Film-Tech

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INTRODUCTION

A typical 35 mm platter transport consists of 3 horizontal, 44- to 52-inch diameter platters that can each accommodate up to 25,000 feet of film, and can provide 4½ hours of uninterrupted operation when fully loaded. The film rewinds automatically after being projected, thus eliminating the need for manual rewinding. Normally, two platters are used with a third being reserved for assembling the next feature attraction when it arrives. Film can be loaded on any one of the three platters and taken up on either of the other two. For example, the film supply on the top platter is led away from the platter cluster rollers to the vertical post (Figure 1) and moves from the top of the post assembly towards the projector via roller assemblies. After passing through the projector, the film returns to the middle platter and is taken up. At the end of the show, the takeup ring is removed from the center of the film roll on the middle platter and the film threaded into the projector as before. The returning film is then threaded into the takeup ring slot on either of the two empty platters. If the theatre is presenting a double-feature attraction, the projector can be turned off at the end of the first feature and simply restarted when the intermission period is over. Five-platter transports are also available for use in side-by-side twin theatre installations. There also is available at least one unique platter transport that relieves the projectionist of the need to thread up after each showing.

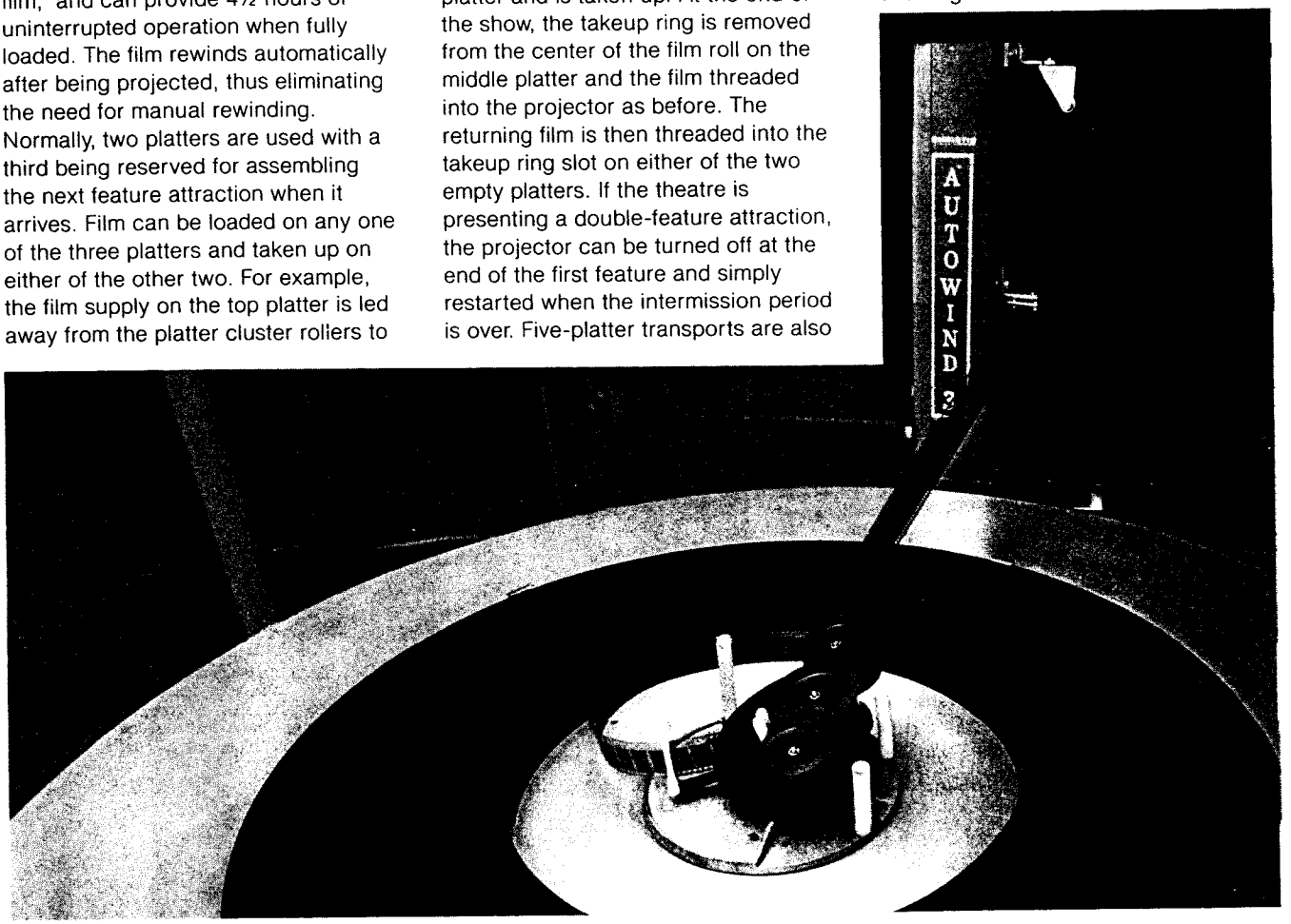


Figure 1.
Top platter of a three-platter film unit showing film path via cluster rollers, vertical post, and roller assemblies.

