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LIGHTING INDEPENDENCE FOR MASQUE

An Interactive Qualifying Project Report
submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE
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Degree of Bachelor of Science
by

Kirby A. Haizlip

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Professor Dean M. O'Donnell, Advisor

ABSTRACT

Excessively large budgets for lighting equipment rentals have come to be a fact of life for Masque. The raison d'etre for this project is to establish a plan for purchasing equipment in order to decrease Masque's dependence on rental equipment from outside sources, which can become prohibitively expensive. Because there is not a great deal of financial resources available to Masque, it will be necessary to integrate purchasing with current rentals in order to maintain production values.

Table Of Contents

Introduction

To adequately light a theatrical production, even on the college level present at WPI, requires a tremendous amount of resources. In some areas of the production, it's simply a matter of participation- the only requirement is enough people with the appropriate skills. However, in others, it's a matter also of equipment. This is the case in the area of lighting. Without an adequate supply of appropriate lighting equipment, it is difficult to put on a production with contemporary production values. This supply can come from one of two places – it is either rented from a firm that supplies lighting and other theatrical equipment, or it can come from the theatre group's own stock. In a situation such as exists here at WPI, Masque (the theatrical organization) owns none of its own lighting equipment. There is an on-campus group called Lens and Lights (LNL) that provides all of the lighting equipment for the minor shows (C-term and Summer theatre). For the major shows, it is necessary to rent some equipment from an outside firm to augment what can be acquired from Lens and Lights.

Lens and Lights is a concept unique to WPI. Like a normal club, it is made up of students and is advised by a faculty member. However, unlike a normal club, LNL does what could be considered a business. LNL provides sound and lighting equipment and services to other on-campus groups and clubs (including Masque), charging a fee for its services. This fee is generally much less than the cost would from an external agency. This money is then reinvested in new equipment and to pay for maintenance of the current inventory.

In a normal academic situation, lighting and sound equipment for theatre events is provided by the stock of the theatre group putting on the show, and other on-campus

events are outsourced to companies. LNL serves an important function in the WPI community, allowing clubs to put on events that they might otherwise not be able to do due to an inability to acquire the appropriate equipment given their limited budgets. However, there are sometimes issues of politics between the members of LNL and other on-campus groups, which can hinder operations for both groups. LNL also has to strike a delicate balance between acting as a business and acting as a club for the students.

The external rental is the topic of interest for this project. LNL can provide a decent quantity of lighting equipment with a reasonable selection for prices that are far below what they would cost to rent on the open market from one of the larger firms. In the large shows, which occur B and D terms, the rental from the external company can often be as much as two or three times the rental cost from LNL, making it necessary to acquire additional funds from the budget of the Humanities and Arts Department. If it is possible for Masque to obtain their own equipment somehow, we can eliminate this rental, or at least make it as small as possible. This, in turn, will help save a tremendous amount of money in the long run.

The money saved would also help Masque given WPI's current financial straits. As WPI faces larger and larger shortfalls, program's budgets become less certain. As Masque is able to purchase its own equipment, it will become less necessary to rely on money from the budget of the Humanities and Arts Department, making it a less tenuous situation. The administration would also look more kindly on allocating money to Masque if it can show that there is a definite advantage (e.g. better to buy something than to rent and have the money gone).

Methodology

Current situation

As it stands, Masque owns no lighting equipment. For each show, Masque must rent lighting equipment from either LNL, an off-campus agency, or a combination of the two. The combined cost of this often dominates the budget for a given show. Masque would greatly benefit were it possible to somehow eliminate this now-necessary expenditure, which would require obtaining our own equipment.

Possible options

There are several possible ways to obtain one's own equipment. To outright buy a large stock of equipment would be unfeasible for Masque, since the budgets are far too small to purchase even a semi-adequate stock. It is worth it to look into donations or price breaks due to our status as part of an educational institution, even if it is a somewhat unlikely possibility. A more feasible plan, that which is the focus of this project, would be to set aside a portion of the lighting budget on a regular basis and use this to slowly build up a stock of equipment.

Criteria

In order to determine what type of equipment should be purchased, and what sort of a plan should be followed in the purchasing of that equipment, it is necessary to take many factors into account. This includes equipment which has been used in the past, available budget in the past, what other schools use, and what input might be offered by people familiar with the theatrical lighting environment present at WPI.

