Engineering Committees Activities

Report of the Ad Hoc Subcommittee on Super 16 Format

This report, presented to the Engineering Committee on 16-mm and 8-mm motion pictures at its meeting of 13 November 1974 in Toronto, Canada, incorporates the specifications and recommendations by the members of the Ad Hoc Subcommittee. While it was the Committee's opinion that the subject is too immature for the development of national standards, it was also felt that the results of the study should be made available to all those concerned.

Current theatrical film practice in the United States for subjects photographed with spherical lenses is to compose the action in a 1.85:1 aspect ratio. Principally for reasons of portability of equipment and occasionally for economy of usage of film raw stock, a number of photographers have turned to the use of 16-mm as camera original film, even though its ultimate use was to be in 35-mm theaters. In framing for a 1.85:1 aspect ratio, as in 35-mm, a considerable amount of image information area is lost since the perforations are spaced for a 1.33:1 aspect ratio. Over the years, there have been a number of potential formats discussed; ultimately, some European photographers put into production use a format which has come to be known as Super 16, in which single-perforated 16-mm film is used and the image area extended into what is normally covered by the 16-mm soundtrack on the right side of the picture. Although this produces a 1.66:1 aspect ratio, it is still a noticeable improvement over the previous format even when a 1.85:1 aspect ratio is used. It is this format which we are presently considering either as to adoption through a set of Standards and/or Recommended Practices or as a step toward an improved format.

This committee had four charges which will be discussed:

I. "To review both the present and possible future goals and objectives of the motion-picture and television industry which have prompted interest in and the limited current use of Super 16."

Definition: The term Super 16 has been applied by common usage over the past few years to a system which includes: 16-mm single-perforated negative or reversal camera film as currently commercially supplied, and a camera aperture cut wider on the right side of the image as far as is practical, without running into scratch problems, into the area previously occupied by the optical or magnetic soundtrack.

Purpose: To produce an image on 16-mm camera film from which 35-mm 1.85:1 or 1.66:1 wide-screen images may be printed with the least amount of magnification (the largest possible camera film image) within the above limitations. The emphasis is on 35-mm theatrical wide-screen presentation. Other derivatives are secondary.

The objective is economy and portability.

It is obvious that an entrepreneur may choose at any time to design a system, build equipment, procure film and provide laboratory services for a special purpose whether it be Super 16 or some other gauge. We have tried to confine the activity of this subcommittee to those methods using modifications of existing equipment and using currently available film as commercially slit and perforated.

Future: The Super 16 format is more affected by marketing than by engineering considerations. It should be more attractive to the independent filmmaker operating on a minimal budget. If laboratories are willing to furnish facilities for duplicate negative manufacture, the function of the SMPTE is to point out and delineate the design considerations.

II. "Identify the segments of the motion-picture and television industry which are or may be affected by Super 16 and the needs of and limitations imposed by these industry segments."

A. Equipment suppliers—camera manufacturers and service organizations; suppliers of film-handling equipment; manufacturers of film-processing equipment; manufacturers of printers; manufacturers of editing equipment; and manufacturers of and modifiers of 16-mm projection equipment.

B. Laboratories.

C. Film distributors, who must also supply derivatives of Super 16 originals in the following forms 16-mm prints with optical soundtrack compatible with "standard" 16-mm for such uses as airline or other non-theatrical projection of theatrical subjects in existing 16-mm projectors, and for mini-theaters; Super 8 prints with optical or magnetic soundtracks for similar usage; 35-mm 1.33:1 aspect ratio prints for television; 16-mm 1.33:1 aspect ratio prints for television; and transfers to magnetic tape either directly from the original or from a dupe negative or from a print.

D. Cinematographers and production staffs.

III. "On the basis of the above, suggest a general outline of materials and techniques which would most likely help the industry as a whole achieve these goals."

A. *Preparation and Production Criteria:* Since the extended picture image area covers substantially the same area as covered by soundtrack when it is used, it should be possible to construct equipment which will protect that area. As a matter of fact, the proposed picture image area leaves a margin of 0.032 inches (0.81 mm) (as specified by the Swedish inventors) versus 0.018 inches (0.46 mm) margin (ANSI Standard) for soundtrack. Therefore, if the specifications of the Swedish inventors are accepted, the image area to be protected will not extend as far toward the guided edge of the film as is currently done for the sound record. It is important at all stages of preparation of raw stock and all subsequent handling of negative and positive that the film be protected from damage by equipment which may have been designed for use with double-perforated film. Following is a tabulation of probable areas of concern:

(1) *Raw Stock.*

(2) *Camera:* Another subcommittee is considering and recommending camera aperture dimensions. Cameras must be designed or modified to provide proper film guides to meet the above criteria. Lenses must be designed or procured which will cover the enlarged image area without vignetting, and the optical center of the camera, in cases of modification, should be moved to conform to the new image center. Specification of registration perforation has been suggested as an essential requirement.

(3) *Processing:* Developing of all film stocks must leave a clean edge: negative, positive, reversal and duplicates. All film handling equipment, splicers, etc., must be capable of handling the format without damaging the extended image area. Film sent to laboratories for processing and dailies delivered by laboratories must be identified to prevent being inadvertently handled on the wrong equipment.

(4) *Printing of Dailies:* Contact or one-to-one printers must be capable of carrying the image information from the extended image area.

