Film-Tech

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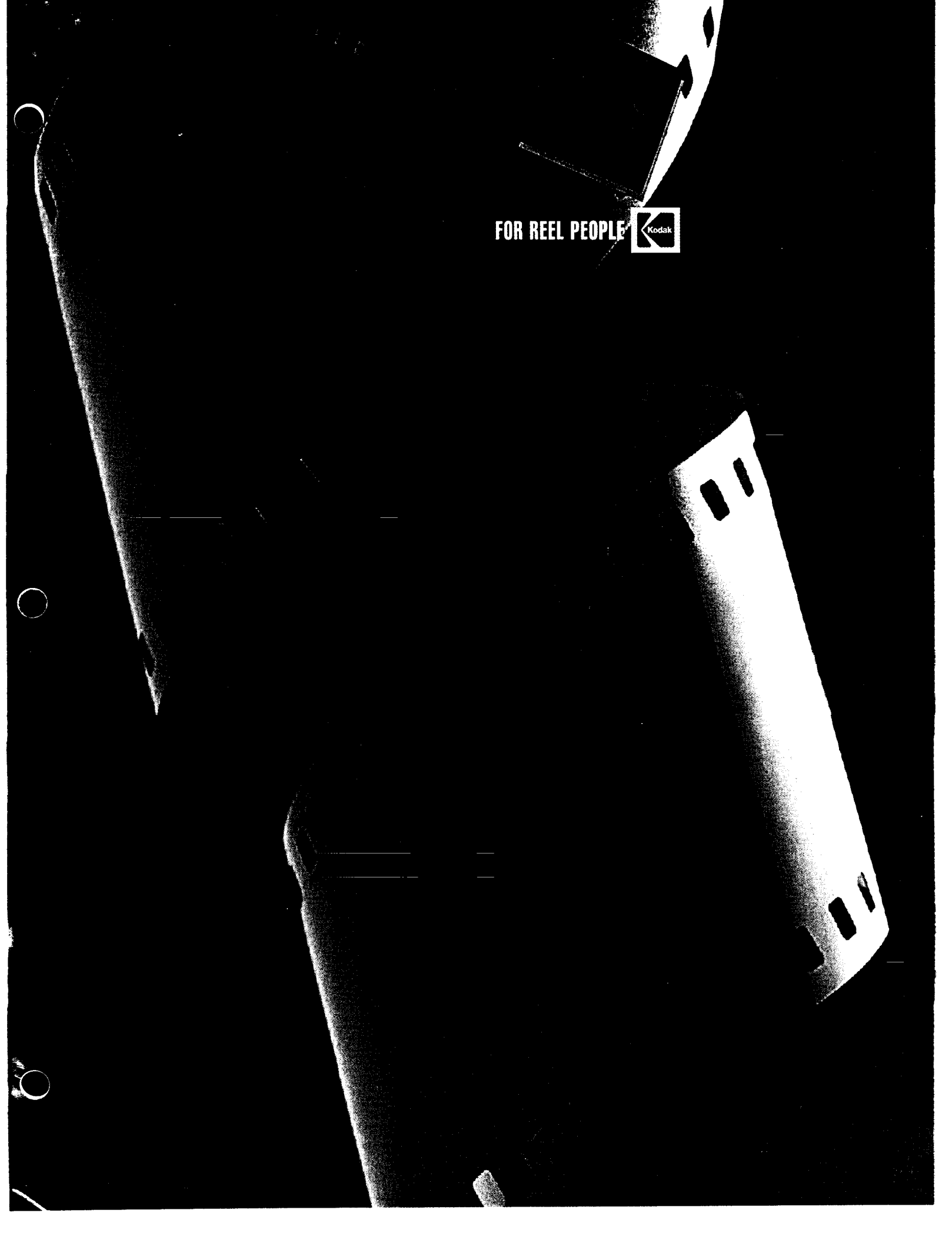
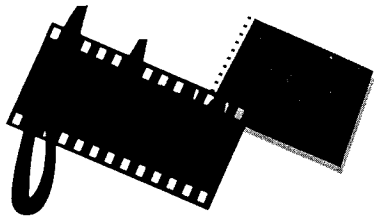

FOR REEL PEOPLE
Kodak



WINTER 1997

II-50-45

CONTENTS

ShoWest Note

Terri Westhafer and John Pytlak will moderate a panel of film-makers, distributors, and others at the opening ShoWest breakfast on March 10 at Bally's Hotel in Las Vegas. The highlight will be a side-by-side film comparison of light levels. The presenation is aptly entitled "Let There Be Light."

Reach Us at Our Internet Site,
www.kodak.com/go/motion

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Senior Technical Associate
Motion Picture Systems Development Group

Pytlak's Practical Projection Pointers

Heat Damage To Prints

Part II

In our last issue, we discussed the importance of heat filtration in projection as well as appropriate xenon wattage to achieve uniform illumination. Now, we will consider the effects of radiant energy on film, heat damage, and how to determine whether you have a heat and problem and how to fix it.