The Only Sequel to Win Best Picture Oscar—The Godfather, Part II *(1974)*

The Only Performers to Win Consecutive Oscars—*Luise Rainer (1936/1937)*
Spencer Tracy (1937/1938)
Katharine Hepburn (1967/1968)

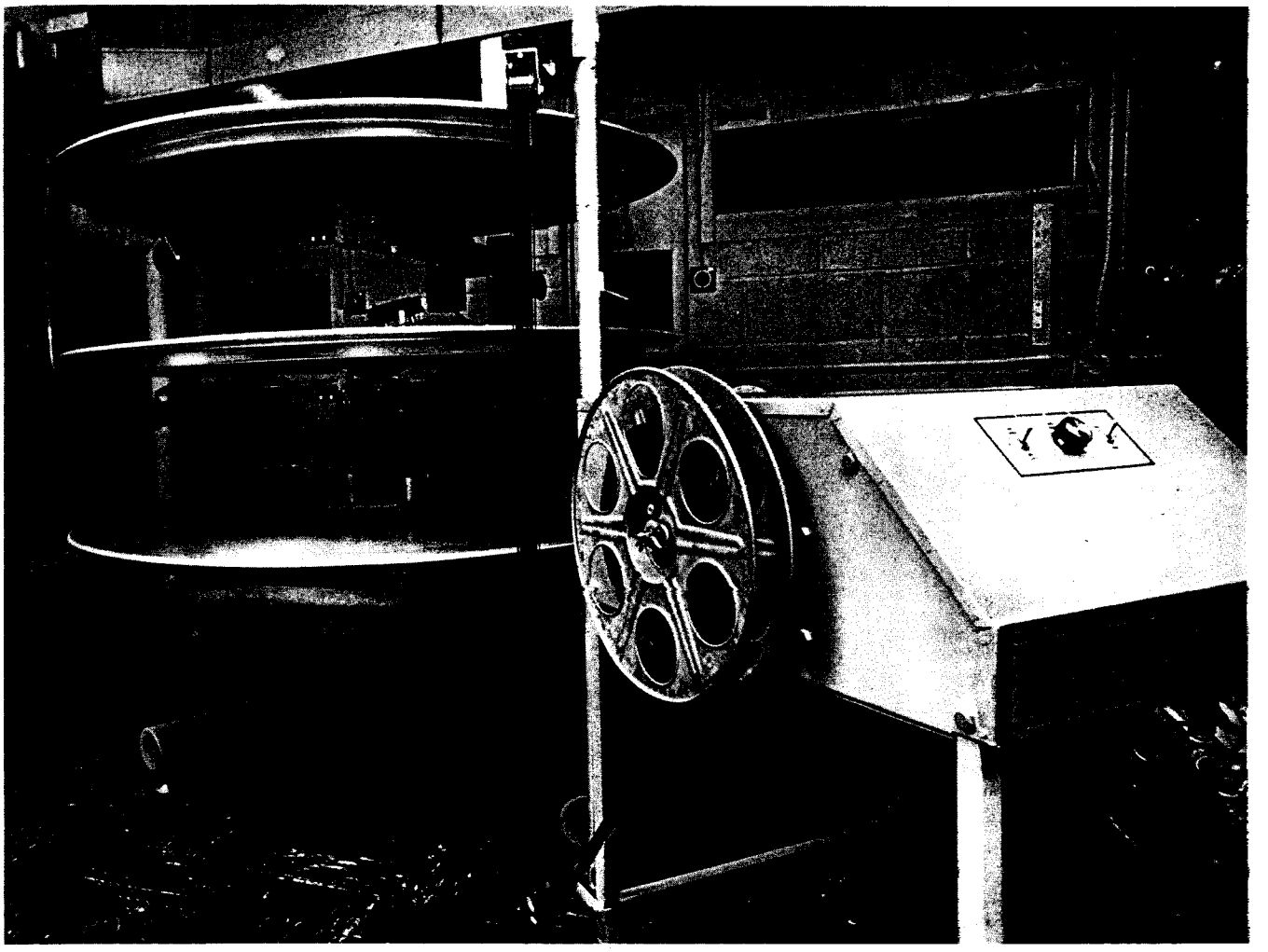


Figure 2.
Makeup table with 2000 ft shipping reel. Film is being loaded onto top platter.

Because release prints are currently distributed on 2000 ft shipping reels, theatres using platter transports must load the individual reels onto the platter (makeup). To accomplish this, a makeup table (Figure 2), which is an integral part of the total system, is used. The table can accommodate reels up to 6000 ft capacity and is electrically interconnected with the platters. Before loading reel #1 onto a platter, an extra 25 ft of leader is usually spliced on the head to provide enough material to thread the long film path. To load the platter, reel #1 (head out, including the extra leader) is placed on the makeup table and threaded onto the appropriate platter. Then, using the controls on the makeup table, the platter is activated and the film is transferred. After transfer, the trailer on reel #1 and the leader from reel #2 are removed and the two films are spliced together. Reel #2 is then transferred to the platter. This process is repeated for reel #3, #4, and so forth until all of the individual reels for the show have been loaded onto the platter.

BENEFITS

The use of large-capacity platter transports generally has helped to improve the screen image quality of 35 mm theatrical motion pictures. Release prints on conventional 2000 ft reels are more susceptible to dirt and abrasion because of the constant handling that is required. But a print once loaded on a platter stays cleaner because it is no longer subject to the individual handling, threading, and rewinding of each reel after each showing. Only on breakdown, after the last run of the engagement, will the film again be handled individually on 2000 ft reels.

Other obvious advantages include the capability of multiscreen presentations from a common projection room using half the usual number of projectors and, although not a universally popular advantage, fewer personnel.

OPERATING PROBLEMS

Film Dirt

The benefits achieved by the use of platter film transports, however, are not without their own particular problems. Most prevalent among these is the susceptibility of the print to collect airborne dirt due to the relatively large amount of film surface that is exposed during threadup, while moving freely in space to and from the projector, and even when resting horizontally on the open platters. (Figure 3).