A Look at Previous Budgets

The limiting factor in the purchasing of lighting equipment, as in the rental of lighting equipment, is money. Masque's budget for a single show is often dominated by the lighting cost, which is in turn dominated by the cost for a rental from an external agency. A budget for lighting can be up to $2800, with the LNL rental for lighting and sound amounting to $500-$600. That leaves a rental allowance of up to approximately $1500, depending on the show and the amount of rented equipment necessary for the show.

In spite of the inevitability of different shows having different lighting needs, there are some types of fixtures that are almost always used, and often end up being rented due to LNL having a limited supply and needing to keep some for their own purposes. If we purchase those fixtures that are rented from external agencies the most often, it will obviate the need to rent that equipment in the future, thereby saving money in the long run.

Although the type of lighting equipment necessary varies from venue to venue and can also change based on the group, the inventories of other schools can give a good idea of equipment which offers good reliability and value to a college theatre organization.

Data Sources

It was necessary to examine many sources of data in order to study the feasibility of various possibilities for Masque obtaining their own equipment. Since there are many other schools with theatre programs similar to Masque's program, the inventories of other schools would be a good reference for what we could expect to be necessary, in spite of

the fact that differing venues and budgets would have somewhat of an effect on the type of inventory which would be desired.

The budgets of past Masque productions, as well as the lighting equipment used, can give a guideline as to both what will be needed in the future and what will be available to spend.

Discussions with various people experienced with lighting, both at WPI and at other schools, would be likely to give more of an idea as to what will be necessary.

Prices were obtained from various vendors who had prices easily accessible via the World Wide Web.. These vendors included High Output, with whom both Masque and LNL have done business in the past (www.highoutput.com), Production Advantage (found using the Google search engine, http://www.productionadvantageonline.com), and SME Enterprises (also found using Google, http://www.theaterlighting.net).

Procedure

The first step in determining what would be the wisest course of action for Masque was to gather all relevant data. This involved emailing multiple people requesting records that I was unable to locate in locations accessible to me, as well as finding what I could on my own, without disturbing other people.

After obtaining all the data, it was necessary to categorize it and place an importance level on each, thereby determining the criteria by which decisions would be made.

With the data now collected and properly organized, it was possible to make decisions. The primary criteria for the project, the yearly budget which would be available and the instruments most used, would come from the rental records for past

shows (summarized in Appendix 2). It was also necessary to obtain prices to purchase the selected lighting equipment, which was done from the web presences of vendors. At this point, other possibilities were looked into as well, including donations and used equipment.

Inventory Expectations

The ideal inventory for Masque would strike a balance between maintaining a realistic amount of equipment and having enough on hand to equip any "typical" show without having to go to an external rental. Such an inventory would include a large number of ellipsoidals, (40-50 would be realistic given the venue and size of past shows), with an inventory of lenses in varying focal lengths. 75 lenses, varying in sizes from 10 degrees to 50 degrees, with a heavy concentration on the middle of the range (19/26/36 degree- 20 each), would serve our purposes nicely. A number of fresnels and PAR cans would also be necessary. Since the number of each of these used can vary widely depending on the show, ETC's Source 4 PARnel would be ideal, as it can serve both roles. 40 of these would be adequate for most Masque shows, given past experience. In order to run all of these instruments, however, lots of power would be needed. An ideal solution would be a built-in dimmer rack with 96 2.4 KW dimmers, along with enough Socapex cable to reach all the lights in various positions on the truss and battens. In order to reach the truss, 100-foot lengths of Soc are needed, and with up to 50 lights on the truss, 6 runs would be necessary, along with 6 more 50-foot lengths to reach the battens.

Instrument	Quantity	Price	Extended Price
Source Four body	50	$ 300.00	$ 15,000.00
Socapex Cable (100 Foot)	6	$ 325.00	$ 1,950.00
Socapex (50 foot)	6	$ 225.00	$ 1,350.00
96 Dimmer Rack	1	$16,000	$ 16,000.00
Source 4 PARnel	40	$ 200.00	$ 8,000.00
		Total:	$ 42,300.00

However, such an inventory is unrealistic given both Masque's current financial situation and the necessary upkeep of such a large inventory. A good compromise would have enough of the often used fixtures that they don't have to be rented, allowing fixtures that are not often used to be rented as necessary. Since ellipsoidals are so often used, a number of them would still be necessary, but considerably fewer – 20 would be adequate, with a similarly reduced number of lenses (36 total, same proportions as before). The amount of socapex cable need only be reduced somewhat, however, to 6 100-foot and 3 50-foot lengths. The number of PARnels would need to be reduced by more than half, to 14, which would still be a realistic. Dimmers are so expensive (between $10,000 and $20,000) that to consider an installed rack would be unrealistic. LNL, with the purchase of a new 24 dimmer rack as of December 2003, can now supply Masque with enough dimmers, which will considerably reduce the amount necessary to expend on external rentals. A realistic price for the new inventory would be one that is approximately the amount which would be spent on rentals in a period of 7 years, or around $8,000.

