

Film-Tech

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CLEANING RELEASE PRINTS

In previous issues of *Film Notes for the REEL PEOPLE*, we briefly mention print cleaning in emergency situations. In this article, we present a detailed discussion of simple, in-house cleaning methods that still belong in the so called "emergency actions" category. Of course, commercial cleaning and lubricating motion picture films are important aspects of film maintenance, but here we mention them only briefly because such operations require specialized procedures, employ complex and costly equipment, are little known

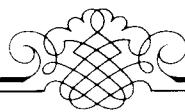
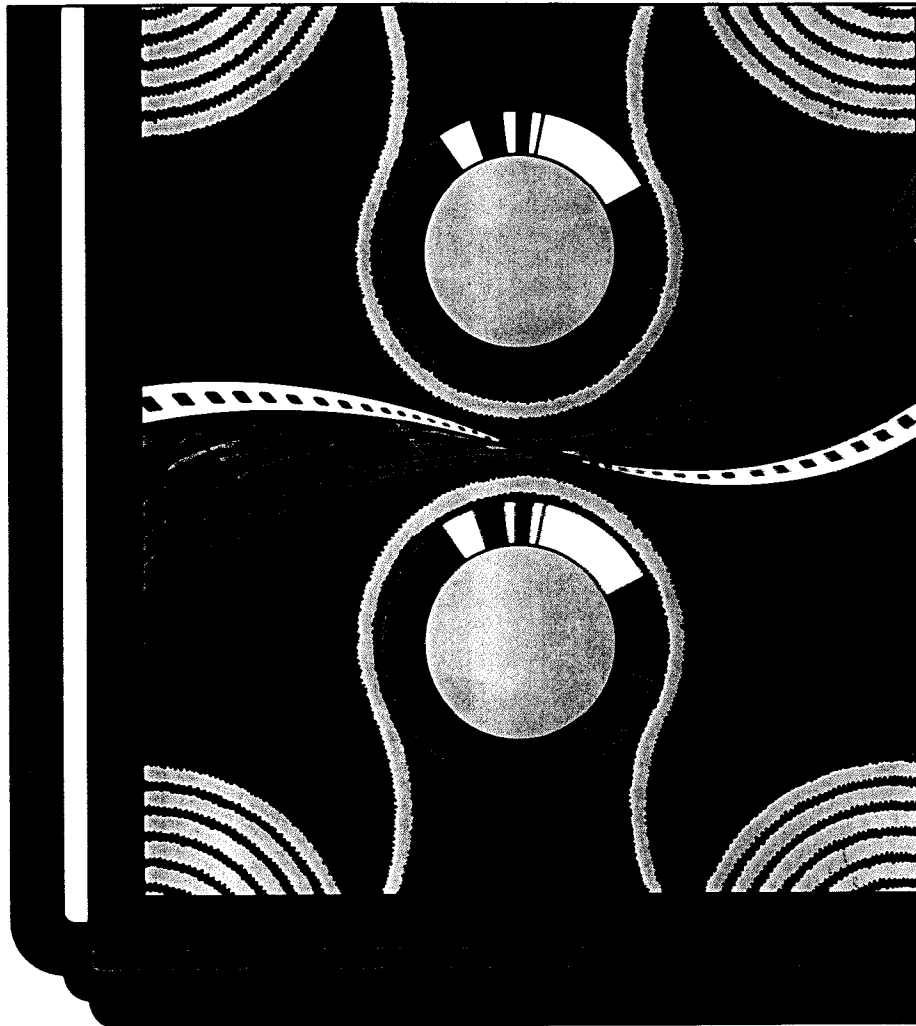
outside the film laboratories and professional film cleaning plants, and are beyond the capabilities of any theatre to accomplish.

Where the Dirt Is?

Because modern motion picture projection equipment, in good repair and properly maintained, can transport a film many hundreds of times without producing abrasions or dirt that are visible on the screen, you might ask, "Where do accumulations of dirt and abrasion come from?" In most cases, they are produced by improper handling of the film or by poorly maintained equipment or both. Motion picture film, like many other plastic materials, has a tendency to build up static charges, especially under low humidity conditions. When conditions that promote static charges are present during projection, floating dust and dirt can be easily picked up on the film. This is particularly true when projecting film on today's increasingly popular platter systems. The accumulation of dust and dirt due to static attraction as well as the abrasion damage that these particles can create are generally even more common during bench rewinding if high winding speeds are used and if the film is close to the bench top. Although the effects of some types of abrasion can be minimized by proper film cleaning, heavy scratches cannot be corrected by cleaning alone. The remedies for these problems are quite specialized and simply can't be done in the theatre.