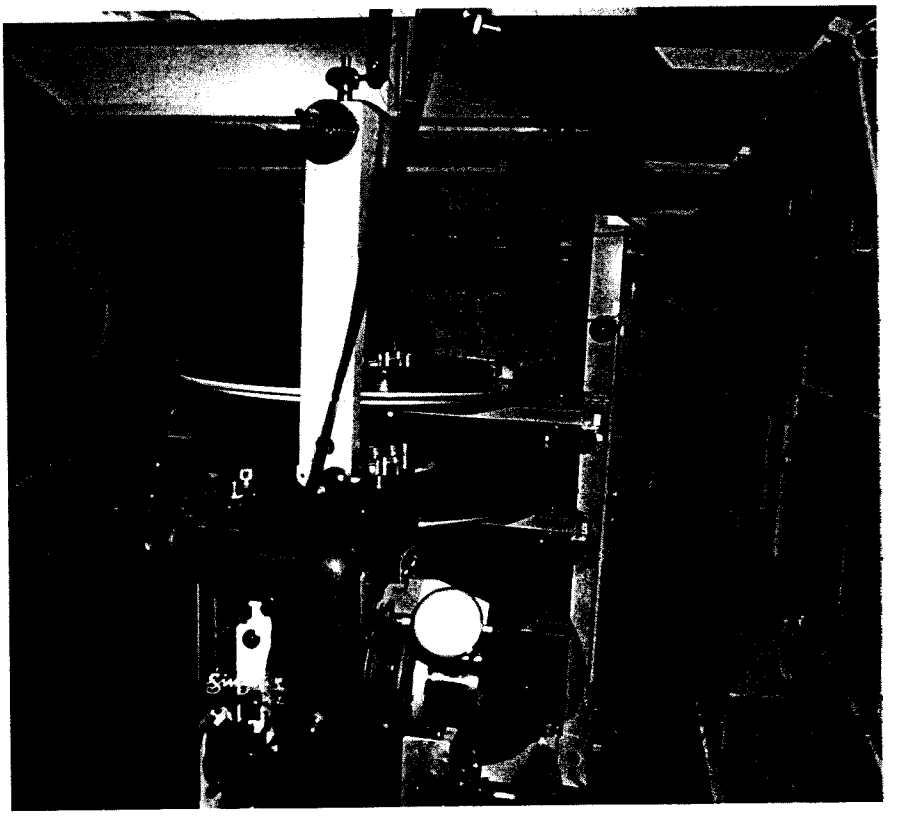


Figure 3.
Unless you keep your booth clean, large amounts of film can be exposed to airborne dust and dirt.

Esoteric Dirt Attractors (or—Cruel and Unusual Punishment for Otherwise Perfectly Good Films)

Most large dirt particles are retained on a film surface because of gravitation, viscous adhesion, electrostatic forces, or any combination of the three. These seventy-five-cent words simply describe the dirt that's dropped on your film (gravitation), sticky or gooey dirt (viscous adhesion), and dirt that is attracted to your film by "static" (electrostatic charges). Furthermore, over 50% of naturally occurring dirt particles absorb moisture. This fact is particularly important where film is concerned since the emulsion also absorbs moisture. In other words, conditions can occur where moisture-laden dirt particles will readily stick to a moisture-laden film surface. Although freely floating dust and dirt in the air are attracted to the film surface by any of the forces mentioned above, gravity is certainly the most persistent. Once the dirt particles in your booth are stirred up, gravity will cause many of the larger particles to "settle" eventually on any unprotected film surface.

Static electricity can also be a major cause of film dirt. When two dissimilar materials (film and rollers for instance), having different electrochemical potentials, are placed in contact with each other, a nonequilibrium condition will arise. Frequently, the two unlike surfaces are found to be electrified after separation, particularly if either or both materials are poor conductors. And since film and plastic rollers with nylon bearings are considered poor conductors and don't return to a neutral state quickly, potential electrostatic charges remain to attract dirt particles to the charged surfaces.

During the threading operation, particularly from the projector back to the platter transport, some of the film will invariably touch the floor (Figure 4). "Sure, but that film is just leader," you say, "and it won't be shown on the screen." That may be true, but the dirt that has been picked up on the leader can be deposited on the platter table and roller flanges and then transferred to the print as it is projected.

The condition of the print as you receive it is also a big factor in print appearance. If the print has been subjected to projection situations where oil, gritty dirt, and grime have been left on the film surfaces, the oil will act as a magnet and attract any dirt present in the room. Later in this article, we will discuss how to prevent, or at least minimize, these distracting dirt problems.