Effect Of Radiant Energy

During projection, the film absorbs radiant energy. This energy causes a very rapid increase in the temperature of the thin emulsion layers when it is absorbed by the dyes or silver grains in the emulsion. The transparent film base absorbs a relatively small portion of the energy so it doesn't heat as quickly. The heat causes the emulsion to expand, displacing the center of the film frame away from the projection lens, which is called "negative drift."

As the radiant energy increases, the drift may vary from frame to frame. When the variation exceeds the depth of focus of the lens, the screen image loses sharpness (focus "flutter"). This is particularly apparent with the use of short focal length lenses. At even higher energy levels, moisture is driven out of the emulsion, causing it to shrink and the center of the frame to move toward the lens ("positive drift"). When some frames drift toward the lens and others drift away, the depth of focus is greatly exceeded, causing focus shifts. Film in this condition is nearly impossible to focus.

These focus effects depend upon several factors:

1. The moisture content of the film is influenced by how it was dried after processing, the drying effect of multiple projections, and the relative humidity in the booth. Kodak recommends maintaining a relative humidity of 50 to 60 percent in the booth.

2. The "core set" (winding) of the film is very important. Based upon Kodak studies, SMPTE Recommended Practice RP 39 calls for maintaining an emulsion-in winding to minimize focus drift problems. "Core set" is also influenced by the diameter of the core of the reel on which the film is wound. Film should always be wound on cores or reels with the largest practical hub diameter. This is why trailers wound on tiny cores often have severe focus flutter.

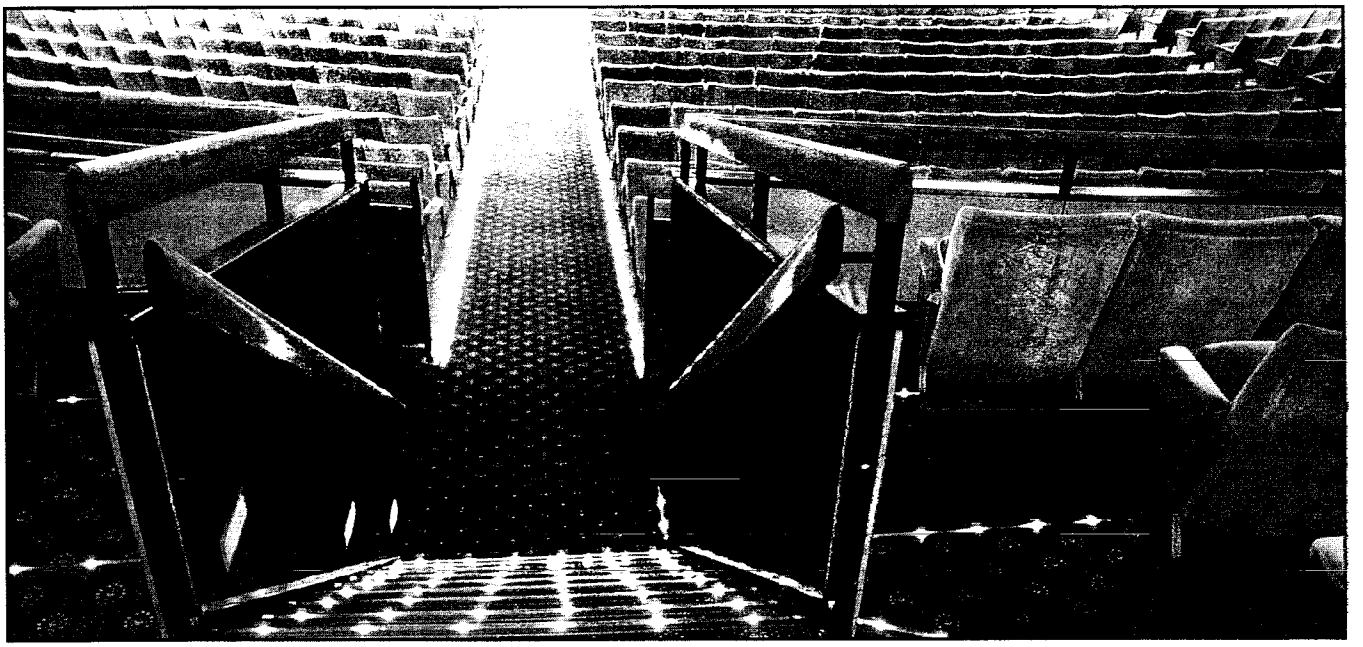
3. The design of the film gate (curved or straight) and the gate tension are important factors.

Cont. On Pg. 10

In The Theatre

SEAT MAINTENANCE

By Jeff Johnson, Cinema Consultant



Seats play an integral part in patron comfort and enjoyment in the theatre. However, they can be the source of various annoying noises as well. Squeaking or banging seats can be most distracting to a patron whose attention is supposed to be on the movie.

After the seats are installed in a theatre, they are too often forgotten. Seats, like all the equipment in the auditorium, need to be checked on a regular basis. When they squeak, bang, and are not firmly affixed to the floor, they will need to be repaired. To make repairs, it is nessary to remove the seat cushion so that you can access the inner workings.

