Executive Summary

The following summary reports are in response to a Scope of Services Contract issued September 1st, 2005. The purpose of these reports is to advise management of the status of the Rigging, Lighting and Sound systems in use at The Pantages Theater, The Theater on the Square and The Rialto. The reports are organized by discipline and by facility.

STAGE RIGGING SYSTEMS

The Pantages Theater rigging system is in remarkable condition for being a 22-year-old machine. The loft blocks and the head blocks (the core pulleys at the grid level, see attached schematic as Appendix #1) are oversized for this application and the result is that the blocks themselves operate below their cycle and load capacities. This should help increase the life of the blocks beyond a normal 25-30 year serviceable life expectancy common in stage rigging blocks. In addition, the lift cable stress has been decreased at the blocks due to the larger diameter sheaves and relatively light loads. The cables are also original to the system and show more signs of age and wear. The cable terminations at both ends are outdated in technique and employ the use of hardware that is no longer approved for overhead lifting, though common practice in 1983. Given the condition of the blocks, a lift cable upgrade will increase the safety of the system overall. The tee bar wall and locking rail are in good working order though some attention would be beneficial. The arbors that counterbalance the loads are structurally sound but the guide shoes are worn out and need to be replaced. The tension blocks are not engaging the tee bar correctly during certain phases of normal operation and may need to be overhauled or replaced. The rope locks were replaced in the late 1990's and are showing signs of use, but have many years of service left in them. The fire curtain was serviced in late 2004, though there are some elements that could be improved such as the fire curtain emergency release station being upgraded from a cotton cord being severed with a knife to a preferred red ring pull pin station. The stage draperies were replaced in 2004; however it is recommended to review the specifications and flame treatment certificates as three curtain samples tested did not pass the NFPA 705 field flame test. A few battens are slightly bent and could cause some interference, but overall are in good working order. The operators should be commended for obviously operating the system with care and helping to preserve its overall condition. They are the single most important element in the safe operation of the rigging.

Immediate Needs:
The "Items that required immediate attention" listed in Jay Glerum's inspection report dated 9/28/04 have been addressed to satisfactory levels, except for the lag screws being upgraded to anchor bolts in the locking rail. There was no life threatening conditions that were discovered this year. Developing an accurate binder or rail log for system record keeping should be implemented immediately as a destination for service records/system documentation/operator training records/near-miss and incident reports and investigation results along with other important information that should be kept on site for ease of reference and entries. See Appendix #2, Recordkeeping.

Near Term:
Safety factors would increase by addressing several issues detailed in the ensuing full report as well as extend the serviceable life of the system as a whole. This includes the lift cables, tension blocks, tee bar wall, fire curtain release system, and locking rail among other common system maintenance items. Signage indicating "Authorized Operators Only" and safe operating procedures should be posted. It is recommended to remove sample blocks within 1-3 years and send them to the manufacturer for an analysis of the bearings, hubs, and condition of the grease. Aging grease can harden and begin to erode the condition of the bearings prematurely. Ceiling shell suspension hardware should be removed from service and an appropriate attachment to the batten installed.

Long Term Needs:
A regular service cycle should help extend the usable life of the system. However, plans should be made for a system replacement of the moving or load bearing parts within 15-20 years, partially hinging on an analysis of the blocks' condition inside and amount of usage.

<End Pantages rigging summary>

Theater on the Square rigging system is the youngest system within the Broadway Center for the Arts, installed in the early 1990's. Overall it is in good working order, but does show signs of use. As with any machine there are ongoing service and maintenance items. There have also been user adjustments, additions, and some damage observed that should be addressed to permit a safe operating rigging system. With care, this system appears capable of performing for another 15-20 years.