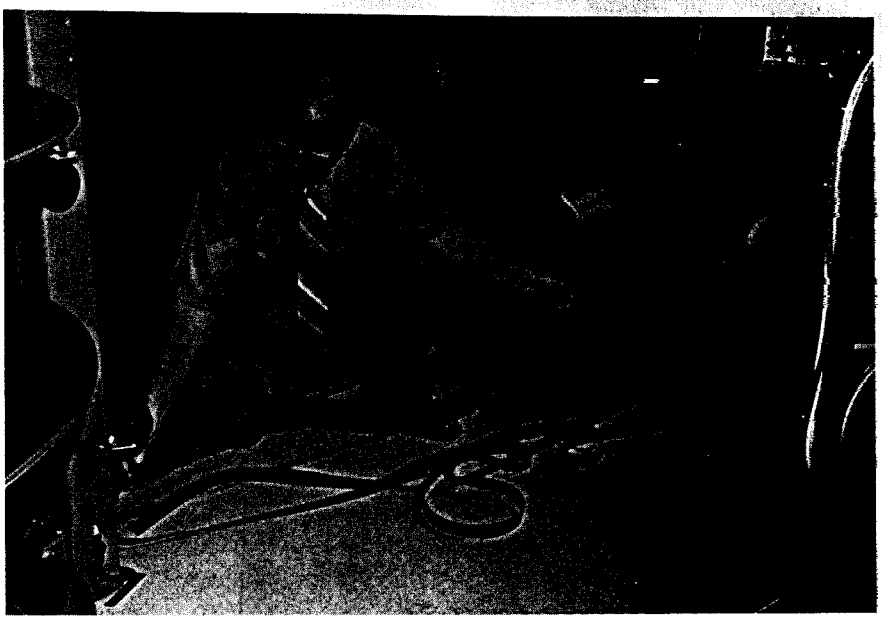
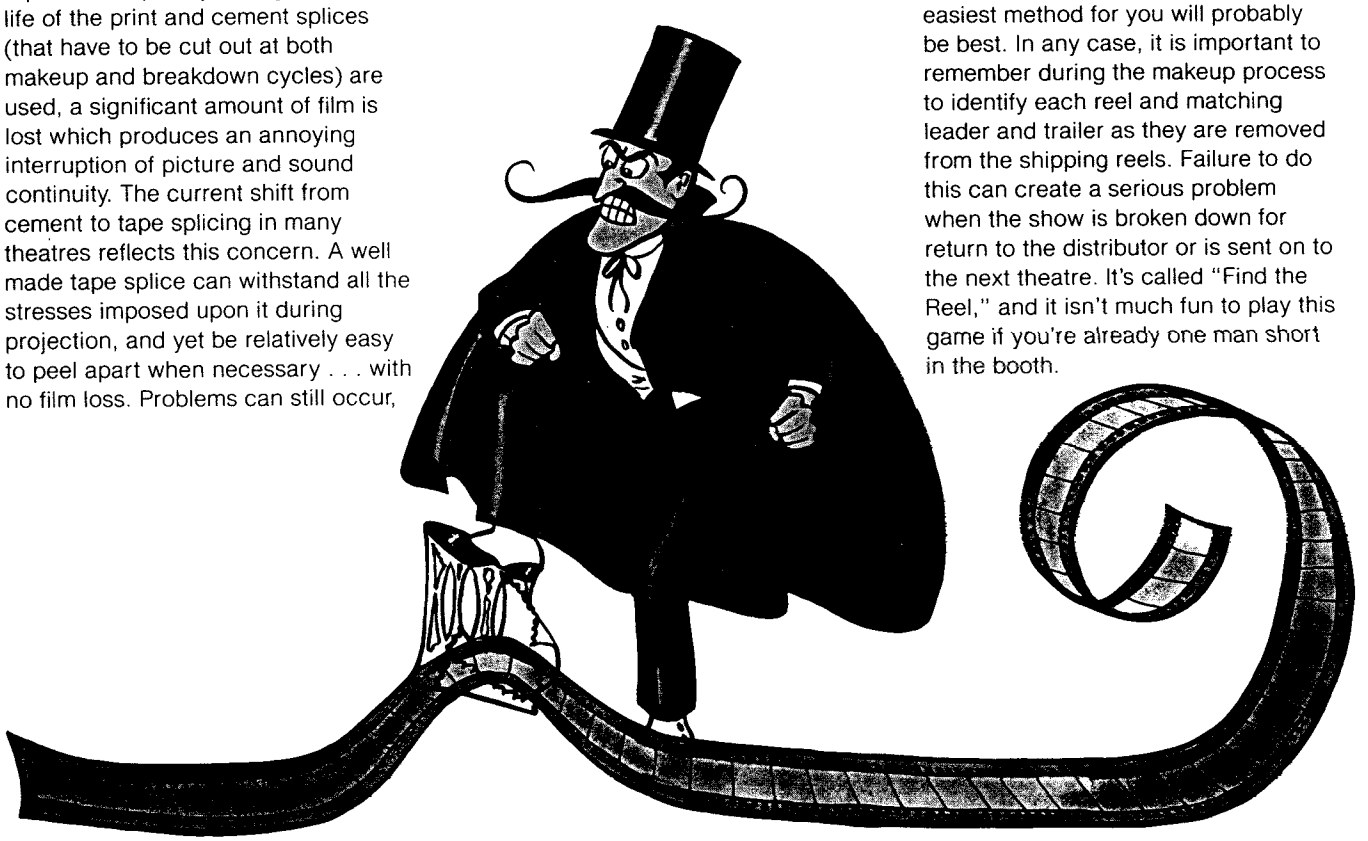


Figure 4.
Film allowed to pile up on the floor during threading, even if its only leader, can cause scratches and abrasions throughout the roll.

Film Handling

As mentioned earlier, to use a platter transport, someone must splice together the individual reels as received from the distributor and wind them onto one of the platters (makeup). At the end of the engagement, the print must be disassembled and returned to the individual 2000 ft shipping reels (breakdown). If this process is repeated frequently during the useful life of the print and cement splices (that have to be cut out at both makeup and breakdown cycles) are used, a significant amount of film is lost which produces an annoying interruption of picture and sound continuity. The current shift from cement to tape splicing in many theatres reflects this concern. A well made tape splice can withstand all the stresses imposed upon it during projection, and yet be relatively easy to peel apart when necessary . . . with no film loss. Problems can still occur, however, when poorly made tape splices cause adjacent film layers to stick together. If enough tape adhesive is left exposed, the stuck film layers can jam in the feed roller cluster of the platter and cause the film to tear. Although the choice of splicing method is up to you, we feel that the many advantages of tape splicing will ultimately make it the first choice among professional projectionists.

Most projectionists these days inspect an incoming print prior to the first showing. In some situations, the projectionist finds it easier to inspect the individual reels on the bench and then load them onto a 6000 ft reel before loading them on the platter. Others prefer to inspect the individual reels as they are loaded onto the platter. Of course, if the print comes to you tails out, you're going to have to rewind anyway so whatever is the easiest method for you will probably be best. In any case, it is important to remember during the makeup process to identify each reel and matching leader and trailer as they are removed from the shipping reels. Failure to do this can create a serious problem when the show is broken down for return to the distributor or is sent on to the next theatre. It's called "Find the Reel," and it isn't much fun to play this game if you're already one man short in the booth.



REMEDIAL MEASURES

Dirty Pictures!

"Where does the dirt come from?" you may ask. "Everywhere!" we say. The floors, the circulating air, your clothes and shoes, smoking materials, the projection equipment, the film itself, and yes, even the materials and cleaning devices you use to keep the room clean. From this introduction, you might say that the "dirty pictures" problem never can be remedied . . . but read on . . . there is hope!

Experience shows us that if the facilities and equipment are cleaned regularly, the appearance of dirt on the screen image is rarely a problem. Regardless of the presence of static, or of gravity, there won't be much dirt attracted to your film surfaces if there is no freely floating dirt present. But since it is unreasonable to expect projection rooms to be maintained in a "white room" condition, other means must be used to help minimize what we call "the dirty picture syndrome."

What Floor, Please?