Required tools include: a 1/2" socket wrench, a 7/16" open-ended wrench, and a 9/16" open-ended wrench. After the cushion is removed, begin at the base of the seat where it anchors to the floor. Tighten and inspect the bolts. As you work your way up, tighten the bolts that hold the seat bucket in place, checking to ensure that the seat will still have full range of motion. While you have the seat cushion off, lubricate the springs. The springs should be lubricated with a 30-weight oil. It should be applied to the pivot rod and plunger assemblies. (These procedures are illustrated in more detail in the step-by-step photos that follow.)

If the seat will not stay in the down position or flutters back and forth, the springs will probably need to be adjusted or replaced. To replace the springs, you will need to remove the retainer spring from the push-rod assembly, then remove the old spring and replace. Re-install the retainer clip and replace the cushion. Often, a simple adjustment of rotating the spring a half turn may be sufficient to make it work properly.

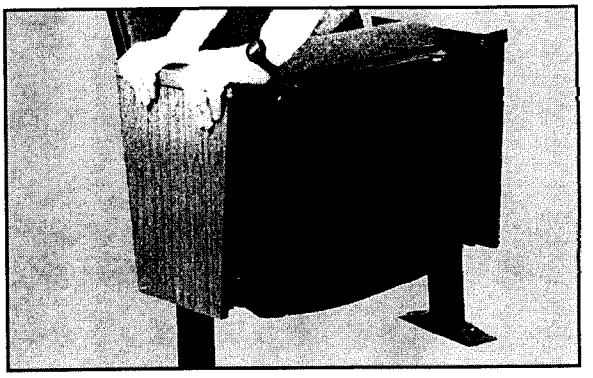
We recommend that managers review the condition of all the seats in their complex by doing a thorough walk-through weekly with the work lights on. While seat maintenance can be grueling, particularly in older theatres when many seats have problems, patron comfort requires regular attention. By keeping your theatre seats free from noise and maintaining their comfort level, you will also be helping to ensure the safety of your patrons.

TIGHTENING INSTRUCTIONS

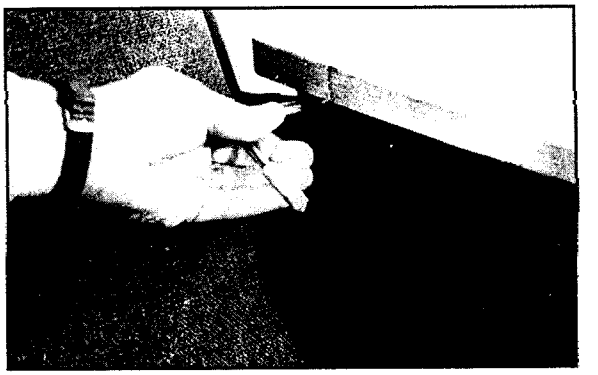
Seat Bolts - I/2" Socket Wrench.
Back Bolts - 7/16" Wrench.

Anchors
- Floor Mount - 7/16" Wrench.
- Riser Mount - 9/16" Wrench.

- Start seat bolts by hand.
- Tighten seat bolt(s) with 1/2" size socket wrench.

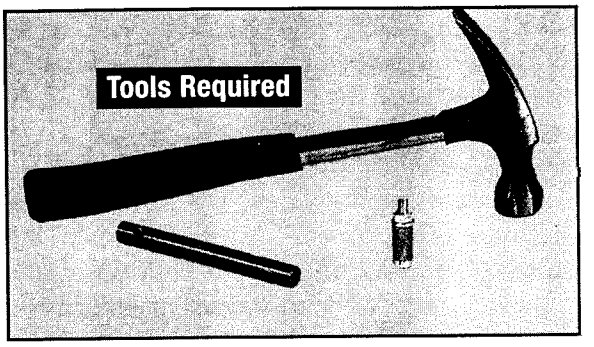


- Check standards for secure fastening.

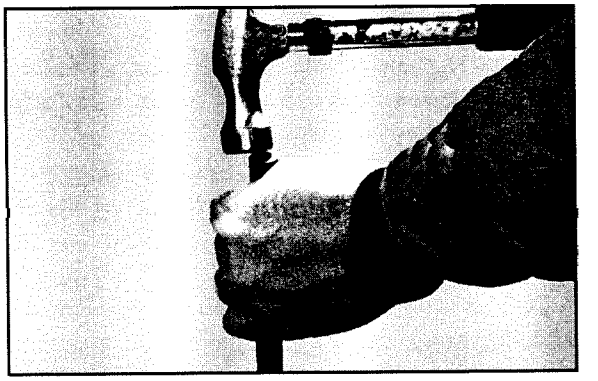


- Tighten back bolt(s) with 7/16" wrench.

RESETTING ANCHORS



- 2 LB. + Hammer.
- Caulking tool with 1/4" or 3/8" center hole.



- Set/reset lead shielded anchor with caulking tool and hammer until lead is firm and caulking tool "pings".
- Reattach chair standard and tighten anchor nut.

Photos and tool instruction courtesy of Irwin Seating.