Quick, but Not So Dirty

Emergency film cleaning at the theatre should be concerned with the removal of dust and other loose particles, gritty dirt, and oil mottle to minimize the potential for minor film base scratches



Percent of Network Prime Time Originated on Film (1983)—79%
(MPAV-MI)

Percent of National/Regional Commercials Originated on Film (1983)—75%
(MPAV-MI)

First Picture in Color to Win Best Picture Oscar—Gone With the Wind (1939)

as much as possible. There are some relatively inexpensive film cleaning devices that can perform these tasks adequately. One such unit is the ECCO 202 System Film Cleaner (Figure 1), manufactured by Electro-Chemical Products, that uses plush or flannel pads moistened with an appropriate film cleaner/lubricant. Other types of film cleaners, such as those manufactured by Christie Electric Co. (Figure 2), United Artists Theatre Circuit (Figure 3), and 3M (Figure 4) to name a few, rely on a slowly moving dry tape web of special material that comes in contact with the film surfaces. The Christie unit is designed to be mounted either on the projector or platter. Some of the tape web materials are impregnated with silicone or other lubricating agent. For an occasional cleaning, our technicians prefer the simplicity of moistened pads because of their effectiveness in removing oil and grimy deposits and the lubricating property of the liquid itself. These "wet cleaners" lessen the chance of abrasion from gritty dirt particles that build up on a dry tape during the cleaning process. Dry tape webs are effective if a clean tape surface is constantly presented to the film surface so that dirt particles will not accumulate and cause further problems. Using a "dry cleaner" on oil deposits or mottle, however, is usually less effective than cleaning with moistened pads.

Dry cleaning devices are particularly well suited for use on projectors and other equipment to maintain the appearance of prints that are free from oil and gritty dirt, or that have been thoroughly cleaned initially. You should be cautious, however, about passing the film through a dry cleaning device during projection runs unless you are sure that clean web material is continuously being presented to the film surfaces. Some of these devices, such as the 3M units, although not readily adapted to a projector or platter, are recommended for use on a rewind bench and often include provisions for neutralizing static charges. Actually, film cleaning should be undertaken only when screen image dirt becomes distracting. Failure to be observant can result in scratches, such as those shown in our

Figure 1
ECCO 202 Film Cleaner and Conditioning System for use at the rewind bench or other stationary mounting site.

Photograph courtesy of Electro-Chemical Products Corporation, Montclair, NJ

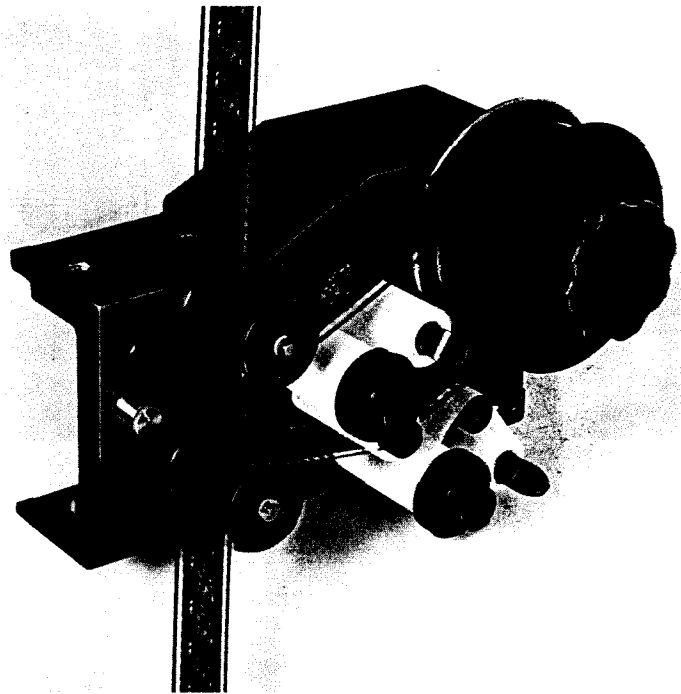
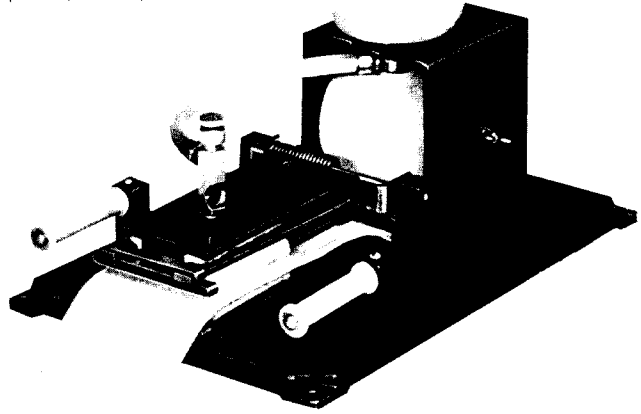