Let's assume that your facilities are dusted regularly and that you have a vinyl or asphalt floor that is frequently maintained by damp mopping, vacuum cleaning, and regular waxing. Let's go one step further and say that your ventilation source is filtered. Under these conditions plus relative humidity (RH) in a normal range (35% to 50%), dirt problems should be minimal providing that the print is clean. Sounds simple, doesn't it? Now, we'll return to the real world and see what actually goes on. How about the floor? Is yours a bare cement slab? If so, each step you take grinds a little of the surface away and creates dirt. If you've opted for the plush look of carpeting, there's no need to tell you that you have a built-in collector of dust and dirt. The solution is to have a surface that neither creates nor captures dirt. A cement floor can be painted or otherwise coated to make the surface almost as hard and "nondusting" as a tile floor. Carpeting, unfortunately, cannot be easily modified to prevent dust and dirt accumulation. There are static control sprays that can alleviate the static charges in carpeting, but they cannot prevent the retention of dirt particles deposited by gravitation. Regular vacuuming, preferably with a central system that doesn't blow some of the dirt back into the room, is the best means of maintaining clean carpeting. Occasionally, professional shampooing should be employed to remove ground-in dirt.

Static All Over

Our heavy emphasis on cleanliness is justified because practical alternatives are generally costly and/or not fully effective. Each roller/film contact in a platter transport system (Figure 5) is a potential static generator. Since most plastic rollers and films are essentially poor conductors, they can retain most of the high static charges that are generated. During the makeup and breakdown processes, the linear film speed at the rollers on a typical makeup table can exceed 800 feet per minute (fpm). At intermediate speeds of about 350 fpm and even at 70% RH, electric field intensities can reach 4000 volts/centimetre. And since industrial studies show that a level of 2000 volts can attract large dirt particles to a surface from one centimetre away, it is clear that the static charge levels at the makeup table rollers are formidable. At 26% RH, for instance, readings in one of our tests exceeded 10,000 volts! Voltage measurements on the film in areas away from the rollers are generally below the level that could be troublesome. This occurs because the nonconducting rollers charge to higher levels than the film since the roller surface makes many contacts with the film while a given area of the film surface contacts each roller only once.

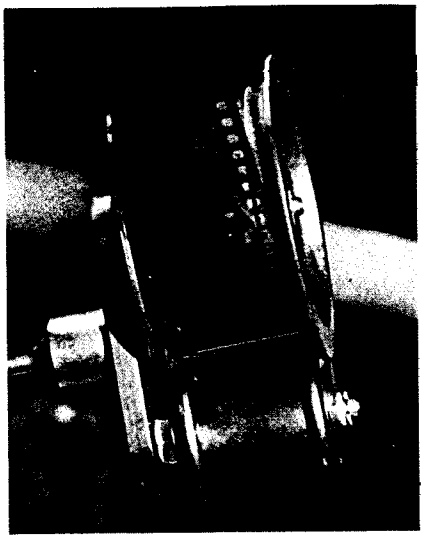
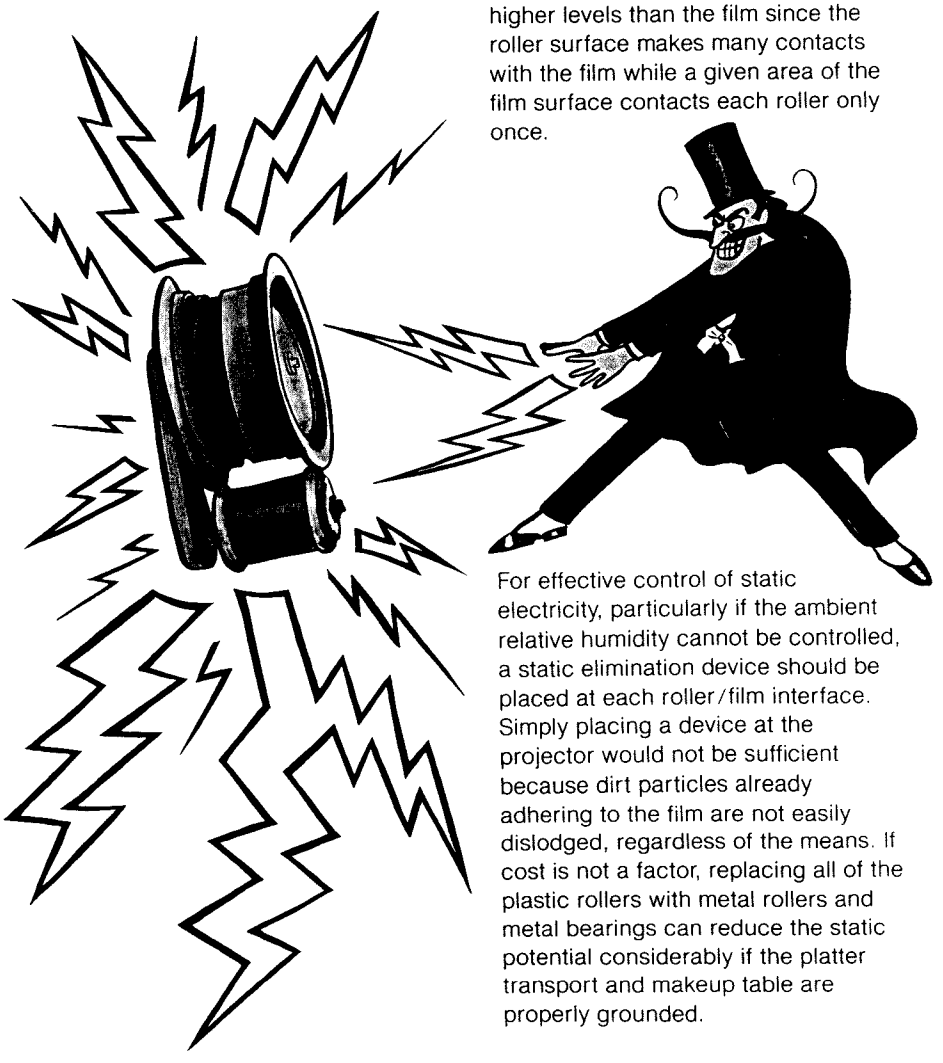


Figure 5.
Keeping the booth clean also helps reduce the amount of dust and dirt attracted by static to your films. Plastic roller assemblies such as this one can generate high static charges.