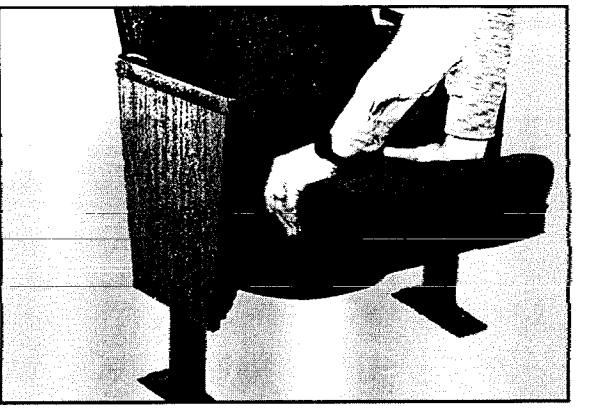
SEAT LUBRICATION

- Remove seat cushion with flat blade screwdriver.
- Insert on side between cushion and metal foundation. Pry up.

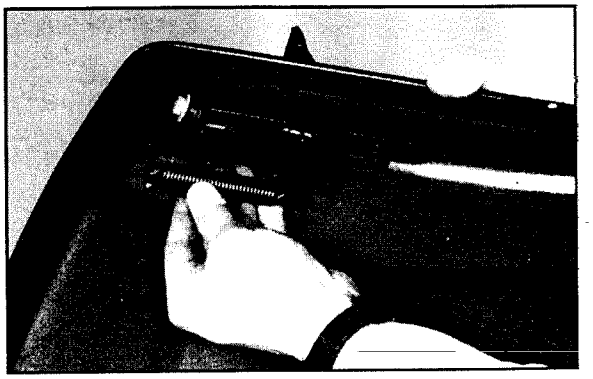
- Apply 30 wt. oil lubricant (or equivalent) to pivot rod and plunger shaft.

SPRING REPLACEMENT

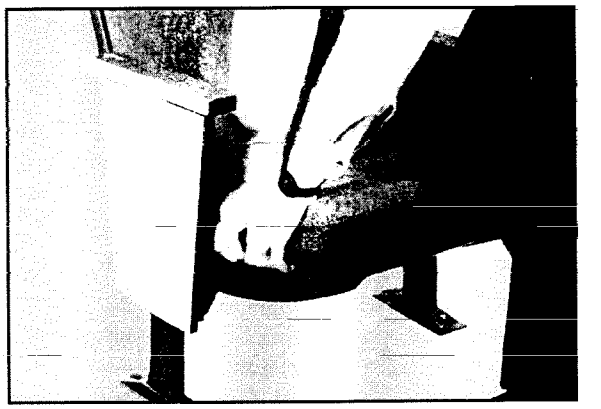
- Remove extension spring.
- Place seat in upright position.
- Install new extension spring.



- Apply pressure to opposite side to "snap" spring clip in place.

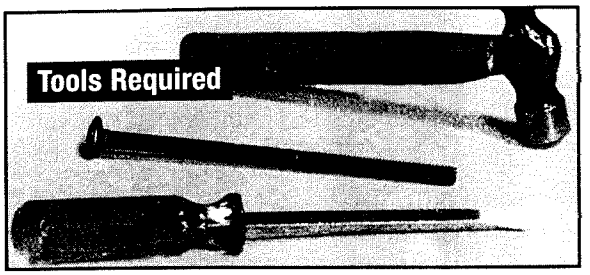


- Remove retainer clip from push rod.
- Insert new spring.
- Reinstall retainer clip.

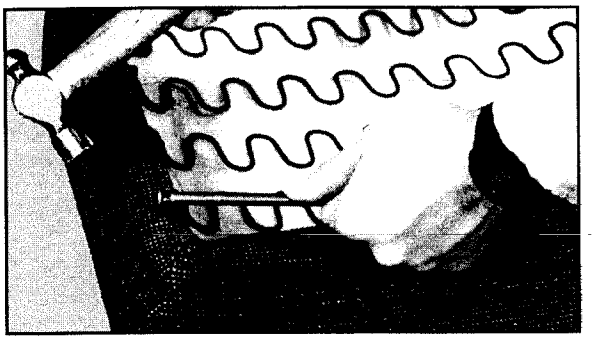


- To replace cushion, insert spring clip under support bracket on one side.

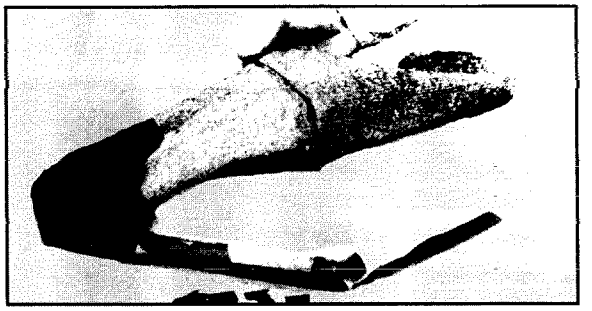
SEAT REUPHOLSTERY



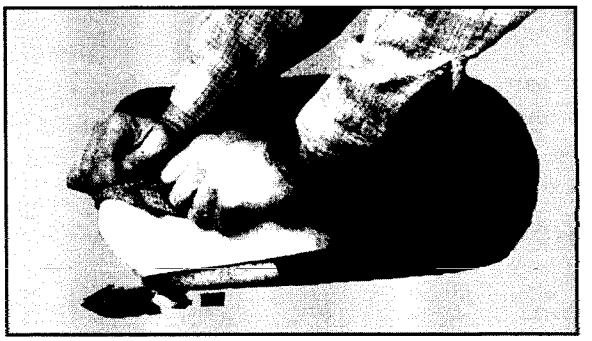
- Hammer
- Large carriage head bolt.
- Flat blade screwdriver.



