Motion-Picture Standards in Canada

Abstract of CBC Operations Instruction Bulletin Number 30

For several years, the Canadian Broadcasting Corp. has been issuing within its organization a series known as Operations Instructions Bulletins. The Bulletin on Motion Picture Standards, issued in January 1957, is reprinted herewith in abstracted form, the omissions being indexes and lists which are already published by this Society and made available to members, usually at no charge.—Glenn E. Matthews, Editorial Vice-President; Axel G. Jensen, Engineering Vice-President.

THE MOTION-PICTURE industry over the past 25 years has achieved a high degree of standardization of equipment materials and practices. One of the main reasons for standardization is the extreme precision required to achieve satisfactory picture presentation in the theater.

It is not unusual to require magnification of 500 diameters of the picture images on theater screens. The images must be laid down successively on the screen at a rate of 24/sec to achieve smooth continuity of visual information. If the maximum vertical displacement of successive images on the screen is taken as 0.5 in., the tolerance in placement of the film frames in the projector gate becomes very small. When it is considered that placement of images on the screen may be affected by the register of the perforations in the original taking camera, as well as in intermediate stages between the original negative and final projection print, the shrinkage of the film itself and the perforating tolerances, it can be seen that the production of a technically perfect motion-picture print requires a high degree of perfection in film handling equipment and in the film material.

Organizations chiefly responsible for motion-picture standardization activities are: the Society of Motion Picture and Television Engineers, the Motion Picture Research Council and the American Standards Association in the United States; the British Kinematograph Society and the British Standards Institution in England; and the Canadian Standards Association in Canada. During the last war the U.S. Armed Forces published a number of joint Army/Navy (JAN) specifications. Many of these have been incorporated into ASA standards.

(The Bulletin then cites the availability of many standards which cover areas in which film is applied to television and lists 41 of the ASA PH22 series (approved or being revised). These are listed, along with other motion-picture standards, in the Index to American Standards and SMPTE Recommendations, in the annual indexes published in each of the recent December issues. The Index is available as a reprint at no charge.

(Then the Bulletin lists 27 other ASA Standards on photographic plates, papers, sensitivity, chemicals, processing, instruments and nomenclature. These will be found indexed among a total of upwards of 300 photographic standards in the catalog, American Standards Price List and Index, Spring 1956, No. 5601, available without charge from American Standards Assn., 70 East 45 St., New York 17.

(Listed below are the British Standards which the Canadian Bulletin noted as of special interest. A complete list of the British Standards is available from the British Standards Institute, 2 Park St., London, W1. The British Standards yearbook is available from the American Standards Association at a price of $2.75.

586–1953: Photoelectric cells of the emission type for sound film apparatus
677–1942: Motion-picture films
850–1955: Definition of cinematograph safety film
1380–1947: Speed and exposure index of photographic negative material
1384–1947: Measurement of photographic transmission density
1488–1948: Test films for 16mm cinematograph projectors
1585–1949: 16mm cinematograph sound on film release prints
1613–1949: Resolving power of lenses for cameras and enlargers
1793–1952: Audio frequency transformers for cinematograph equipment
1988–1953: Measurement of frequency variation in sound recording and reproduction

(The Bulletin lists the following standards of the Canadian Standards Assn. A description of the organization and program of the Canadian Standards Assn., written by Gerald G. Graham, was published in the *Journal*, pp. 156–157, Aug. 1952. The address of the Canadian Assn. is: 235 Montreal Rd., Eastview, Ottawa; or P.O. Box 506 Weston, Toronto, Ont.

Canadian Motion-Picture Standards

Z7.1: Specifications for motion-picture photography
*Z7.1.1.1-1948: Cutting and perforating dimensions for 16mm silent motion picture negative and positive raw stock
*Z7.1.1.2-1943: Cutting and perforating dimensions for 16mm sound motion-picture negative and positive raw stock
*Z7.1.1.5: Raw stock cores for 16mm motion-picture film
*Z7.1.4.3-1948: Emulsion and sound record positions in camera for 16mm sound-motion picture film
*Z7.1.6.2-1948: Sound records and scanning area of 16mm sound motion-picture prints
*Z7.1.7.3-1948: Emulsion and sound record positions in projector for direct front projection of 16mm sound motion-picture film
*Z7.1.7.5-1948: Reel spindles for 16mm motion-picture projectors
*Z7.1.9.1-1948: Nomenclature for motion-picture film used in studio and processing laboratories
*Z7.1.6.3-1950: Specification for sound focusing test film for 16mm sound motion-picture projection equipment
*Z7.1.6.4-1950: Specifications for 3000-cycle flutter test film for 16mm sound motion-picture projectors
*Z7.1.6.5-1950: Specifications for multi-frequency test film for field testing of 16mm sound motion-picture projection equipment
*Z7.1.6.6-1950: Specifications for 400-cycle signal level test film for 16mm sound motion-picture projection equipment
*Z7.1.6.7-1950: Method of making intermodulation tests on variable density 16mm sound motion-picture prints
*Z7.1.6.8-1950: Method of making cross modulation tests on variable-area 16mm sound motion-picture prints
*Z7.1.7.10-1950: 16mm positive aperture dimensions and image size for positive prints made from 35mm negatives
*Z7.1.7.11-1950: Negative aperture dimensions and image size for 16mm duplicate negatives made from 35mm positive prints

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*These are Canadian Standards which are American Standards *adopted without alteration*. The Bulletin gives this advice:

"It should not be assumed that due to similarity of titles, a Canadian Standard is a copy of the corresponding American Standard. In those cases in which the Canadian Standards Assn. has adopted an American Standard without alteration, that is stated in the standard."

