and the ADA (Americans with Disabilities Act), compliant assistive listening systems will be provided for 4% of audience seating capacity. Receivers would be checked out in the lobby, and signage provided. Use of this system will require little or no input from the patron.

Integrated AV Control System

A touch screen-based control system will be implemented to allow for simple presentations to take place without an operator present. Control will be via presets, and will have options such as "PowerPoint lecture", "DVD presentation," and "Lecture." The system will control both AV devices and room lighting presets.

Portable AV Equipment

A complement of portable equipment, including cables, microphones, stands, portable loudspeakers, and other related items are also necessary for a fully functioning system.

Production Lighting Fixtures and Cable

An inventory of approximately 150 theatrical lighting fixtures (typically ellipsoidals, followspots, fresnels, pars and cyc lights) plus accessories would typically be provided.

Accommodation for the integration of advanced devices such as color changers or moving yokes will be provided within the control system, but the initial budgets established will likely not include those types of fixtures and accessories.

Stage Draperies

An inventory of new stage draperies will be provided. These would typically include a decorative manually bi-parting and guillotine operating main curtain, a main border, black masking legs and borders, a cyc, and a black backdrop. All draperies would be certified with flame retardant treatment. Draperies would be tied on to the pipes of the counterweight system, located on a per-show basis.

Acoustic Treatment

One of the primary audience complaints about the theatre is the acoustics. We recommend that an acoustician review the theatre and a course for acoustic remediation should be undertaken. Typically, this includes the addition of reflective and absorptive materials at key locations throughout the theatre. The acoustician will also provide acoustic information relating to mechanical systems for performance spaces.

Orchestra Pit Filler

The existing orchestra pit filler system is very heavy and dangerous to move. The pit filler is so difficult to vary that it typically remains unchanged. This is a loss of the originally designed flexibility of the theatre. A means to vary the floor level of this area allows it to be used either as a musicians orchestra pit (lowest setting), as area for approximately 30 additional audience seats (middle setting), and as a stage extension (highest). Further, the existing concrete "pony wall" between the audience and the orchestra pit should be removed. The pit filler system would be replaced with an aluminum truss and honeycomb deck system. The lightweight yet strong nature of this system would allow for much easier removal and/or reconfiguration. Further, this type of system allows the theatre to retain storage space in the pit area when in "stage extension" mode.

A recessed orchestra pit is required to have wheelchair accessibility. This requirement is currently met with an existing lift. The lift should be inspected and repaired, if necessary.

Fixed Theatre Seating

Existing theatre seating should be either refurbished or replaced. It is important that the audience seating be replaced without any change to the existing seating layout in order to avoid triggering DSA review.

Orchestra Shell Towers

So that the volume of the fly tower does not present an acoustical sink when the stage is used for un-amplified music, an "orchestra shell" is recommended to support musical performances in the theatre. Typically, the design concept of the shell towers is based on the Wenger Corporation "Diva" shell. This is a high quality "off the shelf" shell that allows for limited customization.

Third Priority

Dressing Room Expansion

The current dressing room area is inadequate, given the size of productions facilitated. In order to better support the program, we recommend a dressing room expansion to accommodate two new 12-person dressing rooms (each 750 nsf) with integrated showers & restrooms, and two new 2-person "star" dressing rooms (each 400 nsf) with integrated showers & restrooms. This may be accomplished with a reorganization of the current spaces. This work would need to be undertaken by an architect.

Rehearsal/Classroom Space Addition

In order to better serve the department, a new 1500 nsf rehearsal & classroom space is desired. The space could also double as a flexible performance space. A 15'-0" clear ceiling is desired, with pipe grid and small production systems (i.e. - lighting and AV). This space would be divisible via partition. This work would need to be undertaken by an architect.

Lobby & Restroom Expansion

In order to facilitate pre-function events and for audience comfort, we recommend expanding the lobby and restroom facilities. In the lobby, six (6) nsf per patron should be accommodated. Typically, we recommend exceeding the code-minimum restroom quantities by two times to facilitate intermission restroom usage.

END OF REPORT