Film-Tech

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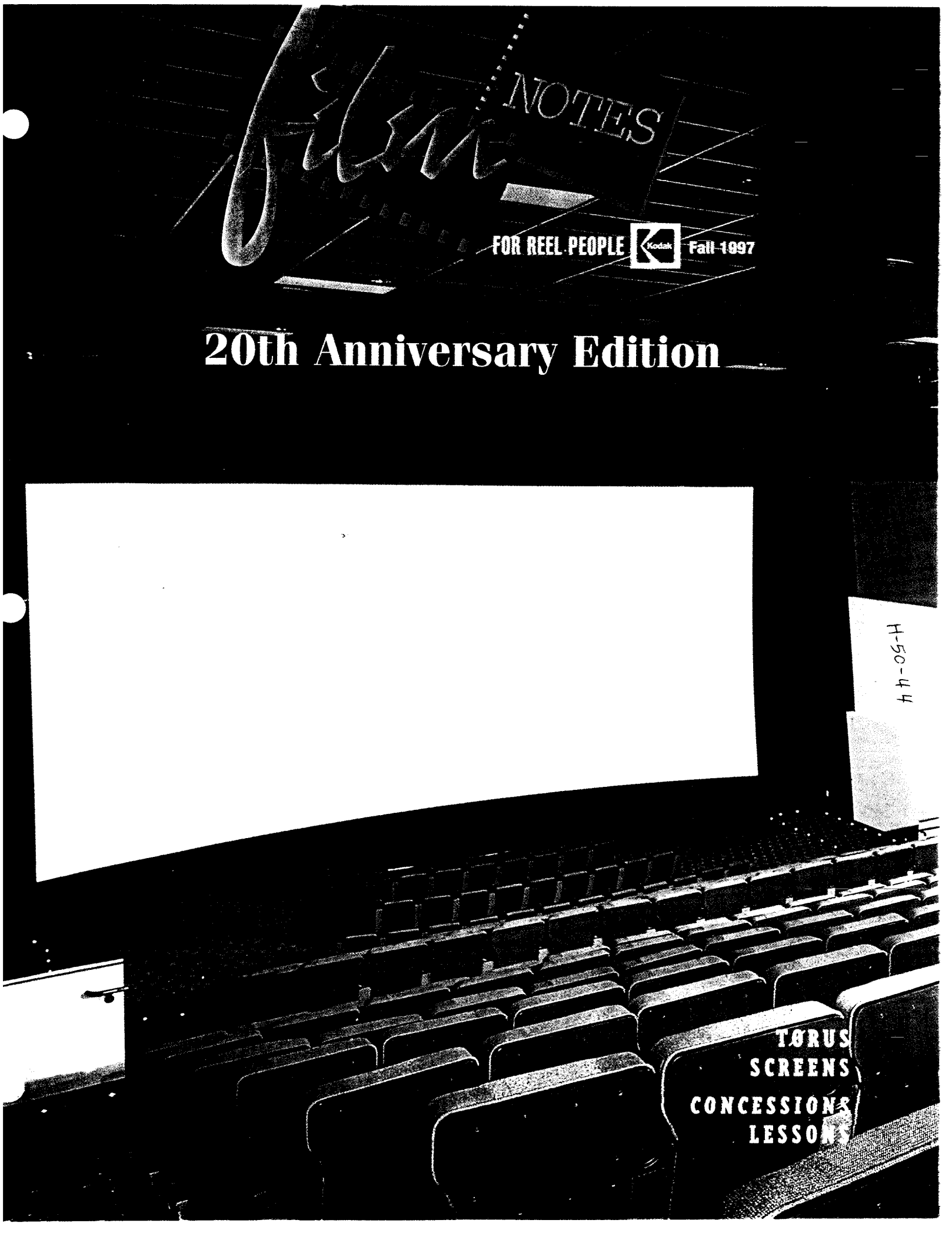
Film NOTES

FOR REEL PEOPLE Kodak Fall 1997

20th Anniversary Edition



TORUS
SCREENS
CONCESSIONS
LESSONS

H-90-44

Film NOTES

Fall 1997

H-50-44

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Pytlak's Practical Projection Pointers

JOHN PYTLAK
Senior Technical Associate
Motion Picture Systems Development Group

Heat Damage To Prints

Part I

New theatre construction emphasizes "wall to wall" images on screens that often exceed fifty feet in width. Only five years ago, the average xenon bulb power was 2000 watts. Today, power levels of 4000 watts are common, with some theatres using as many as 7000 watts to project 35mm film onto 80-foot screens.

Focusing all that power through a postage-stamp size piece of film can cause problems ranging from image flutter and focus drift to permanent print damage like blistering, scorching, fading and dye migration. In our years of studying the effects of excessive heat on film, Kodak has identified three major areas of concern: improper or non-existent use of heat filters, excessive bulb current, and maladjustment of bulb focus causing a "hot spot."

Heat Filters

Use of efficient heat filters is recommended for all projectors and is mandatory for any lamp larger than 2000 watts. Aluminized, silver, or rhodium-surfaced reflectors without heat filtration are intended only for specialized applications and should not be used for theatres. Xenon bulbs emit a large amount of their energy in the infrared portion of the spectrum. Excess infrared energy absorbed by the film is a major source of heat damage, especially with black-and-white prints (silver grains absorb more infrared energy than color dyes).

An efficient heat filter removes most of the damaging infrared energy produced by the lamp. Most heat filters rely on dichroic coatings on the reflector, making it reflect visible light and absorb infrared energy. Consoles with vertically-mounted bulbs usually use a flat dichroic mirror set at a 45-degree angle, which reflects visible light to the aperture and transmits the

Continued on Page 14

Screens, Lenses, Gain & Curves: A Look At Tørus Screens

by Glenn Berggren and Gerald Nash

Change is always with us and it is evident in motion picture theater design.There has been a significant evolution in theater configuration: screens are larger, lens focal lengths are shorter, and seating is tending toward the stadium-stepped tiers. Exhibitors are faced with new problems that have been created by steep projection down angles, lenses with half the focal length of those commonly used just ten years ago and screens that have tripled in area.

Movie Screens

In general, there are three types of screens and two types of screen materials. The two types of screen materials are matte and gain. (Both types may be either with or without perforations). The matte type must be installed as a flat screen so it will not cross-reflect. Gain screens are directional (light reflects mirror-like). Mounting them flat with short lenses creates low efficiency and a "moving" hot spot will be evident.