Planning for Gradual Purchasing

Financial

An average lighting budget for Masque is approximately $1,800 for both the LNL rental and the external rental. Since the LNL rental is a constant $500, there remains the sum of $1,300 per show which is spent on a rental from an external source. . Since there will be little in the way of self-owned equipment in the beginning, the money available for purchase rather than rental will be similarly small. As time goes on and more equipment is obtained, we will need to rent less and will be able to purchase more.

A Five Year Plan

A realistic period of time over which to work our way towards lighting independence would be five years. One year more than the standard period of residence at WPI, this would allow Masque to purchase equipment slowly while not dragging the purchasing out for an interminable period.

It would be unrealistic to expect to be able to spend as much in the beginning of the five-year plan as we will be able to in the end. A realistic estimate for the first year would be $900 per show ($1800 total). Since the goal is to reduce the amount being spent on the external rental as quickly as possible, the best plan would be to purchase instruments which will be heavily utilized in the future and which would likely need to be rented. Ellipsoidals would certainly fall into this category, as LNL's supply quickly runs out, especially if they have other shows going on concurrently. At a price of approximately $300 per instrument, it would be realistic to expect to be able to purchase six Source 4 Ellipsoidals for the first year, including all accessories (pipe clamp, gel frame, plug, safety cable).

First year inventory:

Quantity	Item	Price
6	Source 4 Ellipsoidal w/ accessories	6x$300=$1800
Expenditure:		$1800

In the second year, we would have an increased budget, one that could be expected to be approximately $2000 total. With this increased budget, Masque could afford to purchase 10 PARnels, which would also include all necessary accessories.

Second year Inventory:

Quantity	Item	Price	
6	Source 4 Ellipsoidal w/ accessories	$1800	
10	Source 4 PARnel w/ accessories	$200*10=$2000	*new
Expenditure:		$3800	

At this point (after two years), it would be good to purchase more Source 4 Ellipsoidals, as well as more lenses for the existing stock. There would be 6 in stock already, and a budget for the year of $2200, so we could afford to buy 6 more, along with a variety of accessories as deemed necessary (Gobos and gobo holders, wrenches, any needed repair parts).

Third year inventory:

Quantity	Item		
12	Source 4 Ellipsoidal w/ accessories	$3600	*6 new
10	Source 4 PARnel w/ accessories	$2000	
--	Gobos/Gobo holders	As dictated	*new
--	Wrenches	by budget	*new
	Source 4 Lenses		*new
Expenditure		$5000	

This would be a reasonable inventory. As long as there were enough appropriate lenses for the ellipsoidals, there would begin to be a considerable ever-decreasing need for externally rented goods.

In the 4th year, with a budget of $1200 per show, or $2400 total, it would be a good time to purchase 8 more Source 4 Ellipsoidals to fill out the inventory. This would deplete the yearly budget, but help enormously with freedom to design lighting.

Fourth year inventory

Quantity	Item	Price	
20	Source 4 Ellipsoidal w/ accessories	$6000	*8 new
10	Source 4 PARnel w/ accessories	$2000	
--	Gobos/Gobo holders	As dictated	
--	Wrenches	by budget	
	Source 4 Lenses		
Expenditure		$10,400	

The 5th year would be a time of rounding out the inventory. The budget of $2600 could be used to complete the purchasing of PARnels (4 more, or $720 total), as well as obtain all necessary Socapex cable and splays to go with it. More gobos and gobo holders, as well as some gel sheets, would be a wise investment at this point, if the budget allows.

End of year five inventory:

Quantity	Item		
20	Source 4 Ellipsoidal w/ accessories	$6000	
14	Source 4 PARnel w/ accessories	$	*4 new
--	Gobos/Gobo holders		*new as needed
--	Wrenches		
	Source 4 Lenses		
6	Socapex, 100 foot	6*$325=$1800	*new
3	Socapex, 50 foot	3*$225=$675	*new
9	Socapex-twistlock splays	9*$160=$1,440	*new
	Gel sheets		*new as needed
Expenditure		$13,000	

Although this inventory looks somewhat small when compared to other institutions with theatre programs similar to ours, it would be an excellent start. The presence of so many instruments would allow lighting designers to be more free in their designs. Since the external rental of everyday fixtures such as ellipsoidals and par cans or fresnels would be unnecessary, budgeted money that would normally go towards the rental of those fixtures could now be used for a combination of the rental of more unusual, less-used fixtures, the purchase of more lights, and maintenance on the present inventory.

