

FOR OFFICIAL USE ONLY

Not to be communicated to anyone outside H.M. Service

ADMIRALTY FLEET ORDER

**CARE AND MAINTENANCE OF FILMS (ENTERTAINMENT
AND INSTRUCTIONAL)**

ADMIRALTY, S.W.1,
24th June, 1943.

The following Order having been approved by My Lords Commissioners of the Admiralty is hereby promulgated for information and guidance and necessary action.

By Command of their Lordships,

H. V. Markham

To all Commanders-in-Chief, Flag Officers, Senior Naval Officers, Captains and Commanding Officers of H.M. Ships and Vessels, Superintendents or Officers in Charge of H.M. Naval Establishments, and Admiralty Overseers concerned.

NOTE.—The scale of distribution is approximately half that shown in the Admiralty Fleet Order Volume, 1941, Instructions, paragraph 10.

Head of "P" Branch

2920.—Care and Maintenance of Films (Entertainment and Instructional)

(N./D.P.S. 267/43.—24.6.1943.)

It is important to realise three things about film; first, there is a serious shortage of raw film stock and therefore care of film must be the operator's first consideration if supplies of new films to the fleet are not to be curtailed; second, that it is expensive material—the cost of an average sound print may be from £40 (black and white) to £100 (technicolor); thirdly, that any defect which one operator may inflict upon a film will be a cause of annoyance or worse to every operator who subsequently runs that copy. The largest proportion of film mutilations are due either to sheer carelessness or sheer laziness.

2. (a) The primary source of film damage is dirt which may be picked up by the film—

- (i) if it is allowed to touch the deck or the rewind bench;
- (ii) if it is handled with dirty hands or held otherwise than by the edge of the film;
- (iii) if it is allowed to run through a projector which has not been kept scrupulously clean.

(b) During projection film damage may occur from—

- (i) Worn sprockets, gate parts, rollers or fire traps.
- (ii) Mal-adjustment of take up, gate runners or cradle rollers.
- (iii) Bent spools.
- (iv) Dirt or emulsion deposits in the film track (see paragraph 2 (a) above).
- (v) Excessive lubrication (see also A.F.O. 1537/43).
- (vi) Incorrect or careless threading.
- (vii) Bad joins.

(c) When re-winding damage can arise from—

- (i) Re-winding too fast.
- (ii) Bent spools.
- (iii) Dirty hands or re-wind bench.
- (iv) Tightening the film on the spool after re-winding.
- (v) Allowing the delivery spool to overrun the take up spool.
- (vi) Twisting the film during examination.
- (vii) Bad joins.
- (viii) Banging a badly "plated off" roll of film on the rewind bench in order to flatten the sides of the roll.

Equipment

3. It is essential that all parts of the projector coming into contact with the film during operation are kept in a thoroughly clean and serviceable condition. This applies particularly to projectors where rear-projection is used as the "scratching" will tend to take place on the emulsion side of the film and even greater damage will be caused.

4. *Sprockets*.—Through carelessness or neglect these are frequently left on projectors until the teeth develop bad hooks and knife like edges; a film is practically ruined after one or two showings if run on a projector equipped with such sprockets. If sprockets become "hooked" they should be reversed as detailed on page 32 of the instructional handbook issued with the projector.

5. *Idle Rollers*.—These should be very closely examined to see that they are not sticking or out of alignment.

6. *Tension on Gate Springs*.—One of the principal causes of trouble. Heavy tension on one side can be caused by a poorly adjusted, weak or broken spring, and results in an uneven pull down strain on the film. Gate tension should be slackened off until the film jumps and then tightened evenly until the jump is cured. No more tension should be put on than is necessary to prevent the film from jumping.

7. *Take up*.—The take up adjustment should be checked from time to time, excessive pull can always be detected by the film making a singing noise on the take-up sprocket.

8. The following table gives a cleaning routine as a guide; the numbers in column 1 refer to Handbook M.326 "Operation Manual for A/N Type 7501 Portable Projector", page 26, Fig. B, "Mechanism Lacing Chart Descriptive Index".

1	Component	Period of Inspection	Method of Cleaning
B.2, B.14	Fire traps (magazine)	End of each two reels of film.	Soft rag.
B.4	Picture gate	End of each two reels of film.	Wooden scraper or a copper coin.
B.7	Sound gate	End of each two reels of film.	As picture gate, or with a soft rag moistened with carbon tetrachloride.
B.8	Rough roller	End of each two reels of film.	Rag soaked in cleaning fluid.*
B.3	Sprockets, take off ...	Before each performance.	Toothbrush dipped in cleaning fluid.*
B.12	Sprockets, take up ...	Before each performance.	
B.6	Sprockets, intermittent	Before each performance.	
B.92, B.93, B.94, B.95, B.132, B.133	Cradle rollers	Before each performance.	Rag soaked in cleaning fluid.*

* A suitable cleaning fluid is carbon tetrachloride which is a Naval store article.