The three screen shapes are flat, single-curve, and the compound-curve Tørus screen. The flat screen must be matte (a gain of 1.0) to avoid a hot spot. With careful design, a one-curve gain screen will aim some of the directional light toward the audience. Most of the light will appear as a horizontal hot band in which lost light is reflected towards the ceiling and floor. With a compound-curve gain Tørus screen, all of the light from the entire screen surface will be aimed at the audience.

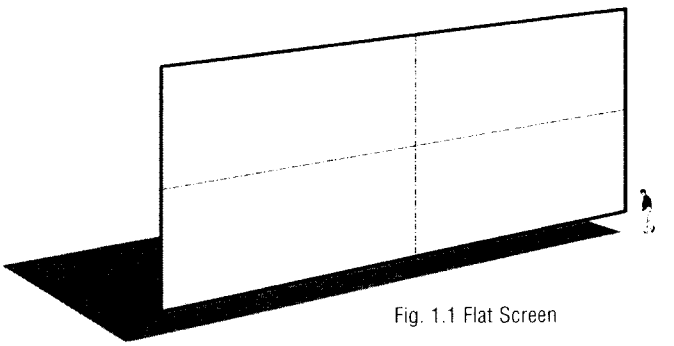


Fig. 1.1 Flat Screen

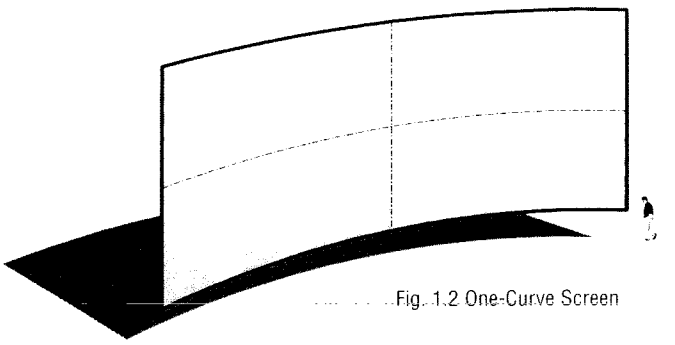


Fig. 1.2 One-Curve Screen

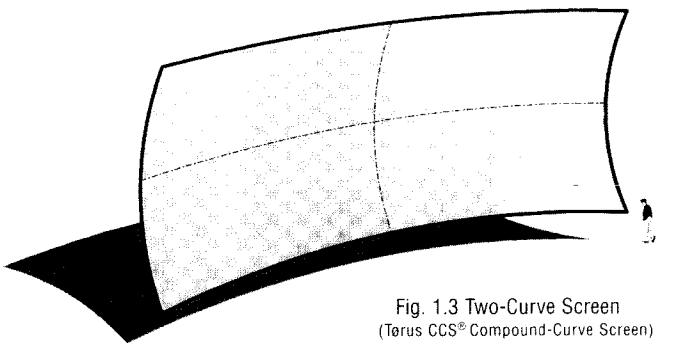


Fig. 1.3 Two-Curve Screen
(Tørus CCS® Compound-Curve Screen)

Fig. 1 Types Of Projection Screens

Lenses

In today's theater design, there is a tendency toward larger screens and shorter projection distances. The use of shorter focal length lenses means that the angles to the sides and corners have become extremely steep. The gain performance in the corners is well below 1.0. This does not contribute to screen-light efficiency and leaves an obvious hot spot. Even in the case of single-curve screens, (because of the steep angles of the short focal length lenses), the top 40% and bottom 40% of the screen will not utilize the efficient portions of the gain curve. The one-curve screen will have the hot

band across the middle and the gain at the top and bottom of the screen will be less than 1.0 also.

The compound-curve screen gathers all the primary reflected light rays, causing them to reflect to the large center area of the auditorium. This cannot be done with a flat screen, and even a single-curve screen performs with extremely low efficiency. Only the compound-curve Tørus screen can efficiently capture the majority of the primary reflected light rays and place them where they belong. The careful design of the screen surface will significantly improve picture quality, color saturation, and contrast. Since lower wattage bulbs can be employed, there will be less heat on the film. Lower wattage bulbs will also reduce the cost of operations (see chart on page 7).

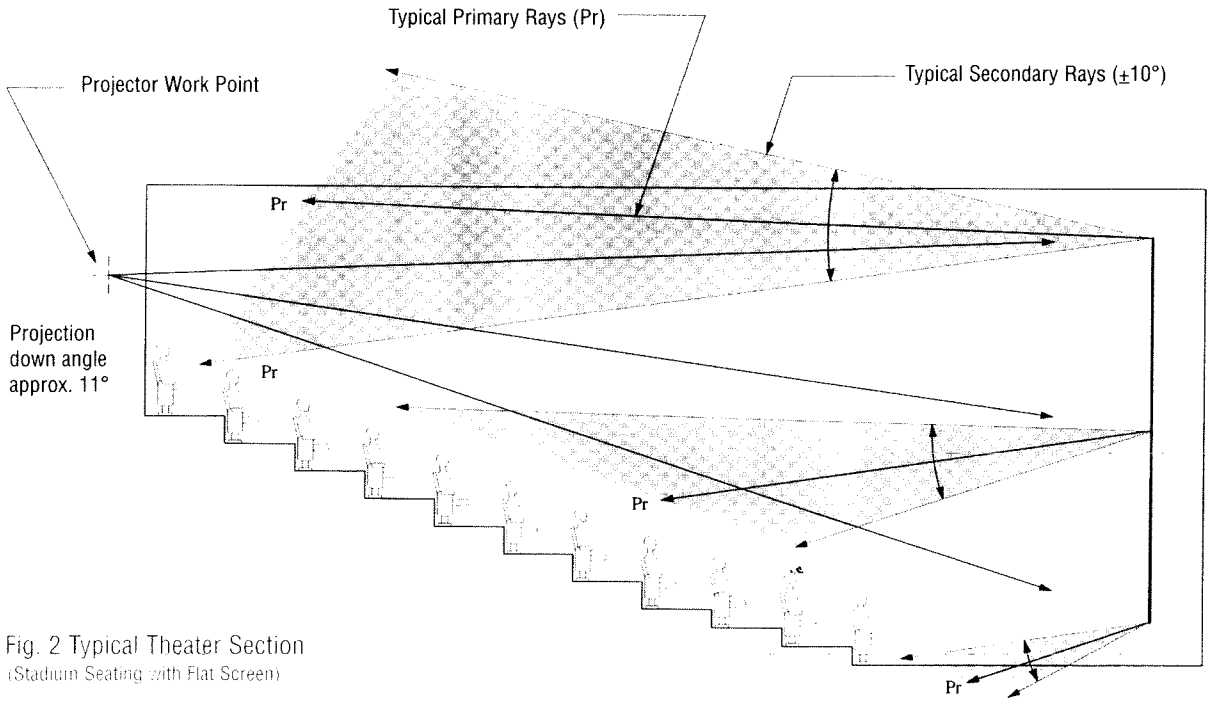


Fig. 2 Typical Theater Section
(Stadium Seating with Flat Screen)

Seating

With conventional sloped (1:12 ratio) auditorium floors, the center screen light projected from the second floor booth will be aimed toward the middle of the seating area. With the newer stadium designs, the screen is aimed upward toward the central seating area. If not, the seats in the middle of the auditorium looking at either a flat or single-curve screen will see most of the light at the top of the screen and there will be noticeably reduced light at the bottom.