Evaluation of the Five-Year Plan

Masque's financial situation for the five years would be as follows:

Year	Total Projected Budget	Purchase Budget	Rental Budget
1	$2,600.00	$1,800.00	$700.00
2	$2,600.00	$2,000.00	$600.00
3	$2,600.00	$2,200.00	$400.00
4	$2,600.00	$2,400.00	$200.00
5	$2,600.00	$2,600.00	$0.00

While the plan would be nice in terms of an inventory, the truth of the matter is that it simply would not allow enough of a rental budget. There are two main points:

1. $300 is not nearly enough of a rental budget for each show in the first year. If there is a requirement for any major equipment such as a dimmer or a large amount of cabling, then we would be unable to use it.
2. There needs to always be a rental budget, however, small, because different lighting designers will come up with different designs, and we need to be able to accommodate the presence of unique instruments for each designer.

With these points in mind, the possibility of a slightly longer plan, such as seven years, can be considered.

A Seven Year Plan

Were we to expand the timeline for purchasing to a period of seven years, it would give more flexibility due to the ability to purchase the same equipment.

In the first year, the same budget of $2600 will still be available. However, due to the possibility that there will be an extremely expensive rental for something like a dimmer or a large amount of cabling, at least $800 per show must be maintained for a rental. With this in mind, there will now be $1000 available for purchasing. This would be most wisely spent on cabling, as that could immediately eliminate a portion of the rental costs.

First year inventory:

Quantity	Item	Price	Notes
3	Socapex, 100 foot	3*$350=$1050	*new
Expenditure		$1800	

In the second year, cabling would no longer be a necessary part of the rental budget, which would free up approximately $300 per show, or $600 per year. This would allow for a purchase budget of $1600. With this money, the purchase of Source Four Pars and PARnels would be possible. At $200 per instrument (with accessories), it would be possible to purchase up to seven instruments

Second year inventory:

Quantity	Item	Price	Notes
3	Socapex, 100 foot	$1050	
7	Source Four PARnels	7*$180=$1260	*new
Expenditure		$2310	

For the third year, it would be unrealistic to expect that the seven instruments purchased in the previous year would impact the budget significantly enough to justify increasing it by an appreciable amount. Therefore, it can be expected that there will

again be a budget of $1600. With this, it will be possible to purchase up to four Source Four Ellipsoidals.

Third year inventory:

Quantity	Item		Notes
3	Socapex, 100 foot	$1050	
7	Source Four PARnels	$1260	
4	Source Four Ellipsoidal	4*$290 = $1160	*new
Expenditure			

After three years of purchases, it would be possible to again increase the amount available to purchase equipment. The budget could reasonably be expected to increase to $1800. With this money, it would be possible to purchase 4 more Source Four Ellipsoidals, as well as any desired gobos and gobo holders.

Fourth year inventory:

Quantity	Item		Notes
3	Socapex, 100 foot	$1050	
7	Source Four PARnels	$1260	
8	Source Four Ellipsoidal	$1160+$1160	*4 new
	Gobos & holders	$200	*new
Expenditure		$4820	

In the fifth year, it would be best to maintain the amount of money available for purchase at $1800. With this, five more Source Four Ellipsoidals could be purchased, as well as needed accessories. (wrenches, cable extensions, etc)

Fifth year inventory:

Quantity	Item	Price	Notes
7	Socapex, 100 foot	$1050	
7	Source Four PARnels	$1260	
12	Source Four Ellipsoidal	$2310+$1160	*4 new
	Gobos & holders	$200	
	Accessories	$100	*new
Expenditure		$6080	

It would be possible in the seventh year to finally drop the necessary budget for rentals down to $700 to allow for any special needs, which would allow for a purchase budget of $1800. With this, it would be possible to finish the purchasing of Source Four PARnels and add to the collection of ellipsoidals.