Immediate Needs:
The first issue to address is the broken Emergency Stop button on the first electric controller in addition to the strain relief fitting at the motor end of the control cable. This should have been reported and repaired at the time of occurrence and should have and should now be locked out/tagged out because it is not in safe working order. The root of this failure is likely a lack of documented safe operating procedures, simply a training issue.
There was no life threatening equipment-based conditions that were discovered this year. However, the technicians appear to be using a focus track for access to lighting fixtures and the hardware used is insufficient for a live load safety factor consideration of 10:1. It does not appear that the technicians are using an independent lifeline required in workplace elevated work areas. This practice should be suspended until a professional safety officer reviews, or likely creates, the safe procedures for worker elevated access and related Fall Protection plan. Developing an accurate binder or rail log for system record keeping should be implemented immediately as a destination for service records/system documentation/operator training records/near-miss and incident reports and investigation results along with other important information that should be kept on site for ease of reference and entries.

Near Term:
Safety factors would increase by addressing several issues detailed in the ensuing full report as well as extend the serviceable life of the system as a whole. This includes the lift cables, mounting safe operating procedure signage along with an "Authorized Users Only" sign, and bringing all elements up to proper safe operating condition. Examples include the tension block side plates rest on top of the hand line knot, worn hand lines, arbor fasteners missing or being loose, improper hardware in use, and unsecured batten extensions. The third electric S-O feeder cable block snags on the passing cables and appears to have been doing so for some time. This condition should be corrected and the affected cables replaced.

Long Term:
A regular service cycle should help extend the usable life and safety of the system. However, plans should be made for a system replacement of the moving or load bearing parts in approximatyely15- 20 years.

<End TOS rigging summary>

The Rialto stage rigging appears to have evolved over time to meet various needs and production requirements. The simple stage has curtains that are resting on the floor and some do not pass a flame test for NFPA 705 requirements. A facility-programming outline would be beneficial for designing the stage to be functional and compliant with both safety and industry standards. Battens are hung in sub standard methods creating potential falling object hazards. The tie-off cleats for the aging projection screen are loose and use undersized anchors, though failure is not predicted soon. Programming may indicate that a modern motorized roll up screen would meet the space needs better.

Of much greater concern is the Front-of-House (FOH) rigging and draperies. The two electric lighting trusses are declared to be unsafe. The inspector understands that Mr. Scott Painter has removed the trusses from service as a result of his observations during the inspection and quick action to minimize risk. The system was not sized, located or installed safely or correctly. Again, programming needs may help define whether two FOH trusses are required and if so, design a proper rigging system for the application that includes user access for routine operation.

The acoustical draperies hung at both levels at the rear of the audience chamber did not have locatable manufacturing identification tags. Purchasing records should be checked to see who made them, when, and other related details. Some of the curtains are not properly sized for their locations and in fact rest on the seatbacks at the rear of the balcony. A major concern is that the fabric did not pass a NFPA 705 flame test. The track is also installed in a questionable manner as regular screws are driven only into plaster and lath ceiling material without the use of structural backing.

The chandeliers, which may be original, are suspended from ancient cast iron winches mounted to wooden supports. The cables are improper as are the terminations and wood-sided pulleys at the roof level. All are considered to unsafe and should be replaced to properly suspend and lower the chandeliers for service.

Immediate Needs:
Reports are that the trusses have been removed from service. The chandeliers should be properly secured (there are some stay chains in place, but not all are connected properly) until the needs are determined and a proper system installed. Many curtains in this space are not compliant with flame resistant requirements, and should be treated and re-sized as required. FOH lighting requirements should be discussed and an appropriate system designed and installed to meet those requirements. Developing an accurate binder or rail log for system record keeping should be implemented immediately as a destination for service records/system documentation/operator training records/near-miss and incident reports and investigation results along with other important information that should be kept on site for ease of reference and entries. Beware of a 6" long piece of electrical tubing resting inside the middle chandelier that may fall if not removed before attempting to service the light.

Near Term:
Safety factors would increase by addressing several issues detailed in the ensuing full report as well as extend the serviceable life of the system as a whole. This includes the onstage batten suspensions, mounting safe operating procedure signage along with an "Authorized Users Only" sign, and bringing all elements up to proper safe operating condition. Examples include the tab pipes and attached curtains. The acoustical tracks should be serviced and securely installed to the ceiling.

Long Term:
A regular service cycle should help extend the usable life and safety of the various systems within this classic space.