The usual flat screen, in a vertical position, will aim the light downward and off toward the side-walls. A single-curve screen will have a horizontal hot band at the top. The center screen primary rays would aim downward to be seen only by those in the front few rows. Most exhibitors do not tip the screens to aim upward. Even if they do, only the hot-spot or hot-band would adjust to the center of the screen. The compound-curve Tørus screen, derived from the Sigma computer shaping program, is forced to aim upward toward the audience. The Tørus screen "hot spot" is the entire screen surface.

For newer theaters with stadium seating and big screens (17' x 40' and larger), the compound-curve Tørus screen is the practical answer for an improved image. It provides superior picture quality and overall light efficiency. In larger installations, a Tørus easily pays for itself in a few years simply in xenon bulb cost savings.

Movie Screens

The years between 1978 and 1992 have seen substantial progress in the development of lenses for 35mm film projection. These new lenses with their finer focus capability have provided an important boost to image quality. But shorter projection distances and wider auditoriums have created other problems. Some exhibitors have tried to solve the problems by using gain screens. It is generally believed that gain is a good thing and it will aid light-return efficiency. The problem is that gain screens are highly directional and the gain can have a negative effect on light distribution.

from the projector at eleven foot-candles in the center and eight foot-candles in the corners, a screen with a gain factor of 1.5 will realize sixteen foot-lamberts in the center, but the eight foot candles in the corner will be reduced to just a bit over four foot lamberts. It can be seen that a flat 1.5 gain screen creates a corner that is only 25% of the center light level. If the screen were a simple single-curve shape, the sides might be better, but the corners would still be only seven foot-lamberts.

If the projection surface were a computer generated compound-curve Tørus screen the lamphouse could be adjusted back to nominal

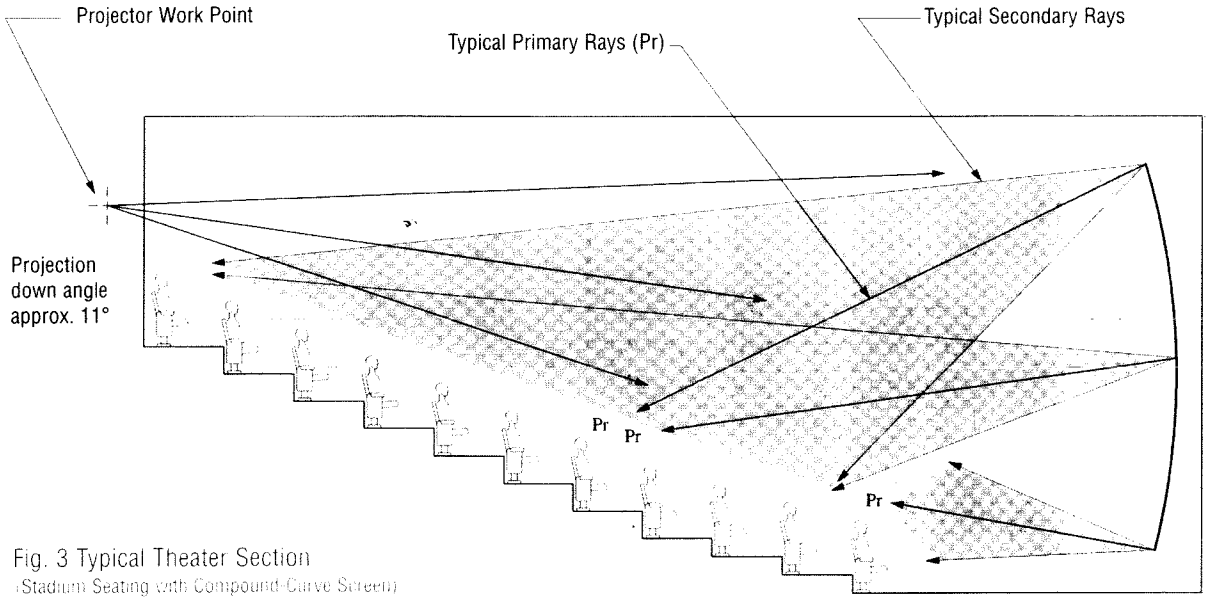


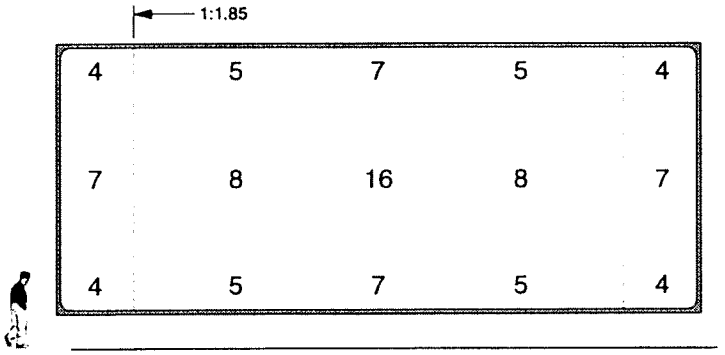
Fig. 3 Typical Theater Section
(Stadium Seating with Compound-Curve Screen)

Since 1993, the typical large screen has tripled in area from 17 x 40 feet to 30 x 71 feet. In order to deliver superior images, this larger size has created a demand for optimum light efficiency. To achieve this performance level, large screen pictures require sophisticated screen shapes and higher gain. The result will be significantly improved picture quality.