Figure 2
Christie Film Cleaner, Model FC-1 for either projector or platter mounting.
Photograph courtesy of Christie Electric Company, Los Angeles, CA

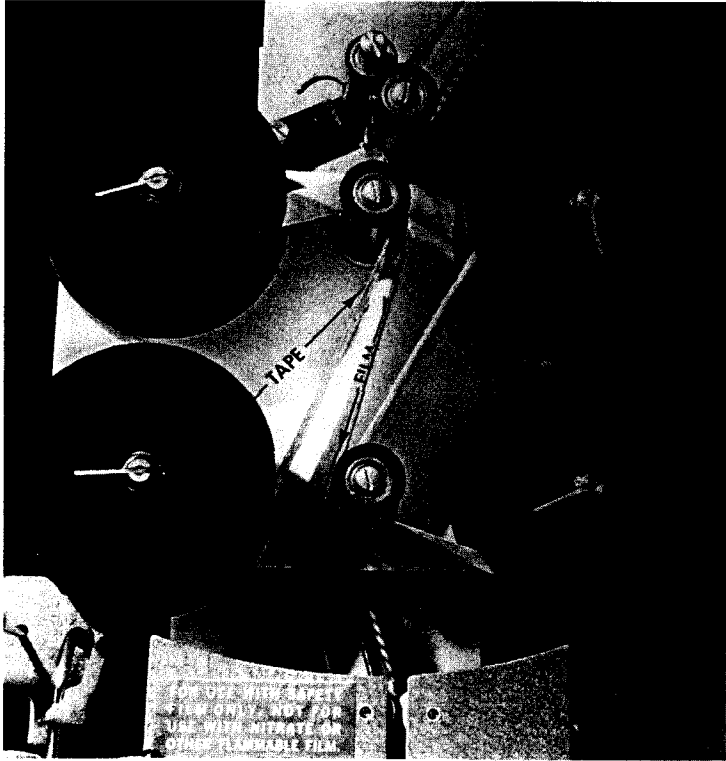
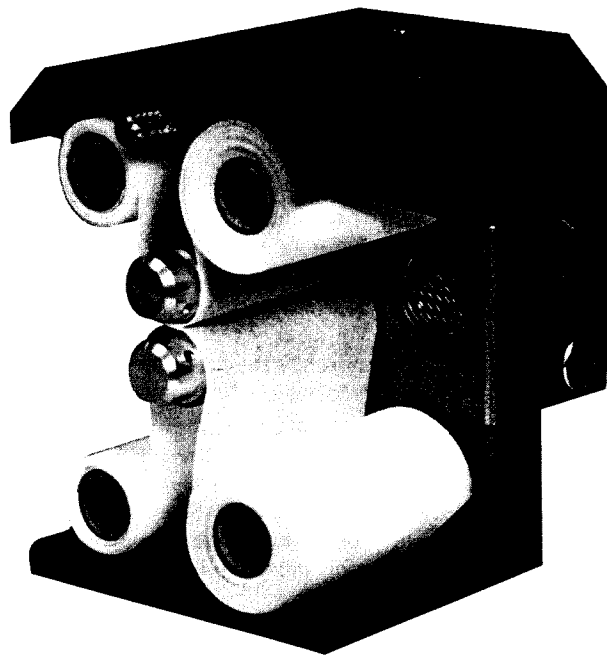


Figure 3
United Artists Film Cleaner is also designed
for projector or platter use.
Photograph courtesy of United Artists Theatre Circuit,
Inc., Great Neck, Long Island, NY

Figure 4
3M Masterwipe Film Cleaner, Model 253
is particularly well suited for use on a
rewind bench.
Photograph courtesy of Static Control Systems/
3M, St. Paul, MN