- Remove cushion as shown on page 5.
- Remove upholstery clips using hammer and carriage head bolt.



- Remove cover.

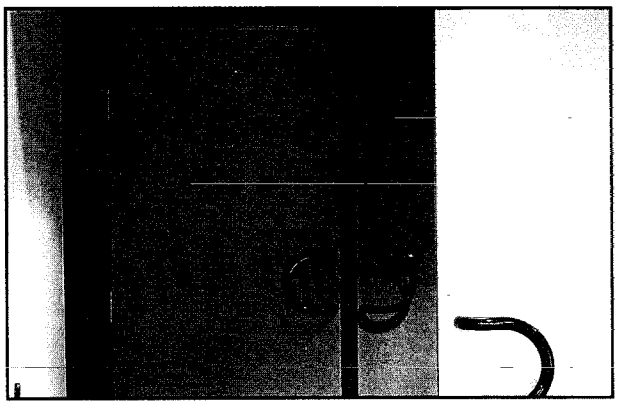


- Install new cover. Start with cover inside out, place pad, chafng barrier and spring assembly directly on seat cover. Pull outside edges of cover over the assembly. Compress foam and pull cover tight.

NOISY AUDITORIUM DOORS

Door hinges and closures should be checked and lubricated at least weekly. Dirt and everyday use break down the oil, especially in the hinges. If the oil is not replaced, squeaking and irreparable damage can occur. If the doors continue to squeak after lubrication, check the door jambs for any detectable movement. If there is movement, the door jamb will need to be secured to the frame. If the hinges persist in squeaking, they should be replaced.

Door closures are another source of squeaking, as well as "banging." The door closures should be adjusted to the point that the doors are easily opened while maintaining enough leverage so the door does not bang against the jamb. The adjustments are easily made at the top of the closure with a tool designed specifically for that purpose. Some may also require an allen screw adjustment.



If the doors continue to produce a "banging" sound after the closure has been adjusted, look at the door frame. On most frames, there are small rubber or felt pads. These act as insulators between the door and the metal frame. If the pads are missing, get replacements through the door manufacturer or at a full-service hardware store.

Technology

Operation Bigscreen Progress Report

By Terri Westhafer
Director, Worldwide
Exhibitor Relations

In the spring of 1996, Eastman Kodak Company launched *Operation Bigscreen* to explore the illumination of screens larger than forty feet in width in today's megaplexes. Our stated goal was to provide the brightest screen image with the least amount of wattage possible. Inherent in the concept of "bright image" is the property of uniform light distribution.

Some of the qualities we have measured pertain to lens and shutter efficiencies, xenon bulb output, port glass reflective properties, mirror design, and the effects of heat on film. In the auditorium, we have cast critical eyes upon seating geometry, use of color and texture in the auditorium, projection angle and throw, and screen curvature and gain.

In addition to Kodak's work, other companies in the industry have been conducting their own research to identify some of the projection problems plaguing theatres today. Their results have been disconcerting, to say the least. At a recent convention, Buena Vista's President of Distribution Phil Barlow told of his firm's tests that were conducted last summer: "We tested several thousand screens for brightness and came up with an average of 8-9 ftL center screen. The quality of the projected image should equal the brilliance of the sound."

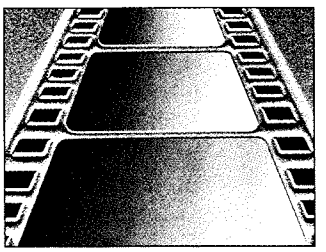
Tim Schafbuch, Director of Lucasfilm's Theatre Alignment Program, cites similar readings. He explains, "Most of the cases our technicians encountered demonstrated that a simple thing—like changing a bulb when it's time—can be a major factor in providing a quality presentation." Since the primary goal of exhibition should rightfully be patron satisfaction, Schafbuch's comments on Lucasfilm's PHONE-THX hotline are of particular interest. (PHONE-THX is the end-credit listed on a number of feature films that invites patrons to phone in any complaints regarding their theatrical experience.) "Nearly half of all the image-related complaints TAP receives from patrons responding to PHONE-THX indicate that, at the very least, the image appeared slightly too dark. The next most frequent complaint was that the image was *extremely* dark."

While we had a general awareness that light levels in theatres did not always rise to the SMPTE standard of 16 ftL center ±2 ftL on the remainder of the screen, we were more than a bit surprised to find how dim many screens actually

are. Typical screen readings from Kodak studies were in the 6-8 ftL range, center. Some were even lower than these readings! And the houses we surveyed were considered to be "showcases." I shudder to think of the light readings on older and sub-run houses, if these are heralded to be at the forefront.