Figure 4 on page 6 reveals an interesting phenomenon. The screen light measurement data clearly shows that any gain surface mounted as a flat screen will give low light in the corners. It must be stressed that there is no adjustment in the projection booth that can correct for this. For instance, with a 55mm lens and the lumen output ratings and the center of the screen would be slightly in excess of seventeen foot-lamberts and the corners would be nearly fourteen foot-lamberts. The compound-curve Tørus screen, because it is custom engineered for each auditorium, functions well for both sloped floor and stadium seating designs. **Tørus screens appear to at least double the effective screen light overall and the xenon watts remain unchanged.**

The use of contemporary shorter focal length lenses also has increased the angles to screen corners. Simply put, for instance, the 95mm lens used on a flat screen with an assumed gain of 1.5 reveals the functioning corner gain to be about

Fig. 4 Screen Type Performance Reflected Light Readings (In Foot-Lamberts)



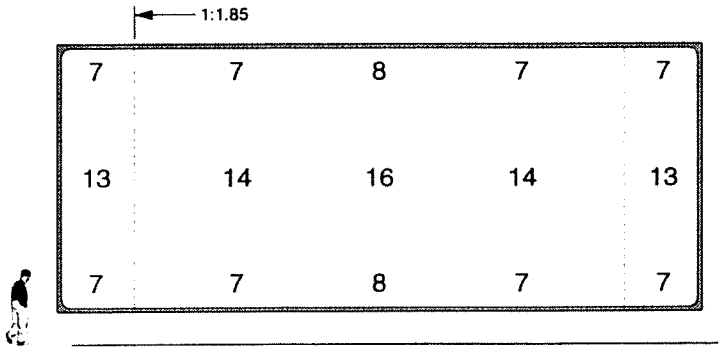
Totals
25
46
25
96

Flat screen with 1.5 Gain and typical short lens; i.e., 60mm Cinemascope

Side Distribution 44%
Comer Distribution 25%

Efficiency 40% (96/240)

Case 4.1 Flat Screen: Nominal Center Screen Brightness 16 Ft/Lam



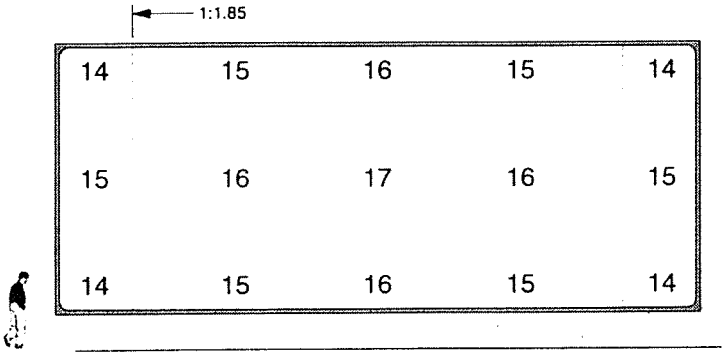
Totals
36
70
36
142

One-curve screen with 1.5 Gain and typical short lens; i.e., 60mm Cinemascope

Side Distribution 81%
Comer Distribution 44%

Efficiency 59% (142/240)

Case 4.2 One-Curve Screen: Nominal Center Screen Brightness 16 Ft/Lam



Totals
74
79
74
227

Two-curve screen with 1.5 Gain and typical short lens; i.e., 60mm Cinemascope

Side Distribution 88%
Comer Distribution 82%

Efficiency 95% (227/240)

Case 4.3 Two-Curve Screen: Nominal Center Screen Brightness 17 Ft/Lam
(Torus CCS - Compound-Curve Screen)

25-foot high screens and larger may have difficulity meeting minimal light distribution standards without using compound-curve screens.

All screens Cinemascope Aspect Ratio 1:2.39 (1.85 indicated). Assume all screens nominal 20' x 48' with 4,000 xenon watts. © 1997 Sigma Design Group.

0.96, not 1.5. If a 2.0 gain screen were used, it would be worse. Calculations show that the light at the corners gets progressively worse as the lens focal length becomes shorter.

Advanced Screen Design

The human eye sees best with sufficient light. Optimum light provides enhanced color saturation and greater contrast. The audience can see the in-depth picture on a Tørus screen because the entire image is bright enough to be seen over the entire screen surface–not just at a bright center spot. Every square inch has uniform light right to the corners of the picture. The Tørus compound-curve screen, at a given gain, provides nearly double the efficiency over any other screen shape. A Tørus screen is a visible, efficient, high-fidelity image. There are more than 400 Tørus screens in theaters today.

The trend of the past fifteen years has seen theaters evolve from small auditoriums with sloped floors and long focal length lenses to larger auditoriums with stadium seating and short lenses. In the planning process the screen factor has been lost and ignored. What worked for Radio City Music Hall with its huge flat screen and long lenses does not work in a new twenty-screen multiplex. Radio City Music Hall has a large 29' x 68' screen image and uses 120mm lenses, yet it has difficulty reaching full screen light. In a modern stadium auditorium with the same screen size– but lenses of half the focal length (60mm)–the light, even with a single-curve screen, will be reflected to the floor. The solution to the problem is a screen where every square inch, corners included, has been computer shaped so that all light is aimed and reflected back up to the main seating area. Imagine 150,000 tiny mirrors on a 21' x 50' screen all aimed at the middle seat. It will be bright.

The Tørus screen provides maximum efficiency of reflected light, with minimal cross reflection and minimal light lost to ceiling and floor. With the compound-curved surface, the efficiency rises as the gain rises. With flat and single-curve screens, the useful efficiency does not rise with increased gain; only the hot-spot becomes brighter. The resulting shape defines the Tørus compound-curve screen shape. With that unique design, calculated exactly for each auditorium, optimum efficiency is realized.

The year 2000 can become the new era of large and bright movie screens. And we can enjoy superb image quality. There is an unseen depth of imagery on film that even cinematographers and directors may not notice. Neither screening rooms nor ninety percent of theaters can illuminate the nuance, depth, and contrast of contemporary film stocks. For years, the movie audience has been deprived of the rich detail that may only be captured on film. The ideal display medium is here: the compound-curve Tørus screen.

For more information contact Sigma Design Group, (310) 452-2292.

Tørus vs. Flat Screen Operating Costs

*Assuming: Cost of Electricity: $ .10/KWH - Annual Interest Rate: 6% - Bulb Operating: 70 Hrs./Wk.

