

**LIBRARY REFERENCE ONLY**

THE LIBRARY  
FIRE RESEARCH STATION  
BOREHAM WOOD  
HERTS.

No F.R. Note No. 457

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH AND FIRE OFFICES' COMMITTEE  
JOINT FIRE RESEARCH ORGANIZATION

This report has not been published and should be considered as confidential advance information. No reference should be made to it in any publication without the written consent of the Director, Fire Research Station, Boreham Wood, Herts. (Telephone: ELStree 1341 and 1797).

**FIRES IN SHOPS AND STORES**

by

**J. F. Fry**

The note summarises information available on the causes of fires in shops and stores and mentions possible remedial action.

January, 1961.

Fire Research Station,  
BOREHAM WOOD,  
Herts.

## FIRES IN SHOPS AND STORES

by

J. F. Fry

### INTRODUCTION

To assist in current discussions of methods of reducing the fire hazard of department stores the readily available material on causes of fire has been examined. Most of the statistical information is not, at present, broken down in sufficient detail to allow for separation of department stores from other types of shops and stores. It is probable, however, that this information is relevant to the discussions and it could be regarded as giving a general guidance appropriate to department stores.

### INCIDENCE OF FIRE

The total numbers of fires attended in department stores in England and Wales have been estimated for each year from 1954-59 and are shown in Table I below:-

TABLE I

INCIDENCE OF FIRES IN DEPARTMENT STORES IN ENGLAND AND WALES

Year	Sampling factor used in analysis	Estimated incidence
1954	1:2	86
1955	1:4	128
1956	1:4	112
1957	1:1	109
1958	1:4	88
1959	1:4	128

### CAUSES OF FIRE

No analysis has been made of the causes of fires in department stores reported by Fire Brigades and, because of the small numbers involved, it is likely that the pattern revealed by such an analysis would not be very conclusive. Since a department store is, to some extent, similar to a group of shops situated in one building the pattern of fire causes is likely to be broadly similar to that characteristic of shops in general, although it is realised that one or two of the causes encountered in shops (e.g. oil stoves) are less likely to be found in the department store than in the small shop.

The causes of fires in shops and stores in England and Wales for the three years 1957, 1958 and 1959 are given in Table II.

From this it may be seen that the largest numbers of fires are attributed to the comparatively small number of causes listed below:-

1. Electric refrigerator
2. Smoking materials
3. Matches (particularly children playing with matches)
4. Electrical apparatus other than cooker, fire, heater, radiator, iron, motor, refrigerator, television.
5. Electric wire and cable
6. Rubbish burning

TABLE II

CAUSES OF FIRE IN SHOPS AND STORES IN ENGLAND AND WALES 1957-1959.

Supposed cause of fire	1957	1958	1959
Ashes, soot .....	29	20	40
Brazier .....	4	-	4
Candle .....	8	20	20
Chimney fire, not confined to chimney .....	20	24	40
Chimney, sparks from (outside building) .....	10	12	4
Cooker, range, oven (not electric, coal gas, oil)	1	-	4
Electric cooker .....	10	-	12
fire, heater, radiator .....	65	52	100
iron .....	8	8	16
motor .....	53	60	56
refrigerator .....	450	420	360
television .....	5	8	4
wire and cable, lead to apparatus .....	18	12	12
wire and cable, other than above .....	111	112	188
wireless .....	8	8	4
other apparatus .....	210	192	220
Explosives, fireworks .....	24	48	36
Fire in grate igniting: furniture, furnishings ..	3	-	-
timber under hearth .....	10	16	8
other materials .....	39	56	16
Fish frying range (all fuels) .....	1	-	12
Flue .....	29	28	32
Gas (coal) burner, jet, ring .....	46	40	36
cooker .....	23	20	20
fire, heater, radiator .....	27	20	8
other apparatus .....	41	28	60
Incubator brooder (all fuels) .....	6	-	8
Intentional burning of grassland .....	1	-	-
Lightning .....	5	-	8
Lime .....	1	-	4
Locomotives, sparks from .....	4	8	8
Malicious ignition .....	28	36	16
Matches .....	47	36	64
Matches, children with .....	158	160	188
Mechanical heat or sparks .....	8	8	-
Naked light .....	37	32	44
Oil blow lamp .....	26	28	20
engine, including petrol .....	4	4	4
lamp .....	5	-	-
stove .....	70	104	132
other apparatus .....	3	4	8
Oxyacetylene cutting and welding apparatus .....	7	4	8
Rubbish burning .....	101	92	172
Slow combustion stove igniting: structural wood .	14	8	12
other materials .	47	68	56
Smoking materials .....	435	376	628
Spontaneous combustion .....	6	-	-
Sun's rays .....	25	-	24
Taper, lighted paper or sticks .....	27	36	16
Taper, lighted paper or sticks, children with ...	6	4	8
Miscellaneous and undefined .....	24	-	12
Unknown source of ignition .....	388	340	400
<b>Total fires in shops and stores</b>	<b>2,736</b>	<b>2,552</b>	<b>3,152</b>