<End Rialto rigging summary>

Rigging Conclusion:

Most deficient findings in the rigging systems inspected are related to items that have gone unaddressed for several years, use outdated hardware, or as a result of some users that are untrained or unaware of safe operating practices. Regular, documented training for the operators should be commenced and an overall higher level of system recordkeeping employed. It may be beneficial to enter into an annual inspection and service contract after necessary repairs are made to assist in maintaining, servicing, and preserving the condition of the rigging machine components in each of these spaces. It is recommended to have repairs or services performed only by independent licensed, insured and experienced rigging firms that have verifiable proper professional qualifications. More details will follow in full report forthcoming.

Credit Note: Both appendix # 1 and # 2 are from "The Stage Rigging Handbook" by Jay Glerum.

STAGE LIGHTING SYSTEMS

The Pantages Theater stage lighting system is not fully operational, however with a several minor repairs, this status will change.

Dimming:

- The control electronic upgrades made to the performance dimmer racks will add many more years of life to this equipment
- While the house lighting dimmer rack is still working, is fairly clean and has good airflow, plans must be made now for the eventual failure of this system. The equipment is old and the company that produced the rack is no longer in existence. Parts are no longer available. When the dimmer fails, it may be some time, if ever, before it can be made operational again. Planning must start now for is inevitable replacement

Control:

- The stage lighting control console is current technology with the latest version of operating software.
- The house lighting wall station(s) will need to be replaced when the dimmer is replaced. Also, new wire will need to be pulled to upgrade the system to a digital control signal rather than the current analog.

Distribution:

- The new pigtails and connectors that have been installed in the on-stage electrics will all help increase the operational life of this equipment.
- A couple of the on stage plug boxes need some small repairs
- The distribution in the house is old, but serviceable. Constant monitoring of this distribution will be needed to ensure its continual operation.

Fixtures:

- The stage lighting fixtures currently hanging on stage and in the house are also current industry standards.
- The surplus of old fixtures stored in the basement are no longer current models, parts are hard to find, and they are difficult to integrate into a light plot with the up to date fixtures.

Theater on the Square has the most problems, and will need the most immediate attention.

Dimming:

- The lighting system is not fully operational. Though the dimmer racks work and the stage lights come on, serious issues exist and the racks will need either a complete overhaul or replacement in the very near future.
- The Lobby and Hallway dimming system is in good shape, however it still needs some attention. For example, a key is broken off in the door to the processor rack.

Control:

- The stage lighting control console is a standard current model from the manufacturer.
- The house lighting control stations are not operational at all, and whether this is because they were disconnected from power in the rack itself or for some other reason, we were unable to establish. Further testing and evaluation is needed to make this determination.

Distribution:

- The circuits in the distribution worked, though several receptacles showed signs of arcing. This is simply a maintenance matter that needs to be addressed to avoid future greater damage.

Fixtures:

- The ellipsoidal stage lighting fixtures are all substandard. They are all displaying signs of their age. The Fresnel fixtures were all in good condition.

The Rialto has the most up-to-date lighting system. It is currently fully operational.

Dimming:

- The stage lighting and house lighting dimmer racks, while not new, are still current models. However, there were also signs in these racks attesting to the lack of a maintenance program. The accumulation of dust and dirt in the rack can possibly lead to rack failure in the future.

Control:

- The stage lighting control console is a current model with the current software for its type. It is completely appropriate for the venue.
- This console also handles the house lighting, so must be activated each time the venue is used. House lighting control stations should be considered to relieve the console of this requirement.

Distribution:

- The circuits in the distribution devices all worked.
- The distribution is either multi-cable on the motorized truss or plug boxes on the beam positions. The multi cable is a temporary set up. If the placement of this distribution is acceptable to the City, more permanent Front of House and Over Stage positions should be considered.

Fixtures:

- Many of the fixtures are top of the line. However, mixed in to this are several that are older and not considered equal.
- Here again, a significant number of fixtures, both old and new, showed evidence of inattention and improper use.