As we continue to accumulate data under the auspices of *Operation Bigscreen*, we are becoming increasingly aware that these low-light conditions are typical not only of large screens, but also of their smaller counterparts. According to cinema consultant and Director of Sigma Design Glenn Berggren: "My recent experience going into theatres with a light meter tells me that a large percentage of cinema operators seem to think that having much less screen light is a great way to save money. In the month of December, my light meter registered only a scant 15% of screens as being bright, with about 40% dim and 45% downright dark."

As we dug deeper into the screen illumination morass, we discovered that several footlamberts were lost due to the "usual suspects": too many bulb hours, lenses of inappropriate focal lengths, poor reflectors, dirty portglass, and so on. But the primary culprit in many instances appeared to be the screen itself. Although some of them harbored large quantities of dust and debris—much of it clinging to the screen like fuzz on a peach due to the practice of cleaning the floor surfaces in the auditoriums with leaf blowers—the heart of the brightness problem seemed to be the nature of the screen surface. According to Larry Jacobson, President of LJ Technologies and consultant for *Operation Bigscreen,* "Curved, high-gain screens substantially increase light levels—as much as thirty percent or more over flat and matte." Berggren concurs: "The right screen is absolutely essential. A high-gain FLAT screen becomes the main item of failure."



Berggren points out that both Osram and ORC have published that the place to start a new bulb is at least 85% of the rated power (not amps). He explains, "If a 4500-watt bulb is 100% at 145 amps and 31 volts, the start cannot be less than 135 amps and 28 volts. If it is, the operator is jeopardizing bulb life and wasting the light output performance."

Phil Barlow encourages exhibitors to commence a dialogue with Buena Vista and other concerned companies in order to increase screen light to the proper levels. He gently chides theatres for stopping short of perfection: "You have all invested so much capital to build fabulous buildings with great equipment and we have all benefited from this bold effort. This is why it is so illogical and counterproductive that so many theatres insist on underlighting the picture by half."

Schafbuch encourages theatres to adhere to the SMPTE standards for screen illumination, stating, "Movies are made according to internationally standardized screen illumination levels. Theatre prints are monitored at labs using these standards. Even if your theatre is getting 12 or 13 ftL, medium or dark scenes fail to show detail. At that point, the director's artistic intent—and the audience experience—is entirely and undeservedly ruined."

We agree with Berggren's refutation of one of the frequently-repeated myths of bigscreen projection: "The cry since Widescreen that on giant screens you need less light is not valid. The eye doesn't perceive screen size when trained on a specific area. It responds to the scene density combined with the light, so the color saturation and image detail are perceptible. Special lenses, screens, larger lamphouses, and so on *can* and *do* adequately illuminate screens larger than seventy feet. But they are not the same pieces of equipment in use in smaller auditoriums." And, yes—heat diminishers need to be in place so as not to damage the film. Water-cooled gates, specially-designed reflectors, high-air concentration devices, and so forth, are available.

Operation Bigscreen marches on. At Kodak, we are heartened by the strong show of support we have received from distribution, exhibition, cinema consultants and equipment manufacturers. This is proving to be a truly united effort toward theatres remaining the perennial favorite place to really experience a motion picture. If we all continue to commit our time and resources toward overcoming hurdles such as bigscreen illumination, the movie-going experience will thrive as the premiere entertainment experience into the millennium. As we ring in a new year, you can count on Kodak to announce more programs to help you, the theatre, provide the best show in town.

Helpful Hints

To continue the "Helpful Hints" nature that has always been indicative of our style for *Film Notes for Reel People*, we offer twenty-one tips in honor of our 21st year.

Twenty-One Steps Toward Brighter Images

By Jeff Johnson
Cinema Consulant

1. After installing a new bulb, reset the power settings so that the bulb is operating at 85% of its maximum rating. To determine the current lamp wattage, use this formula: Amps X Volts = Watts. Both of these readings may be found on the volt-meter on the lamphouse.

2. Always operate xenon lamps close to their published rated current.

3. Make sure that the bulb is of sufficient wattage to properly light your screen (for instance, if you have a very large screen, it is unlikely that a 3000-watt bulb can do the job).

4. Check power settings monthly and adjust accordingly.

5. Make sure all wiring connections are tight and free from erosion.

6. Check diodes on a monthly basis.

7. Using a light meter, focus the bulb so the center of the screen has the brightest light (16 ftL is the SMPTE standard) with ± 2 ftL in all other screen areas).

8. Log the hours on the bulb each month so that it does not exceed its life expectancy.

9. Keep lenses clean and free from oil and dirt (use only approved lens cleaner and tissue).

10. Clean both sides of the port glass weekly.

11. Keep the reflector and split-mirror clean and free from dust.

12. Make sure the lenses are specifically intended for use with each projector system. They are not interchangeable between auditoriums. Check with a qualified technician to be sure they are of the correct focal length.

13. Check your auto-focus. If it is malfunctioning, it can substantially impede light from reaching the screen.

14. The lenses should be re-targeted monthly to ensure that they are aligned to fill the screen properly.

15. Both the RP-40 and travel ghost test films should be run each month to check alignment, resolution, and shutter speeds.

16. If you do not have a light meter or test films, check your onscreen brightness with an open gate and look for flicker. You will see no flicker at light levels less than 12 ftL.

17. Check to be certain no ambient light is falling onto the screen (likely sources are door frames, exit lights, and auditorium lights).

