

Letter to the Editor

Re: Scaling Techniques for Subjective Judgments of Imaging Quality
(Paper by J. Edward Jackson, in the *Journal* for November 1974,
pp. 891-894.)

Dear Sir:

J. Edward Jackson's paper in the November 1974 *Journal* is a welcome dissertation on the philosophy of subjective scaling of motion-picture and television displays. Its title will naturally lead experimenters in need of guidance to turn to the paper for advice, and the final section "Obtaining Good Data" will be of particular value to them.

The exact arrangements to be adopted for a given class of visual subjective studies is a matter that is invariably hotly debated. My personal conclusion is that usually it will be worth accepting a specification regarded as not quite ideal if there is a good prospect that it will be adopted by most experimenters. So long as different workers continue to employ motley conditions, precise and meaningful intercomparison and verification of results will remain impossible.

In the field of broadcast television, the matter is particularly vital because of the necessity for agreed relationships between the many impairments that may arise in transmission and the subjective effects they produce. Such information is essential for the efficient planning and maintenance of point-to-point links and broadcast networks. Accordingly, appropriate studies were commenced by the International Radio Consultative Committee (CCIR) of the ITU some 15 years ago and have been summarized in successive versions of Report 405. The 1970 (New Delhi) meeting outlined the essential details of a preferred method which later formed the nucleus of Recommendation 500, "Method for the Subjective Assessment of the Quality of Television Pictures," adopted at the XIIIth Plenary Assembly in Geneva last year.

The Recommendation applies to laboratory experiments and

also, where appropriate, to operational assessments. Alternative five-category grading scales are listed, appropriate to the "method of successive categories" and also to multidimensional scaling by "uniresponse." There is also a comparison scale containing seven grades, suitable (extending Jackson's terminology) for "very-fine-tuner" operations. Other details include a table specifying viewing conditions in quantitative terms.

For the future, it is to be hoped that the Recommendation will be extended in equally succinct terms to include procedures for analysis, presentation and application of results. I agree with Dr. Jackson that analysis can be fairly straightforward, but, noting the variety of methods that exist here also, I wonder how long it will be before published results can be relied upon to be truly standardized.

Although full details would have been inappropriate to Dr. Jackson's "tutorial" paper, I feel that *Journal* readers would have welcomed a reference to the new CCIR Recommendation.

17 January 1975

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Note: CCIR Documents, including Recommendation 500 from the XIIIth Plenary Assembly in Geneva (1974), are available from the CCIR in Geneva and from the United Nations Bookstore in New York City.—*Edit.*

standards and recommended practices

Approved American National Standards

On 28 May 1975, the American National Standards Institute approved five new standards which are primarily editorial revisions of the earlier issues: PH22.37-1975, Dimensions of Raw Stock Cores for Motion-Picture Film (revision and consolidation of PH22.37-1963 (R1969) and PH22.38-1964 (R1969)); PH22.100-1975, Screen Luminance and Viewing Conditions for 16-mm Review Rooms; PH22.135-1975, Position, Dimensions and Reproducing Speed of Magnetic Sound Record on 8-mm Type R (Regular 8) Motion-Picture Film; PH22.159.3-1975, Specifications for 8-mm Type S (Super 8) Model I Motion-Picture Film Camera Cartridge Pressure Pad Flatness and Camera Aperture Profile; and PH22.164-1975, Position, Dimensions and Reproducing Speed of Magnetic Sound Record on 8-mm Type S (Super 8) Motion-Picture Film.

Inasmuch as compliance with American National Standards is purely voluntary, these standards will become truly effective when broad publicity is given to their existence. ANSI and SMPTE would appreciate any personal influence to pro-

mote the use of these standards where such action is appropriate. Copies of the standards may be obtained for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Proposed Withdrawal of American National Standards

The SMPTE Standards Committee has accepted the recommendation of the Sound Committee that PH22.128-1962 (R1969), Specifications for 8-mm Flutter Test Film, Perforated IR-1500, Magnetic Type; PH22.129-1962 (R1969), Specifications for 8-mm Azimuth Test Film, Perforated IR-1500, Magnetic Type; PH22.130-1962 (R1969), Specifications for 8-mm 400-Cycle Signal Level Test Film, Perforated IR-1500, Magnetic Type; and PH22.131-1962 (R1969), Specifications for 8-mm Multifrequency Test Film, Perforated IR-1500, Magnetic Type, be withdrawn on the basis that there appears to be no need for the standards inasmuch as no test films were ever developed in accordance with the specifications nor is there an indication that any are planned.

Comments should be addressed to Alex E. Alden, *Staff*

Engineer, at Society Headquarters prior to 1 December 1975. The recommendation has been submitted to American National Standards Committee PH22. All comments received through *Journal* publication will be reviewed before conclusion of action by that committee.

Reaffirmed SMPTE Recommended Practices

On 24 July 1974, the Society's Board of Governors, accepting the recommendation of the Standards Committee, approved the reaffirmation of four SMPTE Recommended Practices: RP 6-1967, Reference Carrier Frequencies and De-Emphasis Characteristics for 2-in Quadruplex Video Magnetic Tape Recording (published in July 1967 *Journal*); RP 19-1965, Specifications for 8-mm Registration Test Film (published in January 1966 *Journal*); RP 20-1965, Specifications for 16-mm Registration Test Film (published in January 1966 *Journal*); and RP 32-1969, Specifications for a Super 8 Test Film for Projectors and Printers (published in September 1969 *Journal*).

Copies of these and other SMPTE Recommended Practices may be purchased from Society Headquarters for \$1.00 each. A 20% discount is offered on the purchase of the entire set.