For effective control of static electricity, particularly if the ambient relative humidity cannot be controlled, a static elimination device should be placed at each roller/film interface. Simply placing a device at the projector would not be sufficient because dirt particles already adhering to the film are not easily dislodged, regardless of the means. If cost is not a factor, replacing all of the plastic rollers with metal rollers and metal bearings can reduce the static potential considerably if the platter transport and makeup table are properly grounded.

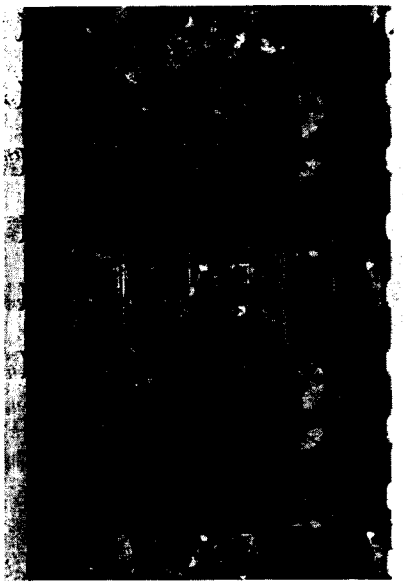


Figure 6.
These very fine (but visible) scratches were produced by a projector-mounted film cleaning machine in less than 200 passes. Such devices are most effective when used only intermittently.

An alternative method for eliminating most visible dirt is the use of film cleaning devices that mount on the platter transport or projector . . . preferably the projector. These units can be quite effective but their constant use can produce fine abrasions on the film (Figure 6). As with any film cleaning method done outside of a commercial laboratory, "clean-while-you-project" devices should be used only intermittently. Remember, they clean the film just prior to its entry into the projector but provide no help in preventing dirt from accumulating on the film after it leaves the projector. So no matter how many excuses you may find to keep from cleaning your booth regularly, there are no magical gadgets that can solve the dirt problem without your help.

At this point, you might ask why you didn't encounter as many static-related dirt problems when projecting with regular 2000 ft reels. The answer is fairly simple. The film was wound on metal reels that were continually grounded through the projector. The open film path was short and mostly vertical so that little dirt could deposit on the exposed film surfaces. The film in the projector was continually in contact with grounded metal components that carried away any static charges. Of course, if the print was dirty to start with, nothing short of cleaning it would have helped anyway. But during threading with a platter transport system, you could be holding the 20 to 25 ft of film needed to go from the projector back to the takeup platter with no place to put it (Figure 7). Short of working with another person to help hold the film, the only practical solution we have observed that keeps the film off the floor is to place it in a container, such as a plastic wastebasket (Figure 8), as you thread the projector. The container can then be conveniently carried to the platter and the film threaded up while still being protected.

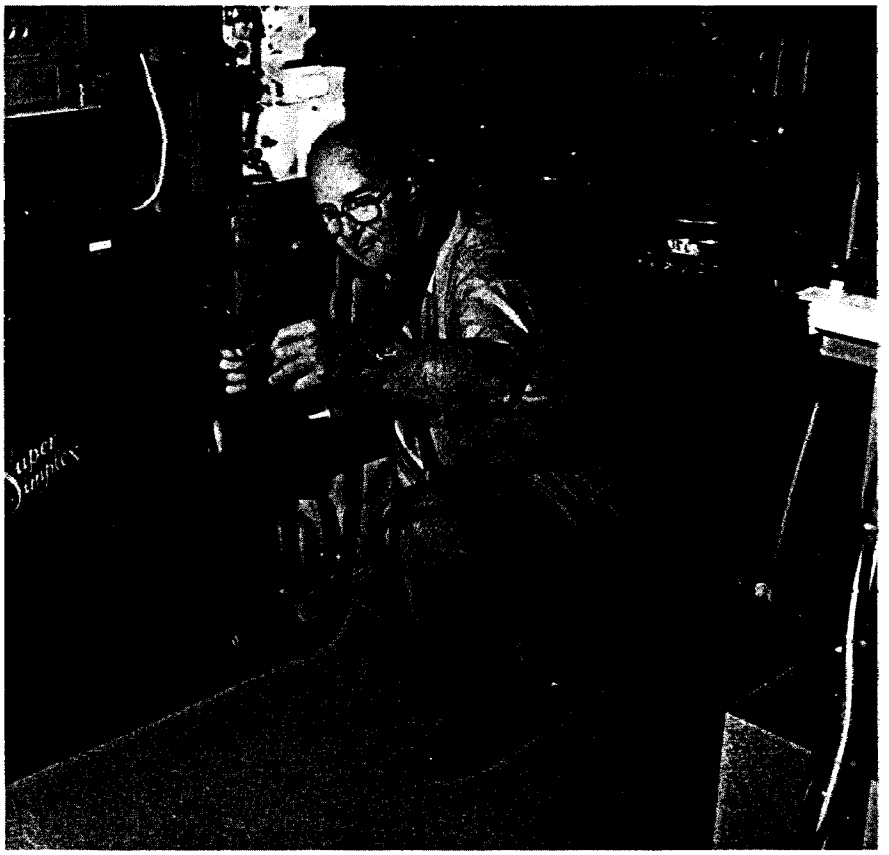


Figure 7.
Twenty-five feet of film leader and no place to put it. Did this ever happen to you? See Figure 8.

Figure 8.
Any plastic wastebasket with a clean plastic liner will help keep your film clean while threading.

***CAUTION:** When threading your platter system, make sure all of the adjustable rollers are correctly aligned and turning freely. Severe scratching and abrasion can occur if film is allowed to drag across one or more out-of-line or stuck roller assemblies (Figures 9a and 9b).*

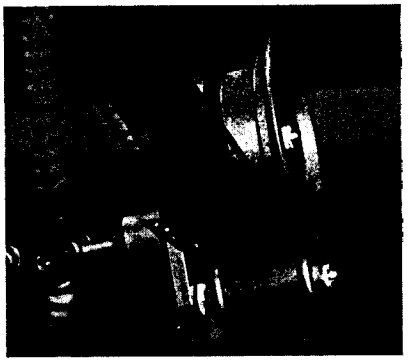


Figure 9a.
Film and roller assembly not correctly aligned—film rides up over edge of roller flange.