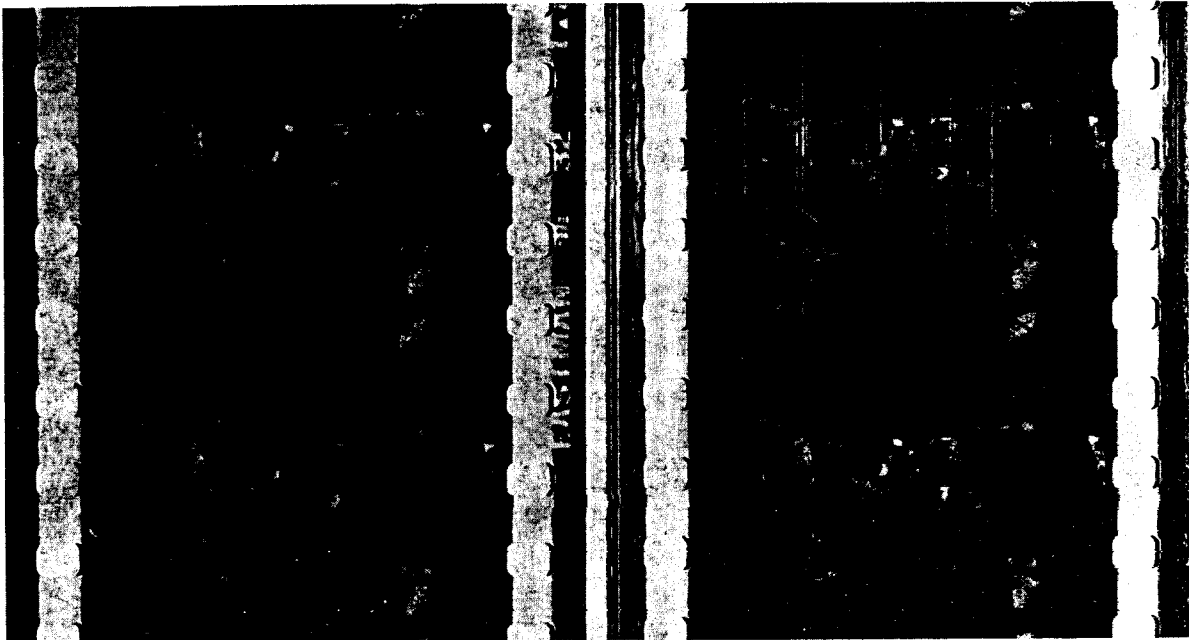


Figure 5
Scratches such as these (on the base side, emulsion side, or on both sides) can occur if cleaning material is not changed frequently.

test film (Figure 5), after less than 200 passes. Although very fine, these scratches were visible on the screen beyond a viewing distance of one screen width.

Before attempting to clean any print, try the technique you have chosen on some expendable film first and check the results. Use a magnifying glass to observe the film surfaces for any signs of additional abrasion caused by the cleaning. Your patrons will appreciate your concern for their viewing comfort.

A Word to the Wise . . .

There are several liquid film cleaners available and they all present certain hazards if not properly used. First of all, we do not recommend using any film cleaner that is flammable. Since all currently available cleaners are more or less toxic to humans, why add high flammability to the risk? If you intend to clean film in the projection room, or in the film exchange, it is vitally important to first assess your ventilation capabilities. Adequate ventilation should remove the solvent vapor so effectively that its characteristic odor is barely perceptible during continuous cleaning operations.

IMPORTANT: *If adequate ventilation cannot be achieved, a definite health hazard will exist and film cleaning with solvents should not be attempted.*

For occasional film cleaning where there is adequate ventilation, a cloth material moistened with film cleaner or cleaner/lubricant is simple, effective, and one of the least expensive methods to use. Materials such as bleached Canton flannel or deep-pile plush are ideal for this purpose and are available from most fabric shops.

The Cloth/Solvent Sandwich

To clean a print using this method, a pad of the proper cloth should be thoroughly moistened (but should not be dripping wet) with a film cleaner such as *KODAK* Movie Film Cleaner (with Lubricant) and folded around the film (Figure 6a). The film should then be drawn through the sandwich of cloth (Figure 6b) at a speed that is slow enough to allow the cleaner to evaporate before the film reaches the take-up reel; winding the film up wet will cause spots and blotches. If your ceiling space permits, you might consider installing an idler roller above the cleaning station to provide a

longer film path from the cleaning cloth to the take-up reel, thus enabling the winding speed to be increased. As the cloth begins to dry, or when a complete layer of cleaning solution can no longer be seen on the surface as it emerges from the folded pad, stop, refold the cloth pad to provide a clean surface to the film, add more cleaner, and continue winding. Be sure to wear protective gloves because prolonged contact with the cleaning solvent will draw the natural oil from your skin and produce dryness and chapping.