9. The deposit from a film collects chiefly at the non-rotating or friction parts and these therefore must be cleaned frequently (see table above). The rotating parts must be closely inspected and cleaned before each performance.

10. Where pads are fitted at the gate of the projector, these may be lubricated with thin oil. Care must be taken, however, to see that they are not saturated with oil; otherwise, oil will drip on to the film and soak through the emulsion, giving the film a cloudy appearance and eventually causing the film to rot.

11. Where the picture is projected through a port, the glass of the port must be kept scrupulously clean; dirt or dust will quickly rob the picture of its brilliancy.

Projection port glasses should be made either of optical or of best quality plate glass. They should be cleaned in the same way as projection lenses, i.e.,

- (i) Remove all visible or invisible dust from the surface of the glass with a soft brush.
- (ii) Clean the glass with a chamois leather slightly moistened with a drop of pure alcohol or surgical spirit.
- (iii) Polish with a soft cloth.

Under no circumstances should the surface of the skin be allowed to come into contact with the surfaces of lenses or projection windows.

12. In view of their expensive nature, special precautions should be taken to ensure careful handling of the incandescent lamps. To avoid weakening the filaments through ship vibration, they should be kept in the vertical position whilst in use and also when in store on board.

13. *Cradle Rollers*.—These should be so adjusted that they rotate only if two thicknesses of film are placed between the rollers and the sprocket.

14. In tropical or high temperature conditions the projector may become dangerously hot. It will be beneficial therefore for a five minute interval to be ordered after every fourth reel, both projector doors being left open to enable the mechanism to cool off and fan left running under lamp.

Films

15. New or "green" films require lubrication before being projected as the emulsion tends to come off and to clog in the gates. The result is a loud rattling noise from the projector, somewhat similar to machine gun fire, and possible serious damage to the film.

(Note.—R.N.F.C. entertainment films are normally specially processed to avoid this).

16. When a new film is received it should be removed from its can and a little white vaseline should be rubbed well into either side of the roll. Any film which is of doubtful newness or which causes a rattling noise in the projector should be lubricated and treated as "green" film. No film should be shown to an audience until the projectionist has had the opportunity of running it through first privately to ensure that there are no faults and that it will go through the projector properly. When "green" film has been run through a projector it is very important that any deposit of emulsion should be removed from the picture and sound gates after every reel. This should be done only with a copper coin, a hard wood scraper or a soft rag moistened with carbon tetrachloride and *never* with a piece of steel or brass.

17. Other important points concerning the welfare of the film are the avoidance of any sharp edges in the film track; the cleanliness of sprockets and rollers (see table in paragraph 8); the correct alignment of take-off and take-up arms; and the rejection of any spool that is bent.

18. *Re-winding.* The obvious purpose of the re-winder is to reverse the film from "tail-out" after it has been shown to "head-out", ready for re-showing. Rewinding should however always provide an opportunity for the close inspection of the film.

19. In rewinding the film is always run from the top of the take-off to the top of the take-up. It should be wound at reasonable speed, and the edges of the film guided between the spools between thumb and fingers, so that any damaged perforations can be easily detected. Never handle the emulsion side of film, as dirt on the fingers will be transferred to the film, and grit may cause scratching.

20. A reel of film must never be placed on a bare spindle for re-winding, otherwise the inner turns will tighten up and be damaged; always use a split spool or at least a short piece of brass tube.

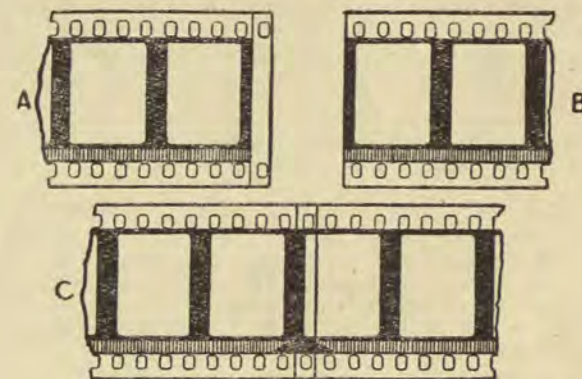
21. Films are despatched in transit cases containing a number of tins, each holding one reel of approximately 1,000 ft. of film. It is usual to show in 2,000 ft. reels and so the single reels have to be joined together two at a time, the tail of one reel and the head of the next reel being removed. These starts and ends are sometimes not replaced correctly and often not replaced at all. This leads to damage to beginnings and ends of reels, and frequently to confusion. Operators are therefore to take care that starts and ends of reels are carefully kept by and replaced at the end of the programme's run. They should be wound round their respective reels and on no account squeezed into the tin as a separate roll.

