



EVOLUTION OF A 16mm black-and-white and sound print made by the 35/32mm printing method. The first film is the 35/32mm picture dupe negative; 2 is 35/32mm sound negative; and 3, 35/32mm double composite print. Strip No. 4 is the completed 16mm print after being

slit and trimmed from the 35/32mm film stock. The method results in better print quality and sound tracks having improved frequency response. (Although films illustrated are not all related, they are typical examples and demonstrate the process.)

## WHY THE 35/32MM METHOD RESULTS IN BETTER 16MM PRINTS

Film laboratories have discovered it is more economical and productive of better prints to process two 16mm images side-by-side on a single 35mm film in one operation.

ONE OF THE IMPORTANT economies effected in the production of 16mm films for television and other professional uses is credited to the 35/32mm printing method, by which 35mm film perforated with standard 16mm sprocket holes permits two 16mm prints to be made simultaneously, side by side, split from the center of the 35mm width after the latter is trimmed to 32mm in width.

Although the 32/35mm method is now in general use by many of the commercial film laboratories in the U. S., it was first used on a large scale commercially at General Film Laboratories in Hollywood. General's Vice-President William E. Gephart explained the method in detail in a

paper presented before members of the S.M.P.T.E. at the Society's convention in October, 1956, at Los Angeles.

The method utilizes 35/32mm films in the various processing and printing steps. Special printing machines are required, but otherwise, assembly, cleaning and developing of the 35/32mm prints are accomplished on normal 35mm equipment.

"The method is practical," points out Gephart, "since most of the original negatives for today's TV and other commercial 16mm films are 35mm, and most of the professional laboratory equipment in use today was designed to print or process film in 35mm width."

According to General Film Laboratories Corp., the method of printing on 35/32mm film results in cleaner 16mm prints, better sound quality, and sharper picture reproduction than where prints are made directly on 16mm negative film. Equally important is the economy of producing two prints in a single operation.

While slitting the 35/32mm film into two 16mm strips is an added operation, it doesn't begin to eat up the economy of processing two 16mm prints at one time. But the slitting operation and especially the trimming of the delicate 1½mm strips on each edge of the 35/32mm film (to reduce it to 32mm in width) is perhaps the most precise and the one that is supervised more closely than all the others.

When the 35/32mm printing method was first introduced, motion picture engineers doubted the accuracy with which the edge trimming operation could be performed by the film laboratories and cited that irregular trimming would produce "weave" of the image on the screen during projection.

General's engineers assert they licked the problem by designing and building their own precision film slitter. The dimensional stability of the 16mm prints emerging from General's slitter is said to be well within ASA standards. The slitting operation is checked several times daily by examining samples of slit film on an optical comparator for placement, weave, and smoothness of edges, and the same specimens are then checked a second time by actual projection at normal 16mm speed.

In Gephart's paper (which was published in its entirety in the March, 1957, *Journal of the SMPTE*) it is pointed out that the 35/32mm method has a decided advantage over other procedures in that it can be handled on normal 35mm nonsprocket-drive developing machines along with other 35mm material. It also benefits from the good solutions control and mechanical maintenance normally practiced on these machines. Moreover, the paper points out, the extra 1½mm existing on the 35/32mm films throughout the processing gives roller support, edge guiding, and protection to the finished product. Roller marks, rough edges, abrasions and dirt that might get into the picture area are trimmed off and discarded, thus presenting a new smooth edge. The sound tracks, being in the center of the 35/32mm film, have complete protection.

The usual method of producing 16mm black-and-white prints by the 35/32mm method is to make a 35mm fine-grain duplicating positive by contact printing from the original 35mm negative. From this a dupe negative is made by optical reduction on 35/32mm film. This negative may consist of a single 16mm reduction or a double-row of two 16mm images side by side. Sometimes the twin images are duplicates while at other times they are each different so that two different productions are printed and processed in one operation.

The dupe negative is then contact-printed to 35/32mm positive, composite with the sound negative, and the print then slit and trimmed to produce two 16mm prints.

The method is equally flexible for making 16mm color prints from 35mm color negatives. Here there is a choice of three methods, all utilizing the various color film stocks available from Eastman Kodak Company:

- 1) making a 35mm color interpositive on EK 5253 from the original 35mm color negative, then making a reduction 35/32mm color internegative Type 7253. Contact prints are then made on 35/32mm Type 7383 color print film. In

contact-printing the sound track, 35/32mm sound negative is used.

- 2) 16mm color prints can also be made on 35/32mm color positive by reduction printing from the original 35mm color negative.

- 3) by making a 35/32mm internegative on Eastman Color Internegative Film, Type 7270. This may be done either by reduction printing from a 35mm color print or by contact printing from a 16mm Kodachrome print. Following this, a direct contact print is then made on 35/32mm color positive which is subsequently slit and trimmed to produce two 16mm prints.

One of the advantages of the 35/32mm printing method cited by Gephart is that the printing negatives wear exceedingly well, having on the average a much longer life than a 16mm dupe negative.

"Negatives made on 35/32mm film," Gephart said, "stand the wear and handling of multiple printing much better than 16mm negatives, due to the added width of the film providing support to the sprocket holes. Where required, we can easily obtain a minimum of 200 good 16mm prints from a 35/32mm negative."

So extensive has the use of 35/32mm film become, that it now is generally available from both Eastman Kodak Company and DuPont, already perforated. It is not a "special order" film requiring any period of delay for production and shipment.

Following adoption of the 35/32mm method of printing by General Film Laboratories Corp., the company's research engineers kept a two-year record showing results of making 16mm release prints on 16mm raw stock, compared to making them on 35/32mm raw stock—both in the same laboratory and under similar conditions. The results, without question, favored the 35/32mm method, which reduced the number of rejected prints in inspection by 50%, lowered processing costs, and resulted in better sound tracks that showed improved frequency response by 1 to 2 db at 5000 cycles.

HERE IS SHOWN graphically the relationship of the two 16mm films with the basic 35mm film stock on which they are printed in duplicate. A indicates full width of the 35/32mm film, identical with regular 35mm film except for perforations. The 32mm width (two 16mm widths) is shown at B-B, and a single 16mm film width at C. 1½mm is trimmed from either side of the 35/32mm stock at time of slitting. (Illustration courtesy of *Journal of the SMPTE*.)