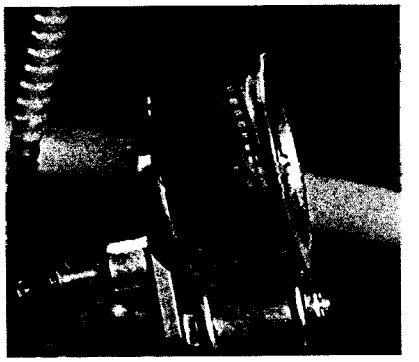
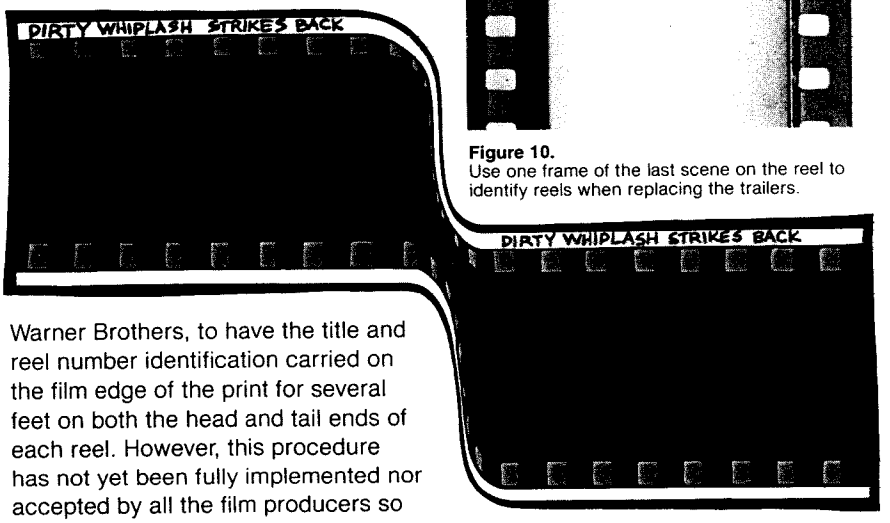


Figure 9b.
Film and roller in correct alignment—film rides smoothly between roller flanges.

To sum up what we have said . . . this is the moment of truth . . . if you don't keep your projection room and equipment clean, no substitute method or device can do a fully adequate job of keeping the film surface clean.

More Film Handling

Issue H-50-3 of *Film Notes for the REEL PEOPLE* describes simple methods for identifying leaders and trailers when they are removed from the individual reels (Figure 10). Actually, the problem isn't identification of the leader or trailer, but rather the identification of the reel on which they belong. Only leaders and trailers that have lost the initial identifying footage should have to be identified. The seriousness of this problem has prompted some film producers, such as American International, United Artists, and



Warner Brothers, to have the title and reel number identification carried on the film edge of the print for several feet on both the head and tail ends of each reel. However, this procedure has not yet been fully implemented nor accepted by all the film producers so you still have to look carefully before you reattach leaders and trailers. Some projectionists keep the removed leaders and trailers filed in sequence so that the correct leader/trailer pair is readily available for resplicing onto the reel when the individual reels are removed from the large reel or platter.

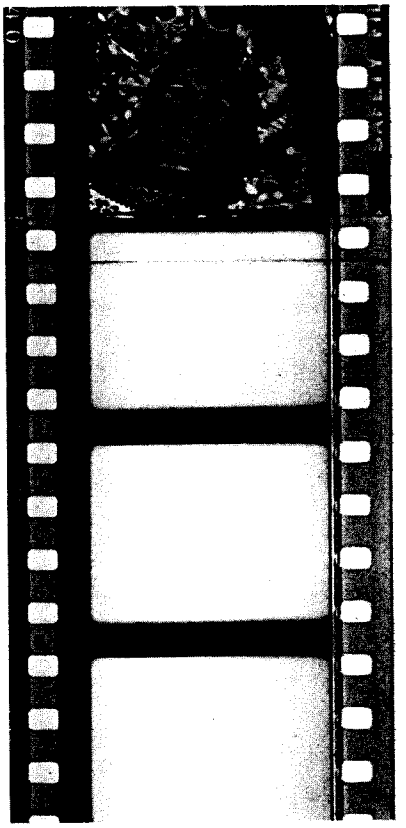
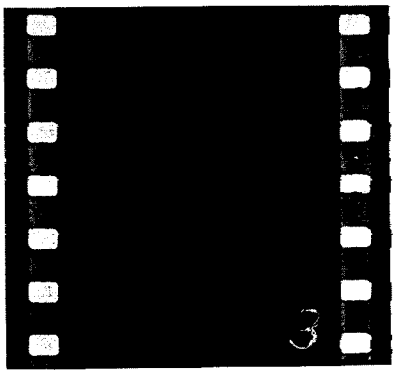
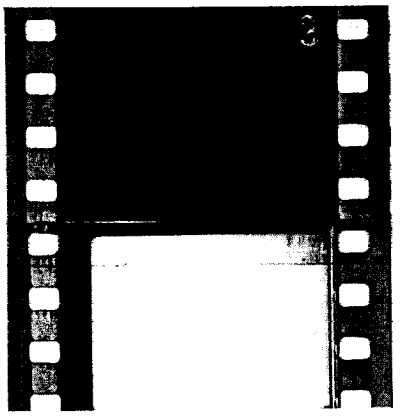


Figure 10.
Use one frame of the last scene on the reel to identify reels when replacing the trailers.





For reels that end with a fade-out, use a matching number on each side of the cut for identification.

Speaking of splicing, many of the operators we've talked to agree that tape splicing should become the universal method. If tape splicing did become universally implemented during makeup and breakdown, film losses that occur under present conditions, that is when cement splices are encountered and cut out, would be reduced.