18. Examine all the areas surrounding the screen for the first twenty feet. If any of them—including the ceiling—are white or light-colored, the light saturation onscreen will be diminished. The front of the auditorium should be BLACK, or, at least, very dark.

19. Check masking so that it has no sharp edges and does not create screen shadows.

20. Spot clean the screen weekly to remove debris and spillage that may have occurred (use only a DAMP cloth–no heavy water or detergents). Dust the screen monthly, using either a feather duster or telescoping-handle screen brush. Dust the entire screen.

21. If leaf blowers are used in the auditorium, make sure that the blowing action stops at the front row. Do not blow the front floor since this is a major contributor of dirt on the screen.

Pytlak Continued From Page 2

4. The density (darkness) of the film image contributes to the amount of energy absorbed by the film, with dark scenes showing more flutter than light ones. This is the reason flutter is often more visible in the closing credits (white letters against a black background).

5. The amount of energy going through the film frame is the single strongest determinant of a stable image

Heat Damage

Excessive radiant energy can cause permanent damage to the print. Because silver grains absorb more infrared energy than dye images, black and white prints are especially sensitive to improper heat filtration. "Blistering" occurs when the energy level is so high that the emulsion heats to the point of bubbling away from the base. In extreme cases, the film actually chars.

With color prints, excessive radiant energy can cause the emulsion to heat to the point of the layers separating internally. This "emulsion void" first manifests itself onscreen as a frost-like crystalline (snowflake) pattern in darker areas of the scene. This is caused by the refraction of light at the internal separation. Looking at the print film itself, reflected light usually reveals opalescent spots in each frame, corresponding to the "hot spot" of the projector. Viewed from the emulsion side, these spots are often magenta or blue. Viewed from the base side, the spots are green or yellow. This is due to the void that occurs within the emulsion layers. The magenta layer is on top, cyan in the middle, and yellow at the base. Depending upon the film type and power level, this damage may occur within a few times of being projected.

"Dye migration" is another form of heat damage sometimes associated with emulsion voids. Multiple projections with excessive radiant energy can cause the dyes to spread out and move to adjacent areas of the image, causing colored fringes or halos around darker objects or people in the scene. Although current Kodak film stocks are resistant to "dye migration," theatres must maintain their vigilance to prevent heat problems. Certain features may be more sensitive to heat since silver is deliberately left in certain color prints when the cinematographer wishes to increase contrast and shadow density. This is a creative decision which can enhance the appearance of the film, but it can have an adverse effect on projection because of the added density and infrared absorption from the silver left in the print.

Do I Have A Heat Problem?

Good projectionists should watch for signs of heat problems. If obvious damage such as blistering, emulsion voids, or dye migration occurs, the cause must be diagnosed immediately. The first three questions to ask when troubleshooting a heat problem should be: A) Is efficient heat filtration in place; B) Is the lamp operating at the proper current; C) Is the lamp focus adjusted to produce good uniformity without a hot spot. If a projector causes heat damage despite being properly aligned, contact your theatre equipment dealer, the manufacturer, or a service engineer to explore more efficient heat filtration, the installation of a higher-gain screen, screen curvature, or other ways of optimizing screen light without film damage. Because heat-related damage often takes a few weeks to occur, make it a practice to carefully examine the print later in the run, logging and reporting any damage. Heat damage usually happens in the dark scenes first, since they absorb the most radiant energy. Dye fading caused by excessive ultraviolet energy usually results in the color balance of the print becoming more green, with the highlights turning slightly yellow, especially in the "hot spot" of the projector. If visible dye fading happens during the run, additional ultraviolet filtration may be needed between the lamphouse and aperture.

Addressing Heat-Related Focus Problems

Even if it doesn't produce film damage, high levels of radiant energy can still hurt image quality and audience satisfaction. Fuzzy pictures and poor focus uniformity are especially distracting on big screens where the high power levels and short focal length lenses needed to fill those screens often cause problems. Equipment selection (heat filtration, curved gates, focus stabilizers, modern lenses) play major roles in achieving sharp images on big screens. Don't forget the other factors that can be used to improve focus stability: relative humidity between 50 and 60 percent, emulsion-in winding, gate tension adjustment, and avoidance of small-hub reels and cores.

John Pytlak's E-mail address is: jppytlak @ kodak.com.