If you have purchased one of the film cleaning devices that uses plush or flannel in rolls, pull out fresh sections of the material frequently to prevent gritty dirt particle buildup. A major disadvantage in solvent cleaning a new print is that the lubrication applied at the processing laboratory is almost always removed. And the small amount of lubricant present in most film cleaners is usually not adequate to compensate for the edge wax needed during initial projection runs. To be safe, the print should be properly relubricated by edge waxing in a laboratory or film treatment plant. Seasoned prints ordinarily do not require this type of relubrication after cleaning because the film surfaces become hardened with use.

Clean Film Investments

The material cost for cleaning an average release print should be reasonable, but could involve considerable time if cleaning is done close to the rewind because of the slow winding speed necessary to assure adequate solvent evaporation. Without considering the initial expense of a dry tape web cleaner, and assuming that the cleaning device is mounted on the projector, the cost for cleaning a release print can be as little as 10 cents per hour of running time for both sides of the film. It is a good idea, therefore, to recognize all the requirements for doing a proper cleaning job—before you actually attempt it. If you have any doubts about the success of an in-house

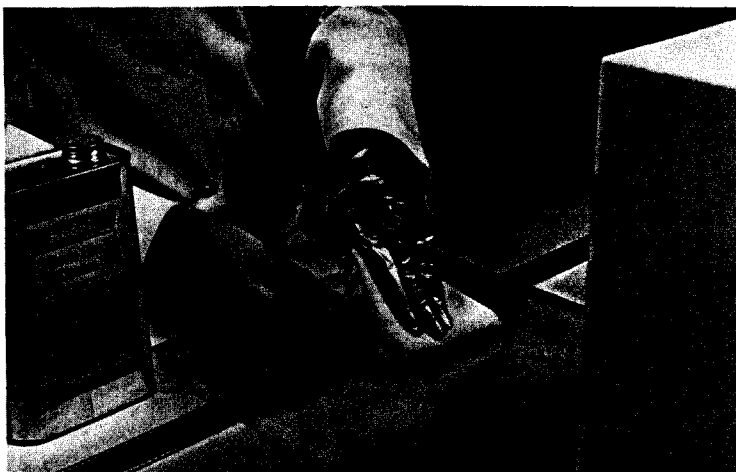


Figure 6a
Make sure there are no wrinkles in the folded pad that might cause abrasions.

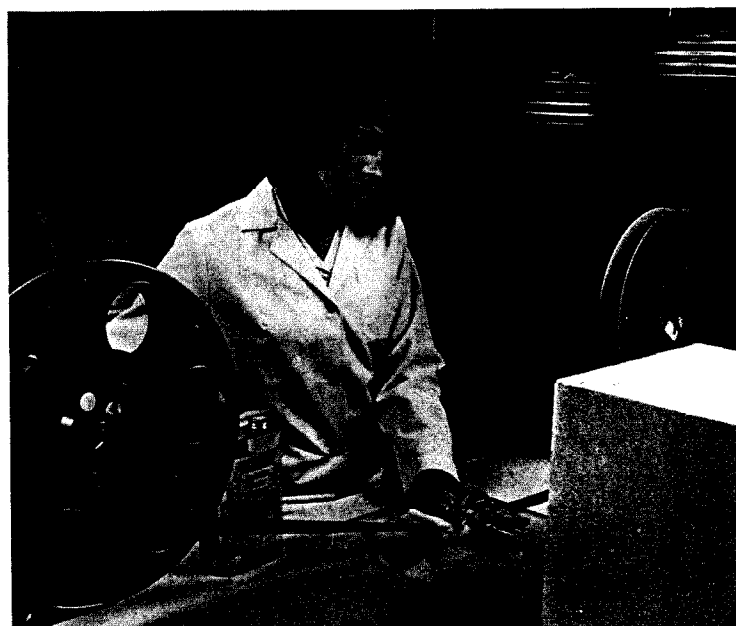


Figure 6b
Use the flat part of your hand to exert only light, even pressure on the film as you wind.

cleaning operation, it might be best to forget it and leave the cleaning and lubricating of your films to the professionals.