Immediate Needs:

- Implementation of a cleaning and repair program aimed at correcting the many small deficiencies noted at all three venues. This will forestall any possible future damage to system components.
- Planning the allocation of funds to either overhaul or replace the stage dimmer racks at the Theatre on the Square.

Near Term Needs:

- Planning the allocation of funds to replace the house lighting system in the Pantages.
- Complete replacement of the ellipsoidal fixture package at the Theatre on the Square.

Long Term Needs:

- Upgrade to new control electronics for the stage and house lighting dimmer racks in the Rialto.
- Addition of house light control stations to relive console of those functions.

SOUND SYSTEMS

The Pantages Theater currently does not have a fully operable system. The theater has apparently been working with portable speakers set up on the sides of the thrust stage, and supporting pieces of hardware not owned by the Theater were required to make these temporary pieces functional. Other individuals or companies were supplying these additional items. The majority of the permanently installed sound system has been removed. This

includes the center speaker cluster and the amplification and processing equipment related to it. A lack of regular maintenance has created a stockpile of defective or suspect equipment that is at best unreliable and is not chosen by system technicians for use. The basement storage areas contain vast quantities of outdated, redundant and superfluous audio equipment that cannot be combined to create a working system. Personal audio equipment (not owned by the City) is also being stored in the Theater as a matter of convenience. It is our opinion that the temporary speaker configuration is barely adequate to ensure proper coverage of the seating areas, and cannot be considered appropriate in any case. Most certainly the speaker system would not meet even the most minimum requirements for a traveling stage show or musical, as defined by the Technical Riders available to this company for evaluation.

Theater on the Square has an operable system that consists largely of portable speaker systems applied in a permanently installed configuration. The size of the room and placement of the speakers was consistent with other facilities of similar size and shape. However, the components have been installed using hardware not load rated or certified for overhead lifting. While the system is functional, the condition of the equipment racks and related wiring is substandard and poised for failure or low reliability, mostly due to poor maintenance and "quick fix" techniques. The microphone complement was found to be inadequate. Again, personal or third party equipment was being used to assist in the implementation of production requests.

The Rialto has an installed center cluster that is functional, but is not being used. Instead, loudspeakers and additional bass extension modules are stacked on the corners of the stage and floor respectively. It may be that the stage has been extended forward (downstage) since the installation of the center cluster, which would explain the abandonment of the cluster. This positioning of the speaker system would create feedback problems with microphones in use downstage of the cluster. In fact, supporting this theory, our performance tests showed little difference in frequency response and output level between the stage area and the front seating sections of the venue, when the center cluster was energized. There are a number of loudspeakers positioned around the room as if they were to be used for surround sound speakers in a movie-theater playback scenario. The wiring to these speakers is not professionally installed, and the speakers themselves detract from the overall architecture of the space. Aside from the generally poor condition of the electronics in this system, the wiring is haphazard and poorly labeled. The entire multi-channel cabling system running to the mix control position is inadequate in a number of channels, failing and cannot be relied upon.

Immediate Needs:
Restoration of the sound system in the Pantages. This would include purchase of an appropriate speaker cluster, amplification and processing equipment and any other supporting hardware needed

Near Term Needs:
Restoration of the sound system in Theatre on the Square. This would include re-rigging any hanging part of the system with proper techniques and hardware. Also included would be re-wiring to upgrade to current standard, and purchase of supporting hardware.