22. *Joins.*—It is essential that operators should quickly master the art of making a good reliable join; nothing is more dangerous (or more annoying) than faulty joins. A good join will always outlast the life of the film in which it is made. If the films are received "tail in" they should be re-wound, so that before joining, the end of the film will be on the outside of the reel.

23. Place a reel—reel 2 for example—on the take-off of the re-winder so that the length of film between take-off and take-up will have its emulsion upwards; run the re-winder slowly, looking out for any defects in the film. At the point where the picture changes into lead-film cut the film on the mask-line—that is, midway between two perforations, as shown in B, Fig. 1—ensuring that the cut is perfectly square.

24. Place another reel—reel 1—on the take-off the same way round. Cut the lead off this, but this time not on the mask line, but just beyond the next perforation, as seen in A. (It is recommended that about six frames of start mark be left between reels). Place a straight edge across the mask line of the latter film and, moistening

the emulsion, scrape it off, exposing the celluloid. Holding the two films in register, apply a little cement on the join, and press the films together rapidly and securely.



There will now be a double reel of film with the master title of reel 1 on the outside, and with reel 2 carrying straight on at the end of reel 1. Subsequent reels can be joined up in the same way.

25. The inexperienced operator may think that if he overlaps the film for a greater distance than that shown in the sketch, the join will be stronger; actually this is not the case, because the wider overlap makes the join so stiff that sooner or later in passing over a sprocket the corners will give and the whole join possibly be ripped apart. The practice of "vee-ing" film and of making "half hole" joins should never be followed.

26. There are four main points to be carefully remembered in making a join; first, to scrape the emulsion so that it will coincide with the cut end of the other film; second, to scrape the emulsion very thoroughly, for cement will not stick emulsion or gelatine; third, to apply just as much cement as will suffice to hold the join; and fourth, to apply ample pressure in drying to remove air bubbles; which must weaken the join. If a joining press is used, it is wise to wipe the join by hand before the cement is dry, to ensure that all air bubbles are removed.

27. When the join is dry, carefully draw in with special ink obtainable (known as blooming ink) a wedge of "bloop" over the sound track, as shown in C, otherwise the join will make a click in the speakers as it goes through the sound heads.

28. Imperfectly matched sprocket holes are apt to cause the following troubles:—

- (a) Film jumps as the join goes through because the sprocket holes are too small to allow the sprocket teeth to set properly; hence the film is lifted away from sprocket causing damage to film.
- (b) A too small sprocket hole locking on sprocket tooth and pulling the film round under the sprocket.
- (c) Film running off sprocket.
- (d) Sprocket teeth "climbing" one or more holes thus shortening or losing one of the loops and throwing the picture out of the frame on the screen.
- (e) Take up, i.e. pulling film over lower sprocket thus shortening or losing the lower loop.

29. A new type of universal film cement, which will join both "flam" and "non flam" film, can be drawn from Naval stores at the nearest dockyard under Subhead F.3, Pattern 7522.

If universal cement is not available it should be noted that it is not possible to join "flam" film with "non-flam" cement or *vice versa*.

Cement for joining "flam" film may be made up from the following formula—

Amyl acetate	...	...	...	...	5 parts
Acetone	...	...	...	...	4 parts
Glacial acetic acid	...	...	...	...	1 part
or					
Amyl acetate	...	...	...	...	3 parts
Acetone	...	...	...	...	2 parts

"Non flam" film may be joined with the use of plain glacial acetic acid. This makes a join which is stronger than those made by commercial "non flam" cement but which does not last for quite such a long time.

30. *Dual Projection.*—One of the grossest causes of mutilation is the provision of private change-over cues. There is not the least necessity for any disfigurement, since cues are normally embodied in the film; if they should be missing the dots can be painted in by means of blooming ink, or a new signal may be made by marking the edge of the film with Chinese white for about a foot where ordinarily the dots would have been. Actually, films are often disfigured by crosses, punch-holes, scratches or other defects apparently because some operator is too unobservant to notice the cues. All these marks of course show on the screen and the conscientious operator who subsequently receives that particular film has the totally unnecessary task of cutting them out.

31. Excessive heating deteriorates the lens glasses and balsam. The arc beam should not be projected through the lens for any length of time without, in the case of a rear-shutter projector, running the shutter, or in the case of a front-shutter projector, having film in the gate.

(A.F.O. 1537/43.)

(A.F.Os. 901/39, 671/40 and 4025/1940—not in annual volume—are cancelled.)