	20x48 Screen Size			24x57 Screen Size		
Number Of Years	Flat (4500 W/Bulb)	Tørus (3000 W/Bulb)	Savings	Fflat (7000 W/Bulb)	Tørus (4500 W/Bulb)	Savings
1	$6,419	$3.865	$2,554	$17,038	$6,419	$10,619
2	14,681	7,509	7,172	35,815	14,681	21,134
3	22,456	10,944	11,512	53,475	22,456	31,019
4	29,771	14,183	15,588	70,087	29,771	40,316
5	36,653	17,237	19,416	85,711	36,653	49,058
6	43,129	20,116	23,013	98,364	43,129	55,235
7	49,223	22,830	26,393	112,308	49,223	63,085
8	54,946	25,389	29,567	125,424	54,956	70,468
9	60,351	27,802	32,549	137,761	60,351	77,410
10	65,427	30,076	35,351	149,364	65,427	83,937

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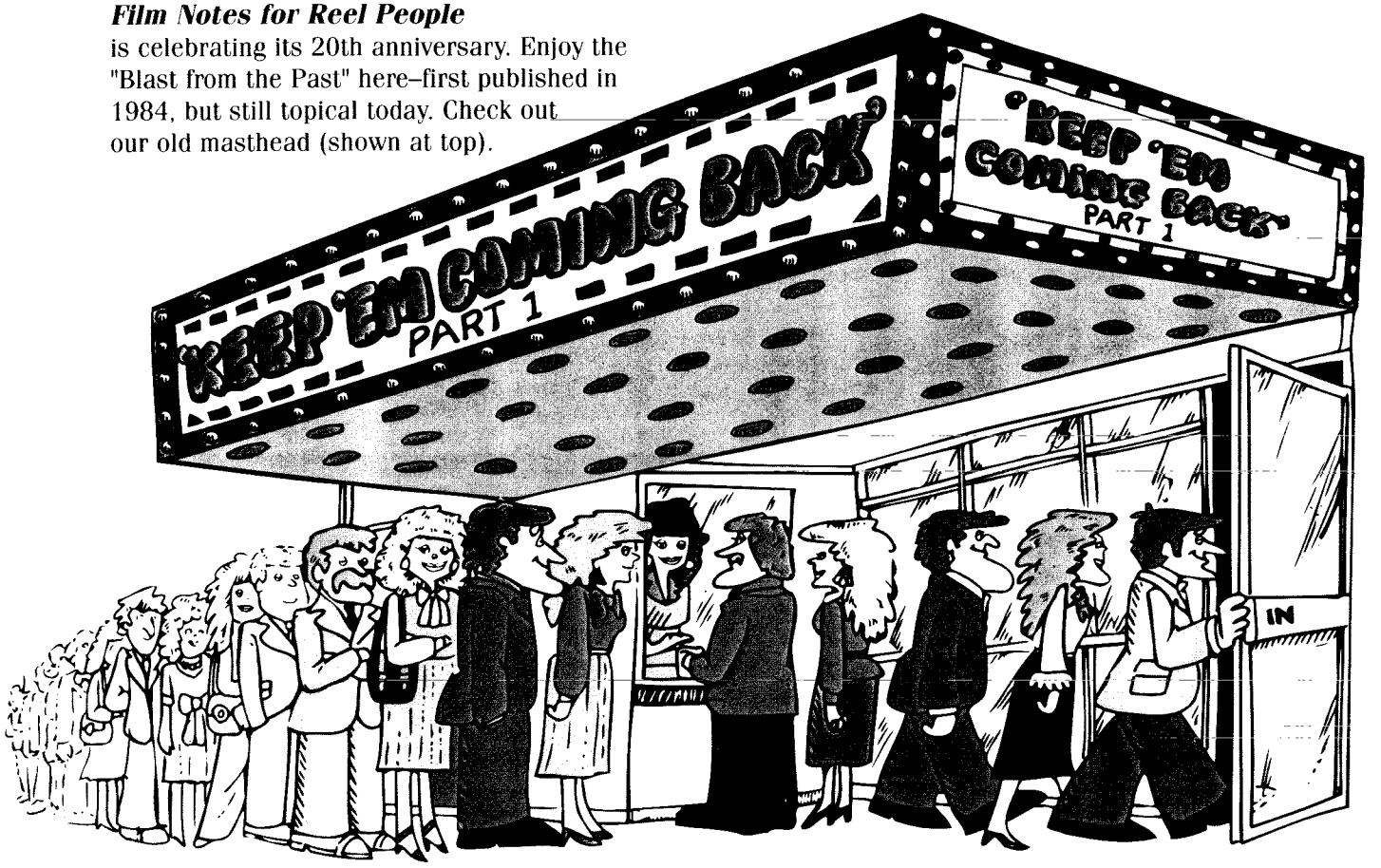
FILM NOTES FOR THE REEL PEOPLE

Film Notes for Reel People is celebrating its 20th anniversary. Enjoy the "Blast from the Past" here–first published in 1984, but still topical today. Check out our old masthead (shown at top).

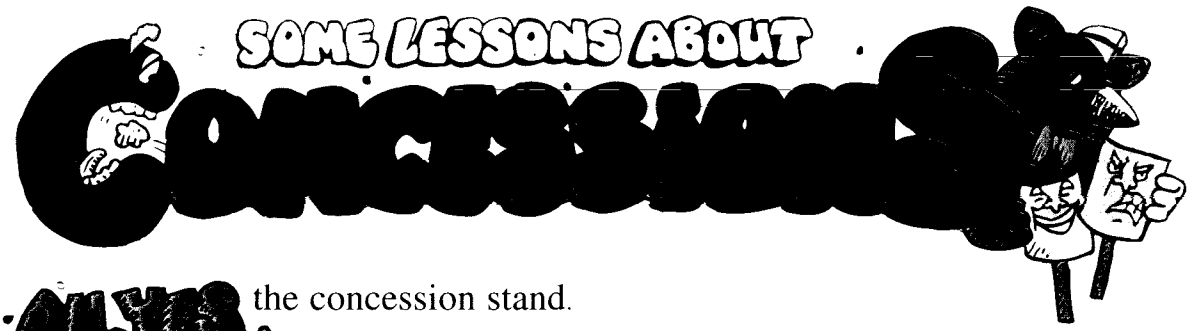


Introduction

1984 is the year that we at Eastman Kodak have designated to take a more active role to "Keep 'Em Coming Back" to your theatre. In this light, our four quarterly issues of *Film Notes for the Reel People* will address various aspects of theatre maintenance, projection practices, employee training and courtesy, and concessions.

There are certain service organizations dedicated to assisting exhibitors and distributors in perpetuating the motion picture experience. Over the years, Eastman Kodak has taken an increasingly active role in each of them. Included in this group are NATO—the National Organization of Theatre Owners; SMPTE—the Society of Motion Picture and Television Engineers; TEA—the Theatre Equipment Association; MPAA— Motion Picture Association of America; ACVL—Association of Cinema and Video Laboratories; and the InterSociety Committee, founded by former Kodak vice president and general manager, Kenneth Mason.