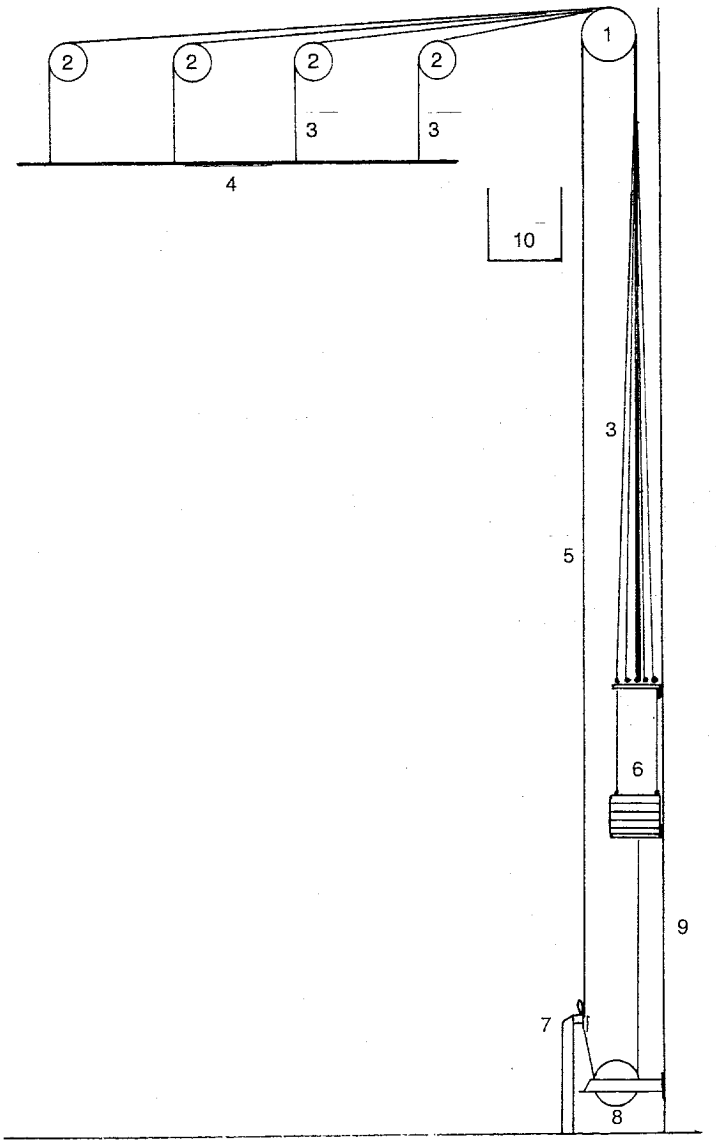
Long Term Needs
Complete re-design of Rialto sound system.

End Summary

4.02 Single-Purchase Counterweight System

A typical single-purchase counterweight set (see figure 4.1) consists of:

1. Head block for lift line and hand line
2. Loft blocks (mule blocks as needed)
3. Wire-rope lift lines
4. Batten
5. Hand line (purchase line)
6. Counterweight arbor
7. Lock rail
8. Tension block
9. T-bar guide rails
10. Loading bridge



4.1 Single-purchase counterweight set

6.06 Recordkeeping

One of the questions asked after an accident is whether the rigging equipment has been inspected and properly maintained on a regular basis. *Rigging equipment is machinery. It requires care and maintenance.* Because it suspends objects over the heads of people, it poses a high degree of risk to life and limb. Failure to care for rigging equipment is negligent behavior. Performing regular inspections and correcting problems as they occur and before they are serious are required procedures in order to ensure the safety of everyone working on the stage or under any suspended object.

Two sets of records are of great value in maintaining and ensuring the safety of rigging equipment. They are (1) a rail log and (2) an inspection and maintenance log. By keeping written records you do not have to rely on anyone's memory, and you have written documentation of the care and diligence used in the facility in case of an accident. The written records can be an important tool in risk management, and they could hold critical information if there is a change of personnel.

A. Rail Log

Rigging components wear out due to stress and fatigue. It is much easier to predict when failure will occur if a record is kept of the use of each line set. Develop a simple form that is filled out for each production that comes into the facility. The form should include the following:

1. The name of the production
2. The dates of the run
3. A listing of each line set
4. The amount of weight on the line set
5. The number of times the line set moves during each performance

The format can be modified to fit the type of use for your particular venue. The important items are the weight per line set and the amount of use, determined by the number of cycles during a given period. More heavily used line sets will require more frequent inspection and component replacement.

B. Inspection and Maintenance Log

Develop a written log to record the periodic inspections and maintenance of the equipment. The basic items that the log should include are as follows:

1. The date of inspection
2. The name of the inspector
3. Check sheets that contain space for each component of each line set inspected
4. What items required repair or replacement
5. When the repair or replacement work was done
6. The name of the person doing the repair or replacement