*Z7.1.7.12-1950: Printer aperture dimensions for contact printing 16mm positive prints from 16mm negatives

*Z7.1.7.13-1950: Printer aperture dimensions for contact printing 16mm reversal and color reversal duplicate prints

*Z7.1.7.14-1950: Method of determining resolving power of 16mm motion-picture projector lenses

*Z7.1.7.15-1950: Method of determining freedom from travel ghost in 16mm sound motion-picture projectors

General Photographic Specifications

*Z7.0.2.1-1950: Diffuse transmission density

*Z7.0.2.2-1951: Standard method for determining photographic speed and exposure index

*Z7.0.2.4-1951: Spectral sensitivity indexes and group numbers for photographic emulsions

*Z7.0.3.1-1950: Standard definition of safety photographic film

*Z7.0.3.2-1951: Films for permanent records

Z7.0.4.1-1951: Standard method for determining veiling glare in photographic systems

*Z7.0.4.2-1951: Apertures and related quantities pertaining to photographic lenses

*Z7.0.8.1-1951: Practice for temperature of processing solutions

*Z7.0.8.7-1951: Permanency of the silver images of processed films, plates and papers

(The Bulletin next describes the technical and standards activities of the SMPTE, reporting, for instance, much that was in the August 1956 *Journal* Engineering Activities column, pp. 441–444.

(Twenty-one of the SMPTE test films are enumerated by the Bulletin which notes briefly the value of test films and slides in design, operation and maintenance. A Test Film Catalog is available from SMPTE headquarters, at no charge.

(The Society's *Journal* is described by citing the contents of one particular issue, August 1956, and further by listing some 75 articles of the past which have related to film and television. The Society has available from its headquarters, at no charge, a "Television Bibliography" which lists papers published in 1940–1955.)

British Kinematography, published by the British Kinematograph Society, 164 Shaftesbury Ave., London W.C.2, is an additional source of information in the English language. The activities of this organization, however, do not extend to Canada and United States to any appreciable degree.

The Canadian Standards Association sectional committee on Photography was organized in 1948. Three sectional committees are at work — Z 7.1 — Motion Picture Photography; Z 7.2 — Still Photography; Z 7.3 — Survey Photography. Committee Z. 7.1 has completed a review of all basic ASA and BSI motion-picture standards and to date 43 Canadian Standards in this category have been published. The committee meets at intervals to consider the status of existing and proposed standards. A subject at present under review is the losses in the area of a 35mm motion-picture frame in reduction to 16mm and reproduction in the television system.

Technical Committee 36 of the International Organization for Standardization has been set up to deal with motion-picture standards. At a meeting in Stockholm in June 1955, 40 delegates were present from Belgium, Czechoslovakia, France, Germany, Italy, Netherlands, Russia, Sweden, U.K. and U.S., and decisions were made on 14 proposals.

Many other organizations contribute to standardization of materials, equipment and procedures. In April 1956, the National Association of Television Film Directors in the U.S. published a preliminary report on a survey of all TV stations in the U.S. In reply to the question — the detail that gives the most trouble in film operations, 33% reported that this was: repairing films received in damaged condition, due to improper inspection.

The detail giving the least trouble in film room operations was not answered by 42% of stations; 91% had abandoned hand-punch cue marks on films. SMPTE leaders were used by 51% of the stations. Ideas and suggestions of problems needing discussion: 40% of the replies referred to a standard cue, 22% wanted better checking of film quality, and 8% asked for more information on how to clean film properly.

The motion-picture industry itself, particularly the 35 mm section of the industry, has established rigorous film handling practices and standards to maintain technical quality of theater films. Until television began to use 16mm film extensively, this film size was so-called substandard, reserved mainly for use in amateur and semiprofessional applications. The extensive use of 16mm film in nonpermanent projection sites, the operation of projection equipment by semiskilled personnel, the significance of cost of handling equipment, and the general attitude of the industry that 16mm film users and viewers were relatively noncritical led to a relaxation of rigid 35mm film standards in this field. Television suffers from these factors as well as the urgent time and quantity demands of the new medium.

It is not possible to make picture and sound images on 16mm film equal in quality to 35mm film, due mainly to the limitations of the smaller film size. However, there is sufficient evidence in television to indicate that in the present state of development, 16mm films can be made with acceptable quality for broadcasting purposes, providing extreme care is taken with the smaller size. To achieve a high standard of picture and sound quality with 16mm film, however, much greater attention is required than in handling 35mm film.

The first objective in the attainment of high quality is to produce scrupulously clean, scratch free, undamaged film. If the very large number of defects of this nature which now occur in 16mm television films could be eliminated or at least materially reduced this would represent a significant improvement, and attention could be directed towards other more obvious defects such as image steadiness and sound quality.