To illustrate the complexity and importance of film cleaning at the professional level, Figure 7 shows a top-of-the-line ultrasonic film cleaning machine which can remove even the deeply imbedded dirt that is usually found around splice areas. Other equally sophisticated film cleaners may use different operating principles, but their function is still the same.

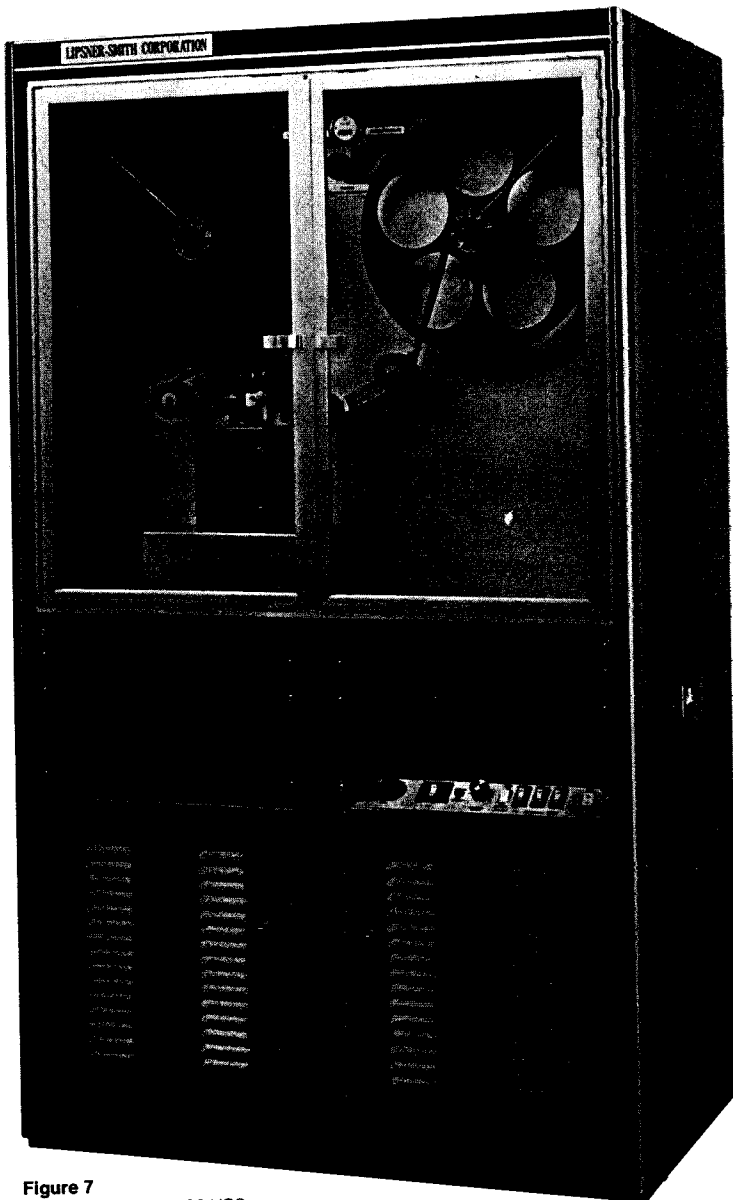


Figure 7
Lipsner-Smith CF3000 VCS ultrasonic film cleaning machine has built-in solvent recovery and reclaiming units.
Photograph courtesy of Lipsner-Smith Corporation, Lincolnwood, IL

The only real solution for dirty, oily, and scratched release prints is to realize that most of the problems are caused by people and that it's up to you to assess and correct your contribution, if any, to these problems. We have observed that when release prints are handled properly and projected with equipment that is conscientiously serviced and maintained, 1000 or more runs are easily achievable without the need for cleaning or repairing of the print.

Ponder These Points!