In addition to our more active involvement in these support groups, we have embarked on introducing ourselves to you—the theatre owner, manager, and projectionist—on a more individualized basis through our traveling field training seminar, MBO: MANAGEMENT BY OBSERVATION. This presentation is designed to heighten (theatre) management awareness of projection practices that make "going to the movies" a more pleasurable experience for your patrons. Like our four issues of *Film Notes for the Reel People* in 1984, the focus of the seminar is to "Keep 'Em Coming Back." It continues to extend Kodak's commitment to exhibition.



...the concession stand.

You love it when you total up your weekly profits; you hate it when you have to hire competent people to run it and clean it; you hate it when it's deluged with frenetic and irate patrons; you love it when your patrons buy all your popcorn. And what about those patrons? They love the popcorn, candy, and ice-cold drinks; they hate the high prices, long lines, and often discourteous service.

Before we delve into the mysteries of this dual love-hate relationship, let's try to put the concession stand in perspective within the overall theatre experience. At the heart of the matter lies your primary reason for being in business: to show film and to provide a pleasurable theatrical experience. NEVER FORGET that your customers are initially attracted to your theatre because you are showing a film they want to see. You might want to argue that point when you see crowds of teenagers clustered around your new game machine or see your small-fry at Saturday matinees clamoring at the concession stand. But remember, if your theatre and your presentation fails to provide them with the enjoyment they seek, they will cluster and clamor at another theatre next week. Sampling the nachos or setting a new record in "Dig-Dug" may attract them after they get there, but first and foremost, you have to get them there! Then, you have to "keep 'em coming back"—again and again.

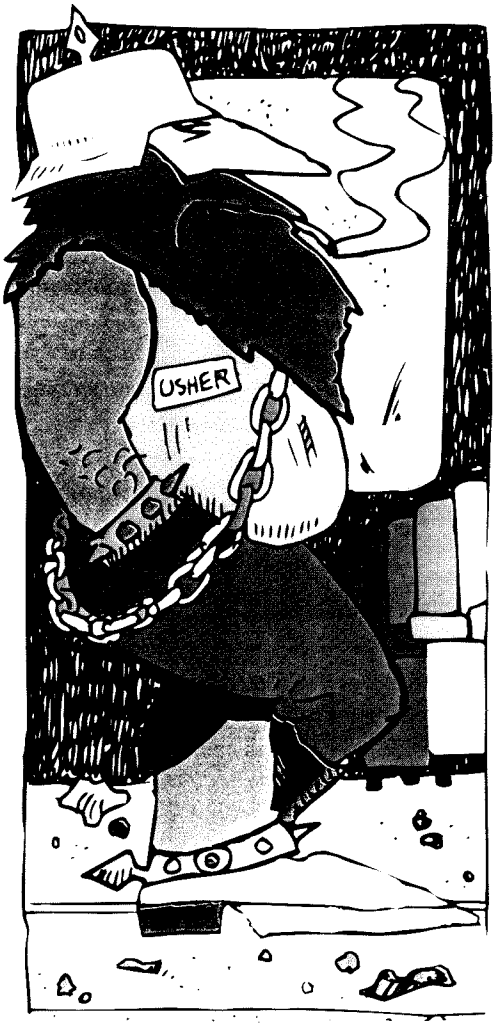
Since the patrons come to see the movie, then, any enhancements to that experience that you can provide will increase their enjoyment. Munching on fresh, tasty popcorn and sipping a cold drink that is not crammed full of ice pleases a customer. Conversely, if they are served by a harried, disgruntled employee and charged exorbitant prices, the gratification derived from the food and beverage is diminished. And anything that interferes with the pleasure of the movie-going experience is counterproductive toward keeping them coming back to your theatre.

There are three general types of concessions in most theatres: food, merchandise, and game arcades. Perhaps we can take a closer look at each of these to insure that they keep your customers smiling–not swearing!

A sure-fire method to keep the crowd moving smoothly is to minimize the motions of the employees behind the concession stand. The following ideas pertain to concession stands that are

circular (with the stock kept in the middle and in cases around the counter) and that have back and front counters.

1. Keep all the items a customer might order within easy reach of each employee so they don't have to run from one end of the stand to the other frantically grabbing candy with one hand and filling a drinking cup with the other. **Remember: the more time your servers spend with each customer, the fewer customers they can serve.** Having popcorn and candy in or behind the display case, with the drink heads and a cash register atop the counter in



each serving area, helps to increase your serving efficiency by reducing the "running and reaching" of your servers. Cups for both popcorn and drinks can be placed in spring-loaded bins near the inside edge of the counter so that another pops up when one is removed. Although duplication of drink heads or cup holders requires higher initial cash outlays, you will reap the benefits immediately with satisfied customers, more productive employees, and an increased dollar volume at the stand because you provide service more promptly. NOTE: If you adopt this concept, ask an usher to assist in channeling the crowd into distinct lines during peak periods and to help keep them moving in an orderly manner toward each server.

2. Schedule one employee to do nothing but stock and clean during peak business periods. For example, if you normally schedule four concession employees to service customers on a Saturday night, try scheduling a fifth person whose sole responsibilities are stocking ice, candy, and cups, popping corn, and making sure the CO_2 tanks are full. This person might also prepare nachos or drinks so that the servers need only reach behind them to obtain the item and present it to the customer. What you spend in additional payroll will come back to you in increased sales by providing faster service in a less hectic atmosphere.

3. Talk with your district or division manager about appointing an employee as "chief of concessions." Aside from giving your concessionists something for which to strive, this person will be charged with the responsibility of staffing the stand properly for peak periods—sometimes taking an usher or two from the floor to work the stand during a rush. One very important function for a chief of concessions is to make sure (before the crowd appears) that the cash registers have sufficient change with which to perform transactions. In short, anything that you as a manager can do to keep the servers busy serving your patrons will keep your cash registers jingling more frequently. **Any time** your servers spend stocking, repairing, cooking, or making change takes them away from their primary function of serving customers.

Theatrical Cafeteria

A cafeteria-style concession stand, where the customers move along selecting the items they want, requires that concession employees keep the bins fully stocked and that there are enough cashiers at the end of the line to handle the crowds. Although cafeteria-style stands are designed for efficiency, the best laid plans go awry when the line stops because one cashier just cannot take the money fast enough to keep it moving.

Remember that employee attitudes and actions in any operation reflect the values of management directly. Hold regular staff meetings. Explain your objectives and outline what you expect of your support personnel to help you achieve these goals.

Although loading a cup with ice will use less syrup, it will also annoy your patrons. A more discreet way of accomplishing the same goal is to carefully monitor your drink yields per gallon of syrup and maintain the proper mix of syrup and carbonation. Guidelines on these procedures may vary from one company to another, but usually, your fountain service sales representative will gladly demonstrate the proper method for calibrating drink heads and suggest a satisfactory mix of ice, carbonation, and syrup. If you check these levels regularly, overuse of syrup becomes readily apparent.