Because of the ease with which tape splices can be disassembled, one cut would be all that is necessary for the life of the print—barring other damage. Each theatre operator thereafter could remove the leaders and trailers by peeling the tape splices apart and also splice the reels together directly without further cutting.

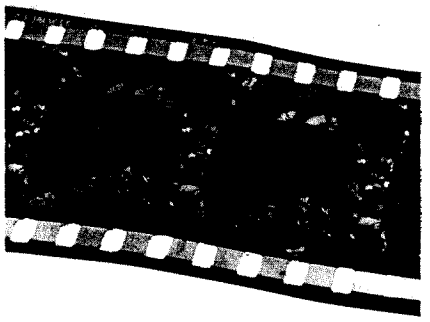


Figure 11.
Make sure punched-out tape perfs do not stay on your splices. They collect dirt, stick in the gate, and can cause a film break if they become stuck to the next convolution of film on a platter.

Overexposed Tape???

When you make a tape splice, however, regardless of the method you use, it is extremely important that no exposed adhesive remains at the splice. This means you must align the tape accurately (and carefully) on your splicer block if you are using tape tabs or sections of perforated tape. If for any reason the tape overhangs a film edge and is still in register with the film perforations, trim the excess flush with the film edge. When using splicers that cut and perforate the tape, be certain that no punched-out perforation bits remain on the splice (Figure 11). Here again, a ragged cut should be trimmed flush with the film edge. Failure to guard against exposed adhesive can cause a film jam at the feed roller cluster on the platter.

During the show, there is always the possibility that some film damage, such as a loose splice or broken perfs, can occur. With reel-to-reel projection, the damage can be easily repaired during rewinding. On a platter transport, however, there is no such opportunity until all the film has returned to the takeup platter with the damaged film buried somewhere in 12,000 ft or so of film. So what can you do then? One of the simplest methods we have observed so far is to isolate the damaged area on the takeup platter while the show is running. During intermission, the damage or bad splice can easily be lifted out from the film roll and repaired. The "Editor's Mailbox" column in H-50-7, *The Case for Test Films,* shows an easy method to accomplish this and is reproduced here for your convenience (Figure 12).

Caution—High Tension

After the last show, you are probably impatient to get the print broken down, but a word of caution . . . if you aren't already aware of it. The tension present at the hub of the shipping reel on the makeup table is extremely high when you start up. If there is any slack in the film, cracks in the film edges, or a poorly made splice, you can easily break the film when you start the makeup table rewind. So turn the speed control on the makeup table just past the "ON" position and hand rotate the platter to get the wind started and the platter turning, being careful to keep the film from slackening. After that, cautiously increase the spindle drive speed and proceed with the breakdown operation. You should repeat this procedure for each reel.

Remember that as the film diameter on the platter diminishes, the initial starting tension on the shipping reel hub increases. Take it easy!

During the breakdown process, patience is a virtue that many find hard to adhere to as they hunt for the connecting splices between reels. Some people go all out to make these splices easy to spot in the roll. But the use of white shoe polish or nearly opaque bright orange splicing tape is not a recommended solution that your patrons will appreciate. At the present time, we don't know if any perfect solution exists, but we do offer the following acceptable technique. During the last show, when the interconnecting splice goes through the projector, place a paper telltale (Figure 13) at the point where the film winds up on the film roll. During breakdown, slow up as the telltale comes close to the outer edge of the film roll because the splice will appear before the telltale falls out. Or if you don't want to bother having to listen for splices, you can use the "old fashioned" method. Wind slowly as the film reaches the capacity of the shipping reel and feel for the splice. (Watch out for out-of-line splices; they can cut you!) Some projectionists compromise by using translucent splicing tape. It causes a minor distraction on the screen, but can be easily seen when it reaches the outer convolution of the film roll although it is not readily visible within the roll.

1. Keep about eight pieces (approximately 2 inches square) of clean sponge rubber (or other soft sponge material) in a container somewhere near the platter assembly. No other material is required.
2. As the misframed splice is taken up on the platter, place four pieces of sponge, evenly spaced, between the wound-up portion and the section that contains the bad splice.
3. As the platter continues to rotate, insert the other four pieces of sponge on the other side of the section with the bad splice. (See Figure 2.)
4. Take up the remaining film normally. After the show is over, carefully lift out the section of film between the two sets of sponges, make the repair, and remove the sponges.
5. When the film has been properly repaired, slip the section back onto the platter. The entire operation takes less than 5 minutes.

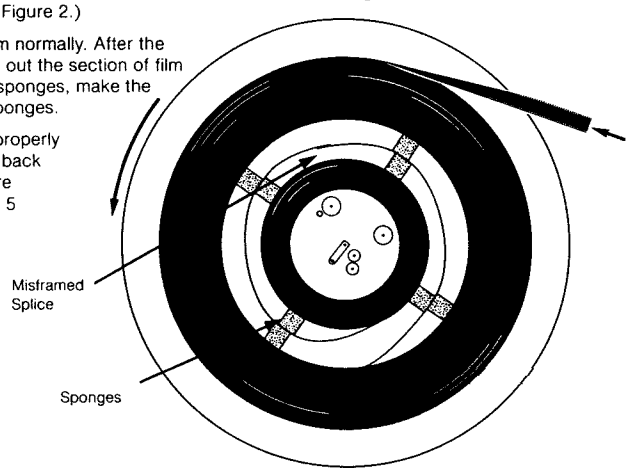


Figure 12. Takeup platter showing the sponges in place to isolate a misframed splice.

Figure 13.
Inserting a small piece of paper in the roll as the end-of-reel splice goes through the gate is an easy, safe, and quick way to find the splices between reels.

Think of Your Patrons

Regardless of the technique or method you use, always keep in mind the comfort of your patrons. Momentary blackouts and large dirt particles on the screen are not appreciated. The use of 35 mm film platter transports is increasing rapidly. In time, platters will probably become the standard film transport system in theatres. For those of you who now have platters or are contemplating their installation, common sense, patience, good housekeeping habits, and careful handling of your films will provide the quality you want and the quality your patrons expect.