Here are some things to remember when you have decided to clean your films:

1. Use only well-known, high-quality film cleaning solutions. *Do not use alcohol of any kind* because some types can soften the emulsion, or the base, and can increase the risk of abrasion during the cleaning process. Alcohols are not good oil solvents, can remove magnetic striping, and are highly flammable.
2. On film with magnetic sound tracks, first check the cleaning solution on a short section of film in the head or tail section where it will not matter if the mag stripe is removed. If a heavy brown color appears on the cloth . . . go no further! Try a different cleaning solution. *KODAK Film Cleaner* (with Lubricant) is suitable for use with some magnetic striping on 35 mm and 70 mm prints providing the contact is brief, as in most normal cleaning operations.
3. Use a soft, lintless white cloth such as Canton flannel or deep-pile velvet plush. Avoid using hard surfaced textiles or exerting excessive pressure on the cleaning pad as these tend to abrade film and hold any grit in contact with the film surface. Also, do not use colored or pigmented cloths or any paper products to clean your films. Fold all cut edges inside the pad to prevent depositing lint on the film.
4. Refold the cloth pad frequently so that a clean surface is always in contact with film. Advance impregnated dry tape webs frequently for the same reason.
5. When cleaning with cloth pads and solvent, wear protective gloves and make sure there is adequate ventilation in your work area.
6. If a new print needs to be cleaned, be sure to have it relubricated properly by edge waxing because cleaning solvents remove the lubricants along with the dirt. Seasoned prints normally do not require further lubrication.

7. Make sure that the film cleaning solvent has evaporated from the film surface before winding the film onto the reel. Place some sort of lamp on the table so that it will reflect from the film surface as you clean. In this way, you can observe the solvent on the film and the point where it evaporates.

8. To speed up the cleaning procedure, lengthen the film path between the cloth pad and the take-up reel. Use idler rollers near the ceiling, or place the reels as far apart as possible . . . maybe on another bench. Of course, you will need a helping hand if you choose the latter alternative. Remember, the faster you wind the film, the more frequently you will need to replace the cleaner on the cloth pad. Never let the pad become so dry that you cannot see the cleaner on the film surfaces.

A release print that has been cleaned will remain that way only as long as the contributing factors that cause dirt problems are known and remedied—or prevented. To begin with, oil acts as a lubricant when applied to bearings and other mechanisms to reduce friction and wear. In an emergency situation (as described in H-50-4), oil can also help to “nurse” a green print through initial projection if laboratory lubrication was inadequate, or missing. Otherwise, oil on film works like a magnet, drawing dust, dirt, and gritty particles to the film surfaces and keeping them there. Where does this oil come from? Usually, from over-oiled projector mechanisms, from worn bearings, or as a result of inadequate or improper equipment cleaning. In every case, the oil finds its way to projector component surfaces that come into contact with the film. Once on the film surface, oil continues to migrate and film mottle develops. Contact with dirty surfaces and airborne dust and dirt, with the help of static buildup, does the rest.

What to Do?

There is probably little you can do, as far as dirt is concerned, about what happens to a film before it arrives in your theatre, but you can prevent further dirt buildup by keeping your booth and equipment as clean as possible. If you make cement splices, be sure the film particles from scraping are cleaned away from the film before you wind it up. Also keep the splicer and bench top clean. Remember, most of the dirt particles that look like large chunks of debris on the screen are almost microscopic in size when viewed on the film surface. You probably will not notice these tiny particles if they are left on the bench top or are scattered inside the projector; a small, portable vacuum cleaner can be a great help.

Not a Cure-All

Simple film cleaning does very little to eliminate scratches and cinch marks because all such marks are actually forms of physical damage to the film surface. Certain types of base scratches can be minimized professionally, but emulsion scratches, in which some of the picture information has been removed, cannot be corrected. Similarly, deep base scratches that have become filled with dirt can often be made less objectionable through effective film cleaning, but the scratches will still be visible.

There are methods by which base scratches can be practically eliminated from a film surface, but they are very complex and can be very expensive. In some laboratories, base scratches on negatives are effectively eliminated by using a liquid printing technique. Experimentally, a

liquid gate was designed and adapted to a projector in 1961. Heavy base scratches were completely eliminated in the screen image, but emulsion scratches were still visible. Some film treatment plants use a combination of heat and solvent to fill in or smooth down the ragged edges of base scratches, thus making them less visible on the screen.

We hope these points will emphasize the importance of proper maintenance of your equipment and careful handling of your release prints to preserve the visual quality of the screen image. Preventive maintenance and cleanliness are the keys: Remember, once the damage has been done, efforts to recover a print can be very expensive and can produce results that are only marginally satisfactory. Remember also that if patrons are to enjoy a film fully, each film handler should try to keep that film in good condition throughout its useful projection life. A film will look best to your patrons if it has been properly cared for and has always been handled in a clean environment on carefully maintained equipment. Patrons say thanks for your efforts by coming back!