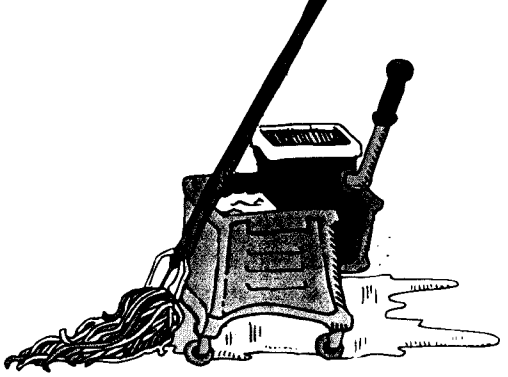
Monitor Thy Yields

Yield-monitoring and portion-control is applicable in other areas of your concession operation as well; popcorn, oil, butter, nachos, cheese, condiments, and snowcone syrup can all be used excessively. By doing a little math at the end of the week when you inventory your concession stand, you can see if usage is too high, either because of a mechanical malfunction or human error.

An all-too-frequent customer complaint is that concession items are stale. We've even heard of instances where chocolate was turning white. And, unlike fine wine, chocolate is *not* better with age! Make sure your employees rotate the candy, nacho chips, popcorn, and hot dog stocks—just like they do in grocery stores—so that there are never any stale items for sale. It is your responsibility to teach your employees the dangers of selling spoiled or tainted food. For example, if hot-dogs inadvertently are left unrefrigerated overnight, they should be discarded rather than risk a food-poisoned patron the next day. Not only would such a customer leave your theatre with a "bad taste" about the theatrical experience, your local health department might take a dim view of your whole concession operation as well!

No Cheating!

To counteract your patrons feeling cheated by high prices, make sure that the candy you are selling for 95



cents is larger than the one they can buy at the grocery store for 25 cents. Rather than out-right markups, you can increase concession stand profits significantly by monitoring your yields, as mentioned earlier, and by issuing employee guidelines on butter, cheese, popcorn oil, and drinks. If you do not have company policies regarding these areas, perhaps you, as the manager, should take a closer look at your concession stand. Are four squirts of butter on that medium-size popcorn really necessary...or would two be satisfactory? Is there a large oil residue in your popcorn popper at the end of the night? Maybe your employees could use less. Try to maintain a good balance between the prices you charge and your need to have saleable products at your concession.

Clean Counts!

Don't forget to schedule a thorough concession-stand cleaning at least once per week when the theatre is closed. A clean work area (in addition to the obvious health and safety benefits derived from keeping a food service area immaculate) makes for a happier employee who, in turn, is more likely to smile at the customer instead of snarling or being discourteous.

Take a closer look at your food operation; you can keep profits moving upward without disturbing your customers. **Remember: without customers (patrons) your theatre wouldn't be open at all.**

Merchandising

Next, let's take a look at selling merchandise inside the theatre. Offering movie posters, records, books, and film-related merchandise certainly can improve your net profit, and can dress up your theatre and provide a real showman's backdrop for the picture you're showing. But providing this type of merchandise for your customers puts you into the area of retailing, not unlike your local discount or department store. Although you are not selling on as grand a scale as these more traditional outlets, remember these few retailing "basics." Any one of them can help make a sale:

1. Make sure merchandise is displayed attractively and is free of dust. Nothing is so tell-tale about slow–moving merchandise as a veil of dust blanketing its surface!

2. Keep the merchandise close enough so the customer can see it, but not close enough to soil or damage it, or worse yet, sneak it away without paying for it!

3. If you offer a variety of merchandise, get a display case or section off a small display area in the lobby and have someone staff it during peak hours to maximize your sales. Creative use of available space can help you maintain a good profit profile for each location.

4. Make sure posters and gallery art are dust-free and have price tags prominently displayed.

5. Hold staff meetings regularly to familiarize your employees with new merchandise, methods of selling, how they should ring up purchases, and the proper way to package items for customers. Since this type of retailing does not take place in all theatres, help your employees understand how they should deal with customers by offering some type of employee sales training program (especially if you are setting up your retailing area for the first time).

Move Over, Penny Arcade!

Finally, let's look at the love-hate feelings toward arcade machines. You love 'em when they're filled with quarters and hate 'em when you have to post an "out of order" sign and get them fixed. You hate them even more if your patrons complain about the noise or lobby congestion caused by cliques of teens gathered around them. But you love it when people are having a good time in your theatre.

Your patrons have this same ambivalence. Keep in mind that **patrons come to your theatre to see a movie.** If arcade machines are positioned too close to the auditorium doors, noise from their "bells and whistles" can drown out the dialogue of the film. If machines are malfunctioning and eating quarters wantonly without switching on a game, the customer is going to be displeased. Then, your time is infringed upon—most likely when you are already too busy. Conversely, if your arcade machines work as they

were intended and you keep them that way, they will enhance not only the pleasure of your patrons, but your total profits as well.

Be aware that arcade machines have volume controls. If your machines can be heard in the auditorium, ask your service representative to adjust the volume so the noises cannot be heard by your theatre patrons. A dependable service person can help keep machine down-time to a minimum, lessen the frustration of the teenager who has been saving quarters all week, and can help you keep profits moving upward.

Spilling of soft drinks is a major cause of arcade machine malfunction. If possible, put all your machines in one area and post a large sign that says "No beverages in this area." If you must scatter them, however, ask your service person for ideas about how to reduce the chances of damage from liquids (Suggestions on this vary according to the construction of the machine).

As a theatre manager, maintaining a certain amount of objectivity on your operation might be difficult at times. Try to step away from it once in awhile by taking a Saturday night off, grabbing the arm of your favorite companion, and heading for the theatre to see a movie. Forget that it's your theatre. Eat the popcorn—play "Kangaroo"—see the movie. Experience the entire scenario as your customer does. Then ask yourself: **"Would I want to come back to this theatre?** Is there anything that might be improved?" Be your own best critic.

unwanted infrared energy to a heat sink.

The efficiency of heat filters varies among manufacturers, and is affected by the age and condition of the dichroic coatings. When purchasing new lamphouses, compare the efficiency of the heat filter system in rejecting unwanted ultraviolet and infrared energy. Always keep the surface of the mirror and heat filters clean and dust free, using the cleaning procedures recommended by the manufacturer. Dichroic coatings are very fragile and easily damaged if cleaned improperly. Heat filters with obviously worn, pitted, or damaged dichroic coatings should be replaced. Do not remove heat filters or use reflectors with no heat protection, even to get a bit more light on the screen. You'll get a bit more light–and a lot more heat damage.