Approved International Standards

The International Organization for Standardization (ISO) approved two International Standards, the technical content of which is published here for your information.

ISO 3026-1975, Cinematography — Printed 8-mm Type S Image Area on 35-mm Motion-Picture Film Perforated

8-mm Type S, 2R-4.227 (1664) or 5R-4.234 (1667) — Position and Dimensions, is in complete agreement with American National Standards PH22.179 and PH22.180.

ISO 3027-1975, Cinematography — Magnetic Stripes and Recording Head Gaps for Sound Record on 8-mm Type S Motion-Picture Prints — Positions and Width Dimensions, is in complete agreement with American National Standards PH22.162 and PH22.181.

The International Standards published here were developed by Technical Committee 26 on Cinematography. The work of this committee is administered by the Engineering Department of the SMPTE which functions as the secretariat in ANSI's name. A report of the last meeting of the committee was published in the February 1974 *Journal of the SMPTE*. The next meeting is scheduled for 17 May 1976 in Paris, France.

Complete copies of all International Standards are sold through the American National Standards Institute, 1430 Broadway, New York, NY 10018. — Alex E. Alden, *Staff Engineer*

Erratum

International Standard ISO 1019-1975E

August 1975 *Journal*, pp. 624, 625.

An incorrect first page was printed for ISO 1019-1975E. To simplify as much as possible the reader's task in referring to this Standard, we here present the entire three pages of the Standard as they should have appeared.

Cinematography — Spools, daylight loading type for 16 mm motion-picture cameras — Dimensions

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard specifies the dimensions and characteristics of daylight loading spools of nominal capacities, 15 m (50 ft), 30 m (100 ft), 60 m (200 ft), and 120 m (400 ft) for 16 mm motion-picture film.

The dimensions specified are in substantial agreement with those given for microfilm camera supply and take-up spools in ISO/R 1116, 35 mm and 16 mm microfilms, spools and reels (see annex).

1.2 Spools for high-speed cameras should be carefully balanced and are not necessarily covered by this International Standard.

2 REFERENCES

ISO 69, *Cinematography — 16 mm motion-picture raw stock film — Cutting and perforating dimensions*.

ISO 3647, *Cinematography — Spindles for 16 mm motion-picture camera spools and projector reels — Dimensions*.¹

3 DIMENSIONS AND CHARACTERISTICS

3.1 The spindle and keyway holes shown in the figure shall be incorporated in both flanges² and shall be aligned. (Some laboratories use 35 mm rewind equipment for winding 16 mm film; often the spindles on this equipment have long keys.) A second keyway, in the corner of the spindle hole opposite the required keyway, is optional, but if used, shall be incorporated in both flanges.

3.2 If rivet heads or other fastening devices extend beyond the outer surfaces of the flanges, they shall lie at a diameter larger than the minimum K diameter and shall be within the boundaries defined by other portions of the volume of rotation diagram.

3.3 Dimension F refers to a slot in the spool core for attaching the film. The slot sides, starting immediately adjacent to each flange and running a minimum distance 6.0 mm (0.24 in) from each flange toward the other, shall be straight, parallel and 0.7 to 1.5 mm (0.03 to 0.06 in) apart. The slot sides may diverge over remaining (central) portions of the slot.

3.4 Dimensions J and J₁ represent the thickness and effective thickness respectively of the spool within the

K diameter area which is centred on the spindle hole axis of each flange.

3.5 A reference plane of rotation for each flange is defined by a plane perpendicular to the axis of the spindle and coincident with the surface of a flat 15.0 mm (0.59 in) diameter support which is in contact with the flange and centred on the spindle hole axis of the flange.

The dimension P is the distance measured outwardly from this reference plane³ of rotation to the farthest plane of rotation described by any point on the flange outside the K diameter area when the spool is rotated on an accurate, tight-fitting spindle. This includes rivets or other fastening devices, variations in flange thickness, flatness, and lateral run-out of the flanges.

Selection of a dimension P value is dependent upon the thickness of the material used for the flanges. According to the flange material thickness:

- a) the K diameter area may be depressed (with P greater than zero), or
- b) the outside surfaces of the flanges may be flat from spindle hole axis to periphery (with P equal to zero), or
- c) in the case of flanges made of very thin material, the K diameter area may be raised rather than recessed (effectively, P less than zero).

3.6 The maximum effective thickness of spools (including all the characteristics mentioned in 3.5) outside the K diameter area has not been stated because it is a function of a spool's specific J₁ value between the 15.0 mm (0.59 in) diameter reference zones on each flange. The largest overall effective thickness, however, will be J₁ max. + 2 X P max. = 19.5 mm (0.77 in).

3.7 The eccentricity of the core with respect to the spindle hole axis, Z, shall not exceed a total radius variation (total indicator reading) of 0.8 mm (0.03 in) for all spool sizes.

3.8 Flanges shall be opaque and their surfaces shall have low reflectance characteristics.

NOTE — When the loaded camera is viewed from the side, with the lens to the left and the bottom of the housing downward (regardless of whether or not the spool loading mechanism is visible from that side), both the supply and take-up spools rotate in a clockwise direction.

¹ At present at the stage of draft.

² Some spools exist which have one flange with the construction recommended in 3.1, but the other flange with a round hole which has a diameter equal to dimension C. This older design is recognized temporarily, but is not recommended for future construction.

³ The reference plane from which P is measured is not necessarily coincident with all points within the K diameter area but only needs to be coincident with those which are in contact with the reference support which has a diameter smaller than K.