1. The incidence of refrigerator fires has been decreasing steadily for several years; it is known to be largely associated with food shops and is probably not a major source of fire in department stores. Newer types of refrigerator appear to be less hazardous than older models and in time this is likely to disappear as a major cause of fire in shops in general.
2. Smoking materials are believed to cause a large number of fires each year and, as the Table shows, accounted for twenty per cent of the fires in shops and stores in 1959. It is clear from this that a significant reduction in the number of fires in these occupancies could be achieved by banning smoking in all shops and stores.
3. It is surprising to find that children playing with matches is returned as a comparatively frequent cause of fires and apart from general education and supervision it is difficult to envisage any effective preventive action that can be taken.
4. "Electrical apparatus" covers a wide range of equipment and no individual item is responsible for a major proportion of these fires.
5. "Wire and cable" is used to denote all the permanent wiring installations in shops up to and including outlet sockets, switches and ceiling roses.
6. The burning of rubbish is obviously a question of "good house-keeping" and something that the shop owners and managers could prevent. The provision of properly constructed incinerators, where possible, might do much to prevent fires from this cause.

#### RESULTS OF SPECIAL SURVEY ON FIRES IN DEPARTMENT STORES

For a period of one year the Organization has been receiving reports from a number of department stores and chain stores on fires occurring in their premises whether these warranted the attendance of a Local Authority Fire Brigade or not. A summary of the results to date is given in Table III.

Although the numbers of fires reported is small there is agreement in some respects with the pattern of causes shown in Table II; in particular the proportion of fires attributed to smoking materials is high, approximately sixteen per cent, although the number of fires attributed to children playing with matches is negligible.

#### OTHER RELEVANT DATA

From time to time the Organization has received reports from individual firms which keep a comprehensive record of the fires occurring in their premises. In general the numbers of fires reported have been small and no clear pattern has emerged although "smoking materials" again appears as a major identifiable cause. One firm in particular appears to have had continuous difficulty with fluorescent light fittings which are said to have caused 18 of the 94 fires recorded in a period of approximately 14 years.

#### CONCLUSION

On the basis of the information at present available on fires in shops and stores it would appear that the most immediately profitable remedial action would be:-

1. To ban smoking. Some department and chain stores already request customers to refrain from smoking, but the main benefit would be gained from a general ban applicable to all shops. The question of legislation arises in this connexion.
2. Correct installation, maintenance and guarding of electrical apparatus. Inspection and testing of apparatus and wiring.
3. Insistence of adequate provision for the safe disposal of rubbish.

TABLE III

## FIRES IN DEPARTMENT STORES AND CHAIN STORES 1960

Supposed cause of fire	In buildings			Not in buildings			Total fires
	Attended by Fire Brigade	Not attended by Fire Brigade	Total in buildings	Attended by Fire Brigade	Not attended by Fire Brigade	Total not in building	
Ashes, soot .....	2	1	3	-	-	-	3
Electric cooker .....	1	-	1	-	-	-	1
motor .....	3	-	3	-	-	-	3
refrigerator .....	-	1	1	-	-	-	1
wire and cable, lead to apparatus .....	-	1	1	-	-	-	1
other apparatus .....	9	4	13	-	-	-	13
Fish fryer - all fuels .....	-	1	1	-	-	-	1
Gas (coal) burner, jet, ring .....	2	1	3	-	-	-	3
cooker .....	-	2	2	-	-	-	2
Malicious ignition .....	1	-	1	3	-	3	4
Matches, children with .....	-	1	1	-	-	-	1
Oil blow lamp .....	-	1	1	-	-	-	1
Oxyacetylene cutting apparatus .....	2	1	3	-	-	-	3
Rubbish burning .....	-	-	-	2	2	4	4
Slow combustion stove igniting other materials .....	1	-	1	-	-	-	1
Smoking materials .....	4	6	10	1	-	1	11
Miscellaneous and undefined ..	4	1	5	-	-	-	5
Unknown .....	7	2	9	1	-	1	10
<b>Total</b>	<b>36</b>	<b>23</b>	<b>59</b>	<b>7</b>	<b>2</b>	<b>9</b>	<b>68</b>

Source:- A survey into fires occurring at the premises of certain retail traders.