Sixth year inventory:

Quantity	Item	Price	Notes
7	Socapex, 100 foot	$1050	
10	Source Four PARnels	$1260+3*180=$1800	*3 new
15	Source Four Ellipsoidal	$3470+3*290=$4340	*3 new
	Gobos & holders	$200	
	Accessories	$200	
Expenditure		$8850	

In the seventh year, the budget would remain at $1800, depending on the size of rental necessary. With this money, 5 more Source Four Ellipsoidals could be purchased, accomplishing the goal of 20 Source Fours. With any remaining money, lenses for Source Fours could be purchased

Seventh year inventory:

Quantity	Item	Price	Notes
7	Socapex, 100 foot	$1050	
10	Source Four PARnels	$1800	
20	Source Four Ellipsoidal	$4340+5*290=$5790	*5 new
	Gobos & holders	$200	
	Accessories	$200	
Expenditure		$10,300	

Beyond Planned Purchasing

After the planned period of purchasing, Masque would have a more than adequate inventory to allow them to keep costs down on lighting for their productions. However, there are questions that would be raised at this point. The first is that of responsibility – lighting equipment can break and needs periodic maintenance anyway. As it stands,

because there is no lighting inventory to speak of, there is no need for someone to perform this task. An ideal person to do this would be the VP Master Electrician of Masque, under the supervision of Dean O'Donnell, the theatre technology professor. The VP ME, again under the supervision of Dean, would also be in charge of making purchases each year.

There would presumably continue to be an additional amount of money in Masque's yearly budget, since the lighting budgets would be kept down. This money would need to be used for the periodic maintenance of the existing inventory, as well as to purchase new equipment as necessary.

Other Options

Companies will occasionally make donations to educational institutions and other non profit groups in order to improve their public image. ETC, the company that manufactures a large portion of the lighting equipment Masque rents both from LNL and external sources, was a company that was selected to ask for a donation. The manager of the ETC Northeast Office was sent an email detailing the circumstances and requesting the consideration of an equipment donation, as was the local ETC Representaive (BIG connect, out of Boston). The email, and subsequent responses, can be found in Appendix 4. :

It is also occasionally possible to purchase used equipment that is still serviceable for a very low price. WHDH in Boston recently upgraded their dimming system, so their previous system, an ETC L86 96 dimmer rack, was made available for the rather low price of $600. This would have been a virtually certain decision to make if the price was the only factor, but unfortunately it was not. The L86 is certainly a nice piece of equipment, but is also rather old. This means that it would be difficult to find parts for it if it should break, as well as to find someone willing to service it. This would be in addition to the initial costs involved with installing the unit and wiring it. (At least $1200 for new backplanes in order to avoid problems down the road, plus labor for qualified electricians to install necessary electrical support)

Appendix 1:

Lighting Hardware Outline

Lighting in a theatre production has three basic components:

- Power Supply/control
- Power Transport
- Instruments

Power Supply / Control

Power for lighting comes from an object called a dimmer or dimmer rack. An individual dimmer is an electronic device that takes a power input and allows you to control the intensity of the output. They are often grouped together in multiples of 6 and installed in rack mounted units. These units of many dimmers consolidate the input and outputs, into a three-phase input and at least one Socapex output, which groups 6 or 8 circuits in one screw-on connection. A dimmer rack also has a connector of some sort to connect to the lighting control board. The present standard for this connection is called DMX, and is a five-pin connection.

The control board can take a variety of forms. It can be as simple as 6 or 12 faders with no other controls or displays, or a board with multiple LCDs, a keypad, a large number (>96) of faders for individual channels, a number of faders for cue stacks, and a sophisticated microprocessor, as well as everything in between. The type of board is heavily dependant on the type of show being put on – a complicated lighting setup for a rock concert that utilizes intelligent lights would require a board such as the second one mentioned, whereas a small theatre production could get a way with something closer to the first. Some boards with large memories for cue stacks and channels can also utilize an external monitor and/or keyboard.

Power transport

Because of the high amounts of power being drawn by a quantity of lights, the way that it is transported to the fixtures is important. It must first get from the tap to the dimmers, and then from there to the lights. The cables used to accomplish this are referred to by their ends, as the only variables are the number of conductors in the wire, and the size of those conductors

Dimmer racks often utilize a three-phase supply of power in order to supply as much as possible to the lights in an efficient manner. Although it can be permanently installed, here at WPI, we utilize a temporary connection called Camlok to connect to the power tap. There is one screw-tight connection for each of the three phases, plus neutral and ground (5 total). As a primary carrier of high current, the cables going from the tap to the dimmer are either 00 ("two-ought") or 0000 ("four-ought), able to carry 200 and 300 amps, respectively.