Bulb Power

The wattage of the xenon bulb has an obvious correlation with the available light output and the potential for heat damage. Although film damage was possible with a 2000-watt bulb, it usually was associated with insufficient heat filtration and gross misalignment of the lamp focus, causing a "hot spot." With bulbs over 4000 watts, film damage is likely to occur with any misalignment of the lamp focus or with poor heat filtration. Running a lamp higher than its rated current range will greatly reduce bulb life, risk catastrophic failure (explosion), void the warranty, and increase the amount of heat. The slight increase in light is not worth it. A good practice is to set up a new bulb to produce the desired screen luminance and uniformity at slightly less than the rated current, and then increase bulb current as the bulb ages and becomes less efficient. DO NOT EXCEED THE MAXIMUM RATED CURRENT.

Illumination Uniformity

Alignment and focus of the lamp are important to achieve good uniformity of illumination on the screen and avoid "hot spot" damage to the film. Focusing the lamp to achieve a bright spot at the center of the screen, with significant fall-off at the sides and edges, not only produces a non-uniform picture but also concentrates the energy of the lamp on a small portion of the film, greatly increasing the risk of heat damage.

Carefully align the lamphouse following the manufacturer's instructions. Alignment tools usually use special jigs and a string or laser to assure optical alignment of the bulb, reflector, aperture and projector lens. The distance between the reflector and film aperture should be set to the exact specification. After the bulb is installed, position and focus should be set to achieve symmetrical distribution of the light and uniform illumination of the film aperture. ***In no instance should the bulb focus be set to deliberately produce a "hot spot,"*** resulting in less than 75% screen luminance uniformity. Bulb position and focus should be checked periodically and each time the bulb is rotated or replaced. If you lack either training or tools, leave the job to a qualified service technician.

Other Factors

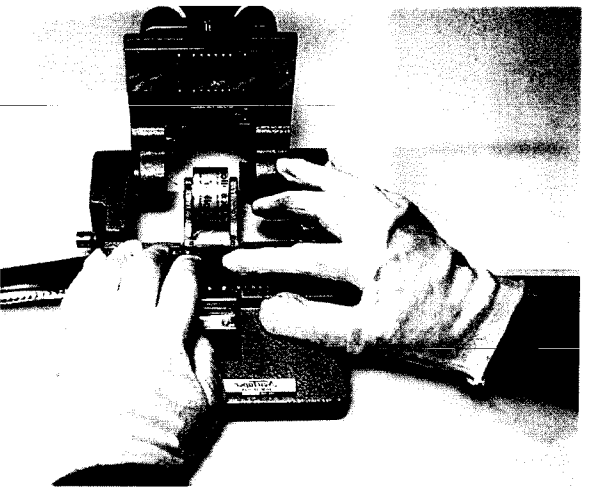
Theatres using large lamps should consider additional equipment that will improve the quality of the screen image. Curved film gates gently curve the film, making it more rigid, reducing focus flutter and improving focus uniformity across the image. Air pressure stabilizers (e.g., Century Cine-Focus) claim to improve focus stability. High-pressure air jets have sometimes been used to cool the film. Water-cooled gates keep the film trap rails and aperture cooler, increasing operator comfort (no burned fingers during threading), and minimizing heat-induced frictional changes that could cause unsteadiness and increase film wear. We have seen rare occasions where film damage occurred when the film contacted very hot metal components in the gate. Some lamphouses (e.g., Christie "Reference" Console) have automatic lamp focus that redistributes the focus pattern to optimize illumination of flat and scope apertures.

If you have heat-related questions, I will try to

answer them in the second half of this article in the next issue. My e-mail address is **jppytlak@kodak.com**. You can write to me in care of this publication as well.

Next Issue:

Do I have a heat problem? How can I remedy it?



Always Wear Film-Handling Gloves

Letters:

Editor:

I applaud *Pytlak's Practical Projection Pointers.*

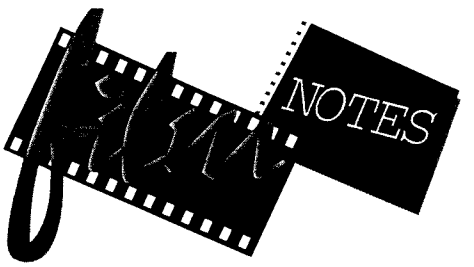
In the May 1997 *Film Notes for Reel People*, it was so simple to buy the Radio Shack humidity gauge, and it works like a champ! I guess I would never have thought of going to Radio Shack for a humidity gauge - I had one of those cheap dial gauges, and it didn't work particularly well.

In every article that Kodak has published (for just about as long as I can remember), you have talked about handling film with gloves. Could you be more specific? We also use Kelmar's PTR film cleaners, and I have written them to ask if theirs are "conductive". I would also like to add to your list of manufacturers of tension sensors - Avask, Inc. in Englewood, New Jersey, phone 201-567-7300, which sells a very economical and effective tension safety device. During 1996 we equipped each of 72 screens with this product. I look forward, hopefully, to hearing from you on the film-handling glove issue. Thank you!

Willis G. Johnson
President
Tivoli Enterprises, Inc.
Downers Grove, IL

Answer:

It is always heartening to hear from our readers. We are pleased that you find ***Film Notes*** *helpful. In answer to your question: Kodak manufactures and distributes cotton gloves for handling film. There are a number of other acceptable gloves available as well. Contact your theatre supply dealer to order. As a point of accuracy: Kelmar manufactures the dry media web cleaner. It is an excellent product for removing film debris as well as oil mottle. Kodak's subsidiary, FPC, manufactures PTR's (particle transfer rollers). In addition to continuously cleaning film as it travels, all PTR's are treated with an anti-stat compound. They are available through FPC in Hollywood (213) 468-5774 or through your local dealer.*



Happy Birthday

Our quarterly publication has been providing technical information to the industry for twenty years. Inside, take a stroll down Memory Lane with an article from our "Keep 'Em Coming Back" series, published in the mid–'80's.

As we move toward the millennium with 1000–1500 new screens each year, it is more important than ever to keep our customers satisfied. If your theatre falls short, they will simply go to your competition. We hope you will find the tips in our concession article as useful today as our readers did 13 years ago. Not only is the information still topical and important, but we found the illustrations to be nothing short of hilarious. Enjoy–we all want to be thriving for the **next** twenty years!

EASTMAN KODAK COMPANY
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