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ALL NEW

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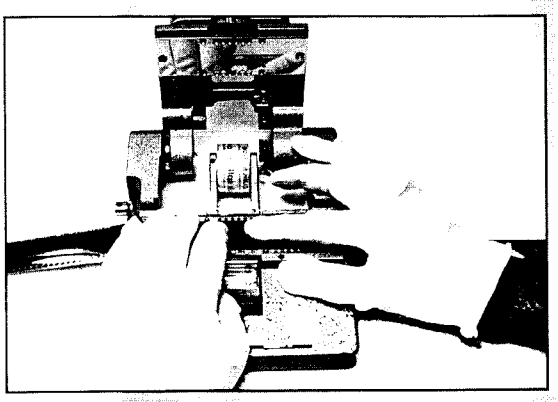
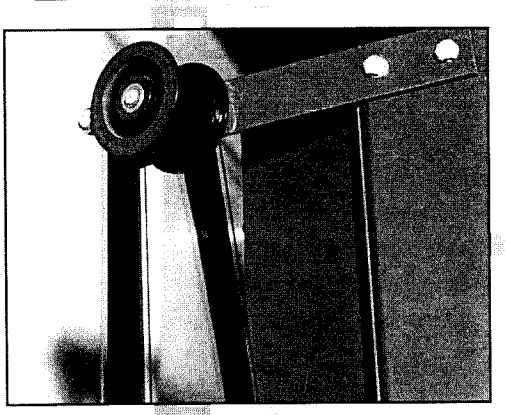
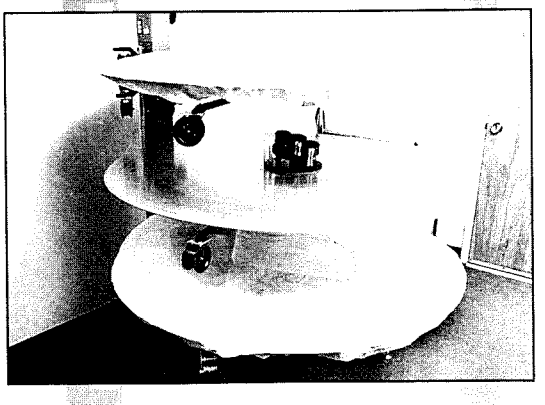
FILM PROJECTION FOR REEL PEOPLE







Film projection is an art... a craft... a learned skill. If you think projection training consists of a "crash course" followed by "push the button and pray...", think again!

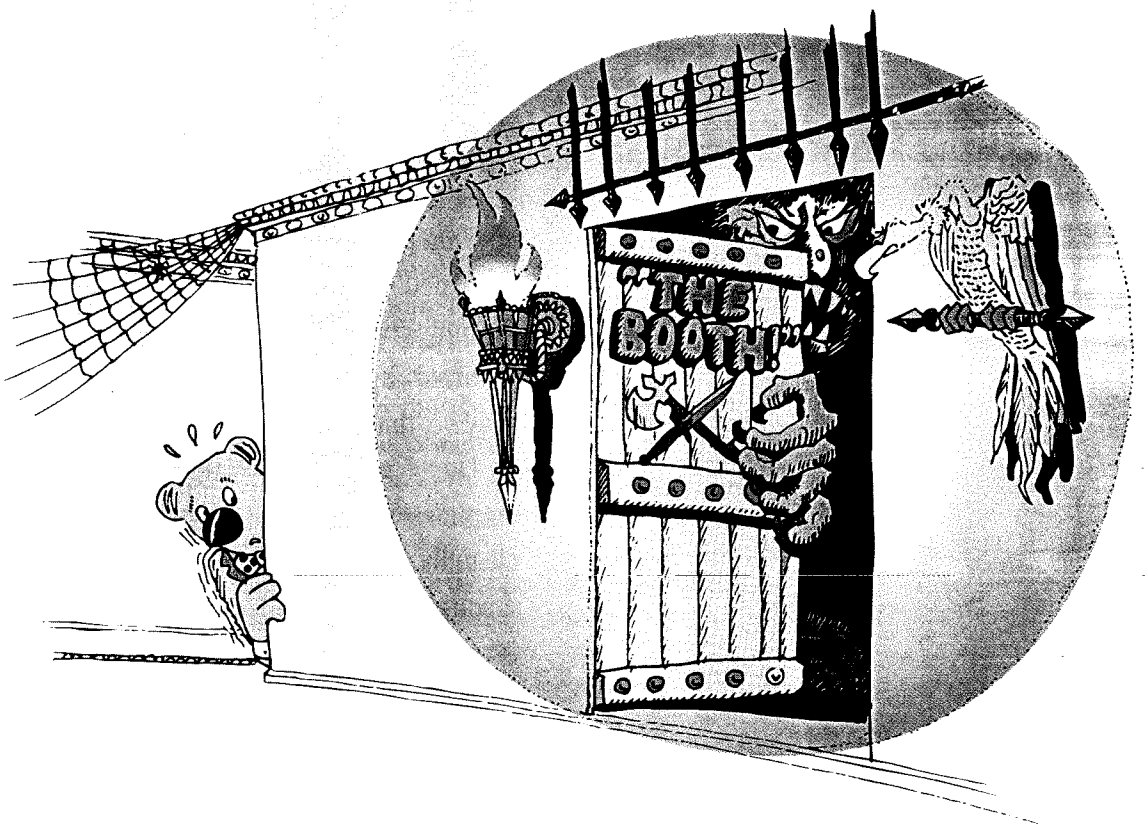
Our new day-long seminar emphasizes film care, projection cleaning and maintenance, and walks through build-up, threading and everything involved in putting on a first-class show.

Whether you're still at the "push the button and pray" stage or are a veteran projectionist, this course will expand your awareness and enrich your knowledge.

FILM PROJECTION FOR REEL PEOPLE is a comprehensive, participatory training adventure. Scheduling it to open soon at a theatre near you is only a phone call away.

Contact: Jeff Johnson
(303) 751-2649

Don't Be Afraid Of Projection!



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