After going through the dimmer, the power must then be carried to the individual fixtures. The method for this depends on the number of lights in a single location that power needs to get to. For one or two fixtures, a single run of "twist" (Three conductor cable with a twist-lock connector), with a splitter ("Twofer") is sufficient. However, if there are many lights in a single location, it is necessary to run a cable referred to as Socapex. This cable has 10 conductors – one positive for each of the circuits, a neutral, and a ground. The connectors are screw-on, to remain secure for extended setups.

Instruments:

There are many lights that are used in a typical theatrical production, all of which can be put into one of 4 basic categories. The first of these categories is the ellipsoidal. Ellipsoidals are named so because of the design of there lens – the elliptical shape provides a bright, clear spot of light on stage. This spot of light can generally be changed from having a very clear outline to one which is more fuzzy, and can be altered with use of a gobo or breakup. Ellipsoidals come in different types, referred to by the angle of the aperture or the length of the barrel x the diameter. This number indicates the size of spot the light will project. A gobo is a piece of metal with a design cut out of it which is designed to be used with an ellipsoidal to project a pattern. These lights are frequently used because of their ability to accurately light a small portion of the stage, allowing control over light and shadow in the performance space. They use light bulbs ranging from 500 to 1000 watts. A good example of an Ellipsoidal is the ETC source Four, available in sizes from 10 degrees (tight beam of light) to 50 degrees (wide pool of light).

A fresnel lens is used to project a wide beam of unfocused light. These lights are useful to flood a large area of stage with low-intensity light. They are classified by the diameter of their lens, primarily 6" or 8", which consume 500 and 1000 watts, respectively. The width of a fresnel's beam can be changed from 15 to 55 degrees.

Par cans are lights which project an oval-shaped beam of light onto a surface. Beam intensity and shape are a function of the lamp rather than the fixture – the lamps include NSP (narrow spot), MFL (Medium flood), and WFL (Wide Flood). The fixture itself is classified by diameter, denoted in eigths of an inch. Therefore, one of the most

common sizes, a par 64, would be 8 inches in diameter. Power consumption is a function of size - a par 64 generally draws 1000 watts, while a par 56 would draw proportionally less (700-800 watts)

There are other classes of lights which attempt to cross over between categories by combining the most useful aspects of two or more types into one fixture. One such light is an ETC Source 4 Par. This light combines the versatility of a par can (a bright, unfocused beam with many beam sizes available) with the usefulness of a Source 4 (easy, cheap to replace lamp, small size). This fixture fixes one major flaw of a PAR can – the expense and difficulty of replacing the lamp. ETC has another fixture which attempts to combine these attributes with those of a Fresnel (Adjustable, low-intensity beam), resulting in the Source Four PARnel, which can also do duty as a par can due to its interchangeable lenses. The PARnel is also a useful instrument to have in an inventory because its bulb is interchangeable with other Source 4 fixtures.

A cyc light is a large, high-powered fixture that is either set on the floor or flown from a batten at the back of stage. It is used to project a large pool of light onto a Cyc, a large piece of fabric that covers the back wall of the stage. These use their own types of bulbs, and can be have as many as six 1000 watt bulbs in one fixture (different circuits).

Strip lights are lights that are flown from the battens and used to light a large area of stage such that there is no difference in light intensity or color across the stage. They use many lamps on the same circuit to achieve this. The lamps are generally fairly typical lamps, such as an R40 Flood lamp

Appendix 2: Financial Data

Year	Show	External Rental Cost
2003	NV21	$2,335.00
2003	Arsenic	$1,150.00
2002	Skin	$1,582.00
2000	Frankenstein	$763.00
Average:		$1,457.50
Normal LNL cost:		$700
Total Average		$2,100

Year		Frankenstein	2001
Term			B Term
Supplier			Port Lighting Systems
Item	**Quantity**	**Price**	**(extended)**
Source 4 body*	21	$5.00	$210.00
Source 4 26 degree lens	6	$5.00	$60.00
Source 4 50 degree lens	10	$5.00	$100.00
Source 4 36 degree lens	5	$5.00	$50.00
Source 4 Par*	8	$8.00	$128.00
AF1000 Strobe	2	$35.00	$140.00
8 Circuit Edison Breakout	5	$7.50	$75.00
Total:			**$763.00**
*-Includes Safety Cables/C clamps			

Year:		The Skin of Our Teeth	2002
Term:			B Term
Supplier:			High Output
Item	**Quantity**	**Price**	**(extended)**
Source 4 Head	33	$7.00	$404.25
Source 4 19 deg lens	8	$7.00	$98.00
Source 4 26 deg lens	10	$7.00	$122.50

