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FIRES RESULTING FROM THE IGNITION OF CINEMATOGRAPH FILM IN
THE UNITED KINGDOM

by

D. W. Millar

Summary

An analysis has been made of reports of fires resulting from the ignition of cinematograph films during 1951 and 1952 in the United Kingdom. The number of fires in 1952 is less than the number in 1951 and considerably less than the number in 1950. This reduction in fire incidence is, to a large extent, due to the change-over from the use of cellulose nitrate to the use of "safety" film in commercial cinemas which began in 1951. There is evidence of a decrease in fire incidence prior to 1951; this decrease may be due to greater care on the part of projector operators.

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Introduction

During 1951 "safety" film, manufactured from cellulose acetate, started to come into general use in commercial cinemas and laboratories in place of film manufactured from cellulose nitrate. "Safety" film has been used in amateur cinematography for many years. The changeover from one type of film to the other is a gradual process. A rough estimate of the proportion of "safety" film in use during 1952 is 50 per cent; by the end of 1953 the proportion will probably be about 95 per cent.

Information on the numbers of fires resulting from the ignition of cinematograph film during 1950 was compiled at the request of Technical Committee CME/6, "Inflammability of films", of the British Standards institution, and given in Joint Fire Research Organization F. S. Note No.139/1952. There were 24 fires in a random one-in-two sample of all fire reports returned by Fire Brigades; of these, 18 were reported to have involved cellulose nitrate film, and 2 were reported to have involved "safety" film. The kind of film involved in the other fires was in doubt or unknown. This analysis has now been extended to cover the years 1951 and 1952.

Frequencies of fires involving cinematograph film during 1951 and 1952

The number of fires resulting from the ignition of cinematograph film during 1951 has been estimated from a random one-in-two sample of all reports of fires received from Fire Brigades during that year. The estimated number is 32, but this figure may be subject to a sampling error of ± 11 .

In 1952 a complete record was kept of fires in which cinematograph film was first ignited, in the United Kingdom. There were 17 fires altogether, of which 15 were reported to have involved nitrate film, 1 was reported to have involved nitrate and "safety" film joined together, and 1 was reported to have involved "safety" film only. In the fire in which both nitrate and "safety" films were involved, the nitrate film was ignited by friction at the gate of the projector, and the fire spread into the top spool box when the operator opened the box. The nitrate film in the box was destroyed but the "safety" film was damaged only at the edges. The fire involving "safety" film only was caused by a child playing with strip film near a fire. In the 16 fires in which nitrate film was ignited there were 7 casualties (including 2 Fire Brigade personnel affected by fumes), 2 of whom suffered severe burns and were detained in hospital.

Changes in fire incidence during the period 1946-1952

Analyses of reports of fires resulting from the ignition of celluloid film, that is cinematograph film and ordinary photographic film, during 1946 and 1947, were recorded in Joint Fire Research Organization F.S. Notes No.65/1948 and No.76/1949. The reports included in the analysis of the fires in 1946 were those appearing in a one-in-four random sample of all fire reports returned by the N.F.S. All fire reports in 1947 were recorded on punched cards, so there was a complete enumeration of fires resulting from the ignition of film. The table below gives data from these and later analyses. To obtain the figures for 1946 and 1947 it has been assumed that fires in cinemas involved cinematograph film only.

Fires resulting from the ignition of cinematograph film

Analysis of reports of fires attended by the Fire Services in
the United Kingdom 1946-1952

Year	Occupancy in which fire occurred	Size of the sample of all fire reports from which film fire reports were taken	Number of reports analysed	Total number of fires	Possible sampling error
1946	In cinemas only	1 in 4 sample	16	Estimate 64	± 28
1947	In cinemas only	All reports	55	55	-
1950	All occupancies	1 in 2 sample	24	Estimate 48	± 14
1951	All occupancies	1 in 2 sample	16	Estimate 32	± 11
1952	All occupancies	Special record of film fires kept	17	17	-

The decrease between the estimated number of 48 (± 14) fires in 1950 and the known number of 17 in 1952 is "significant" in that it is very unlikely to have occurred because of fluctuations introduced by the sampling procedure carried out in 1950. It is no doubt very largely due to the increasing use of safety film in 1952, and it is expected that the 1953 figure will show a further decrease.

The estimated number of 48 fires in 1950 may be compared with a known number of 55 in 1947 and an estimated number of 64 in 1946. The last two figures are for fires in cinemas only and are very likely to be less than the total number of fires resulting from the ignition of cinematograph film. It is possible that there has been a steady though slight downward trend in the numbers of fires in each year from 1946 to 1950, but the possible sampling fluctuations in the figures for 1946 and 1950 are of sufficient magnitude to preclude any definite deduction. The proportion of safety film in use in 1951 was not large (between about 10 per cent and 15 per cent) and the decrease between the numbers of fires in 1947 and the number in 1951 is "significantly" large. There is therefore some evidence that the numbers of fires resulting from the ignition of cinematograph film were decreasing before the introduction of "safety" film.

Conclusions

The introduction of "safety" film appears to have resulted in a marked decrease in the number of fires resulting from the ignition of cinematograph film, and this decrease is expected to continue during 1953. Since 1947 there has also been a decrease in the number of fires, as the result of other factors. It is possible that greater care on the part of cinema projector operators and additional precautions in projection rooms have contributed to this decrease.