(5) *Editing:* Editing and projection equipment for dailies must be capable of showing the extended image area. While it would be desirable for projectors to be realigned for optical centering, this is the one area where a compromise might be acceptable as long as there is even illumination possible and the projection lenses cover a sufficiently large field. The same techniques of editing as are presently used for 16-mm should be followed, in that the original film be prepared for "blind splices," or "zero cuts" to avoid showing splices. The margin between 1.66:1 aspect ratio and 1.85:1 aspect ratio is not sufficient to cover a splice.

(6) *Release Printing:* Printers designed for the manufacture of duplicate negatives to be used in release printing must be centered on the new image area. In the case of reversal internegatives, provision must be made for over-printing a matte to cover the framelines. This is most important in preparation of films for non-theatrical projection of theatrical film, because it is more likely in this instance that projector apertures would not cover the clear framelines otherwise present.

B. Although the prime reasons for the use of 16-mm which encouraged the improvement to a Super 16 format include economy, there is one other important consideration which may warrant some further thought: without modification of a projector, both for picture and for the addition of a non-standard magnetic soundtrack, it is not possible to preview a picture in the Super 16 format in 16-mm as it is in the standard 16 format. Heretofore, with the standard 16-mm format, it was possible to take a 16-mm subject and sell it while it is still in the 16-mm form before investing in 35-mm facilities for release printing. This can be an important consideration in the selection of a photographic medium. Although this is a marketing concern, it is affected by engineering considerations.

IV. "The Standards or Recommended Practices likely to be needed to make development of Super 16 viable should be considered and pointed out."

A. Another subcommittee is developing a standard for the camera aperture.

B. This subcommittee proposes the following:

(1) That the camera specifications should include a paragraph or section to the effect that: "The Super 16 camera finder and/or ground glass shall have a guideline mark of nominal dimensions 0.458 inches × 0.247 inches (11.63 × 6.27 mm) and another set of sidelines at 0.331 inches (8.41 mm), all such dimensions centered on the camera aperture. (These finder markings will define first the image to be enlarged to 35-mm which would be framed in the theater at a 1.85:1 aspect ratio in an aperture of 0.446 × 0.825 inches (11.33 × 20.96 mm) as a guide to the cinematographer; secondly, the 'inside' pair of lines define the television safe action area which, coincidentally, has nearly the same height dimension as the theatrical 1.85:1 aspect ratio.)"

(2) That a Recommended Practice be balloted to include these provisions:

(a) That the magnification ratio in printing 35-mm internegatives or duplicate negatives from Super 16 originals be 1:1.80 ± 0.01 and the center of the Super 16-mm frame as enlarged shall coincide with the center of the 35-mm aperture in the enlarging printer.

(b) The 35-mm enlarging printer aperture shall be 0.520 inches (13.21 mm) in height (maximum) by 0.868 inches width (nominal) (22.05 mm). When printing from a Super 16-mm reversal original, no frameline burn-in is necessary. When printing from a Super 16-mm original negative, the framelines of the 35-mm reversal intermediate negative shall be burned-in (exposed) during a second printing on a *registration* contact printer with full aperture image area of 0.748 inches (19.00 mm) (minimum) height by 0.990 inches (25.15 mm) width (nominal) using a high contrast matte (minimum density 3.60) made on the same enlarging printer used for the blow-up 35-mm picture. A clear frameline exists in the processed 35-mm color duplicate negative. [This will provide black framelines on a print with a maximum projection aspect ratio of 1.59:1 based on the standard projection aperture width of 0.825 inches (20.96 mm).]

(c) For purposes of television prints, a separate internegative shall be made. The internegative centerline and copy ratio, either 35-mm or 16-mm, shall be as specified in ANSI Standards PH22.7, PH22.59 and PH22.92.

1 November 1974

FRED H. DETMERS
Chairman, Ad Hoc Subcommittee

Treasurer's Report — January 1–December 31, 1974

CASH		
General Account - Balance 1/1/75		$ 37,335
Deposits - Regular	$921,098	
From Conferences	86,224	
From Scholarship Grants	10,000	1,017,322
TOTAL CASH AVAILABLE		1,054,657
DISBURSEMENTS TO -		
Office Account		979,670
General Account Balance 12/31/74		74,987
Office Account Balance 1/1/75		35,000
Deposits from General Account	979,670	
Disbursements	979,670	
Conference Bank Accounts	6,985	
Petty Cash - Scarsdale	200	7,185
TOTAL CASH/DEPOSITS ON HAND		117,172

INVESTMENTS		
Reserve Fund - Custody Shown		
U.S. Treasury Bills - CMB	9,813	
Corporate Bonds - CMB	13,106	
Corporate Bonds - SMPTE	85,640	
Common Stocks - CMB	112,449	
TOTAL INVESTED - COST		221,008
CASH SAVINGS ACCOUNT		12,795
ACCRUED INTEREST		3,170
		236,973
TOTAL CASH & INVESTMENTS - DECEMBER 31, 1974		$ 354,145

Respectfully submitted, Robert M. Smith, Treasurer

Accountants' Report

March 17, 1975

To the Members and Board of Governors of the
Society of Motion Picture and Television Engineers, Inc.

We have examined the balance sheet of the SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS, INC. as of December 31, 1974 and the related statement of income and expenses and changes in balances of funds for the year then ended. Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheet and statement of income and expenses and changes in balances of funds present fairly the financial position of the Society of Motion Picture and Television Engineers, Inc. at December 31, 1974 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

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Hauser, O'Connor & Hylind
Certified Public Accountants