Source 4 36 deg lens	6	$7.00	$73.50
Source 4 50 deg lens	9	$7.00	$110.25
Source 4 Iris	3	$6.00	$31.50
6" Fresnel	13	$8.00	$182.00
6x100' Multicable	6	$35.00	$367.50
6x50' Multicable	7	$6.00	$73.50
Cable: 12/3, 20A, 5' w/ GPC	15	$2.00	$52.50
Cable: 12/3, 20A, 10' w/ GPC	10	$2.00	$35.00
Cable: Two-fer, 20A GPC	5	$1.75	$15.31
C-Clamp	46	$0.00	$0.00
Color Frame, 6.25"	33	$0.25	$16.50
Safety Cable	46	$0.00	$0.00
Total:			**$1,582.31**

Year		NV21	2003
Term			D Term
Supplier			Port Lighting Systems
Item	**Quantity**	**Price**	**(extended)**
Source 4 body*	5	$6.00	$60.00
Source 4 50 deg. Lens	5	$6.00	$60.00
8"Fresnel*	28	$10.00	$560.00
Female Stage- Edison	24		$0.00
Barn door for 8" fresnel	16	$3.00	$96.00
2kw Fresnel	5		$0.00
1 lamped 1k part of 8" count			$0.00
Gel Frame	5		$0.00
Par 64*	16	$6.00	$192.00
10" Gel Frame	16		$0.00
Lamped 1k WFL	16		$0.00
T3 6 Cell Strip Light*	4	$40.00	$320.00
female stage to edison	12		$0.00
Gel Frame for cycs	24	$1.50	$72.00
Floor Trunions	4		$0.00
12 Gauge Multi 50'	2	$15.00	$60.00
12 gauge Multi 100'	3	$30.00	$180.00
8 circuit female edison breakout	7	$7.50	$105.00
vx24 channel dimmer rack	1	$240.00	$480.00
neutron hazer	1	$75.00	$150.00
neutron hazer Road Case			$0.00
Total			**$2,335.00**
* - Includes Safety Cables/C-Clamps/Hanging Arms if necessary			

Year:			**2003**
Term:			**B Term**
Supplier:			**Port Lighting Systems**
Show:			**Arsenic and Old Lace**
Item	**Quantity**	**Price**	**(extended)**
100' 12 gauge multi	1	$21.00	$42.00
stage pin 10'	7	$0.35	$4.90
stage pin 25'	4	$1.05	$8.40
Stage pin 5'	5	$0.35	$3.50
Stagepin Breakout	2	$5.25	$21.00
VX24 Channell dimmer rack	1	$168.00	$336.00
ETC Express 48/96	1	$192.50	$385.00
Barndoor 7.5"	3	$1.40	$8.40
Source Four Top Hat	17	$1.40	$47.60
Source Four 19 degree	1	$8.40	$16.80
Source Four 26 Degree	8	$8.40	$134.40
Source Four 50 Degree	5	$8.40	$84.00
Source Four Parnel	4	$7.00	$56.00
Total			**$1,148.00**

Appendix 3: Other Schools' Inventories

School	Fixture Type	Number
Georgia Tech		
	Fresnel	44
	Source 4 - body	20
	Source 4 - body (750)	7
	S4 Head - 26 deg	13
	S4 Head - 36 deg	13
	S4 Head - 19 deg	5
	Strand 3.5x6	2
	4.5x6/6x9	40
	6x12	24
	6x16	2
	Scoop (10")	2
	Scoop (12")	1
	Par 64	8
	Cyc	3
	Spot	2
	Track-Spot	6
	Intellibeam	4
Rutgers		
	Strand 750W 10 deg ers	1
	Kliegl 1000W	10
	Par 64 WFL	10
	Kligle 3486 strip light	6
	Kliegle 3498 mini strip	2
	S4 575 Watt, 19 deg	20
	S4 575 Watt, 26 deg	60
	S4 575 Watt, 36 deg	30
	S4 575 Watt, 50 deg	20
	S4 15-30 deg ers	15
	S4 25-50 deg ers	15
	PAR Spotlight	50
	Altman 100W Cyc	8
	Cyberlight (High End)	2
	Studio Color (High End)	2
	Follow Spot	3
RPI		
	Par 64	16
	Scoop	16
	Striplights	3
	3 Inch Fresnel	2
	6 Inch Fresnel	9
	8 Inch Fresnel	3

	6x9	28
	6x12	17
	6x16	6
	Shakespeare 20 deg	1
	Shakespeare 30 deg	10
	Shakespeare 40	5
	Shakespeare Zoom 15-35	1
	Shakespeare Zoom 30-55	1
	Source Four 36 deg	4
	Source Four 26 deg	2
	Source Four Parnel	2
Virginia Tech		
	6x9	60
	6x12	85
	6x16	61
	6x22	26
	Altman 30 Deg Ers	32
	Altman 20 Deg Ers	35
	Altman 12 Deg Ers	6
	CCT 15 Zoom Ers	8
	Par 64	82
	7" Fresnel	15
	6" Fresnel	54
	4 Cell Cyc	5
	14" Scoop	22
	6' Four-Color strip light	12
	Altman Mini strip	8
	Scenic Projector	2
CMU		
	Source 4 15-35 deg zoom Ers	23
	Source 4 10 Deg Ers	10
	Source 4 19 Deg Ers	20
	Source 4 26 Deg Ers	54
	Source 4 36 Deg Ers	36
	Source 4 Par	28
	Par 64	48
	Cyclorama Strip light	18
	MR 16 Mini Strip	20
	Super Trouper Spot	2

Appendix 4 – Emails regarding Donation

Initial email, sent to both Joe Dinardo (ETC Northeast Regional Manager)

Mr Dinardo,

My name is Kirby A. Haizlip. I am currently working on a project at WPI to fulfill part of my Social sciences requirement. I am performing this project on behalf of our on-campus theatre group, Masque. Masque, unlike most theatre groups, owns none of its own lighting equipment. We have an on-campus group called Lens and Lights which provides audio and lighting services, so Masque rents from them for the productions. If Lens and Lights does not have the appropriate equipment, which happens when putting on the larger biannual productions, then it becomes necessary to rent from an external agency. This external rental dominates Masque's budget and takes away from other areas of the production.

My project's goal is to enable Masque to divert part of the funds that we currently use for rentals and use it to purchase equipment over a period of five years. This way, Masque will not have to rent so much equipment, which will save money in the long run. The current plan is to purchase mostly ETC equipment, as that is what Lens and Lights uses (mostly Source 4 ellipsoidals and Source 4 Pars), as well as what we rent from external agencies, and we have had good experiences with it. We would be purchasing Source 4 ellipsoidals, Pars, and PARnels. If we had the budget, we would also likely be interested in a sensor rack and an appropriate control board, but those are unrealistic given our present budget. This is especially true at the present, as WPI has recently gone through some difficult times financially and we are not sure what our budgets might be in the near future. As an educational institution with a highly valued theatrical program, we feel that we should be teaching with the best equipment, and feel that ETC is the best. The productions are an integral part of the program, often serving as the Major Qualifying Project for someone with a major in the humanities and arts department. If we were able to have a reliable, appropriately-sized inventory of lighting equipment, it would make it possible to use funds for other aspects of our productions, thereby increasing the production values and allowing us to better educate theatre-oriented students. I am writing to request that you consider the possibility of donating equipment to us or allowing us to purchase equipment at a discounted rate so that we may better serve our students. If you have any questions at all, feel free to contact me. I would be very interested in speaking with you regarding this project. I have attached a preliminary copy of my project so that you might get a better idea of what I am attempting to do.

I thank you for your time
Kirby A. Haizlip
WPI CEE 2005
508.523.6193

The response from Mr. Dinardo:

Dear Kirby;
Thank you taking the time to contact me. It sounds like you have a very unique production set up. I would be very happy to help where I can. As you can imagine we get a lot of requests throughout the year. The are times when ETC has some equipment it can donate. It is not as much one may think and it goes

very quickly. I would certainly keep you group in mind when equipment becomes available..

In the mean time there are two excellent ETC dealers in your area, Barbizon Light and High Output. Both are dedicated in enriching the arts in their area as well as having ETC equipment at inexpensive prices. Please give them a call, they would be happy in helping.

If there is anything else I can do, please keep my email address and contact me.

Regards,
Joe DiNardo
ETC Regional Manager

Another response, this one from someone else in ETC, in a position more relevant to donations.

Hi Kirby,

Thanks for the email. I appreciate the effort that you put into your document. You clear vision is very well organized and laid out.
Unfortunately, we do not have any units available for donation at this time.
However, I will file your information, and if something comes up, I will notify you.

Thanks!
Rick Wolff
ETC

Prices

Item	High Output	Production Advantage	SME Enterprises	Stage Lighting Store
Source Four Elliposidal	$261.00	$255.21	$309.00	$286.00
Source Four Par			$154.95	
PARnel	$192.75	$173.08		$200.00
Socapex Cable, 100-ft		$350		