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FIRES IN THE HOME DURING 1948 IN WHICH FLAMMABLE LIQUIDS WERE IGNITED

by

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Summary

An analysis has been made of reports of fires in dwellings which were attended by the N.F.S. and Fire Brigades during 1948 and in which flammable liquids were ignited. There were 452 such fires during the year.

Almost two-thirds of these fires involved either petrol or paraffin, which are also responsible for most of the fires which had casualties. There were 16 fatal casualties, two of which were suicides; all but two of the remaining ones were women. Of injuries sustained, one-third were burns on the hands, while a further third were general severe burns.

The analysis shows that many householders do not fully appreciate the dangers of misusing flammable liquids. Examples of misuse given in the reports include: using paraffin or petrol to assist open coal fires to burn, leaving volatile liquids exposed near naked flames, and negligence in servicing oil burning appliances.

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INTRODUCTION

This investigation has been made to determine the extent to which flammable liquids used in the home are responsible for causing fires and injury. Information is given on the circumstances in which the fire broke out, with special reference to the purpose for which the liquid was being used at the time.

All Fire Service reports of fires in dwellings during 1948 in which flammable liquids were given as the material first ignited were included in the analysis and certain data from an earlier note⁽¹⁾ have been used in the tables.

LIQUIDS AND SOURCES OF IGNITION

Reference to Table I shows that almost two-thirds of the 452 fires starting in flammable liquids involved either paraffin or petrol; and it is probable that paraffin was also the liquid involved in some of the fires included under "unspecified mineral oils".

About 38 per cent of the fires were ignited by solid fuel burning grates or stoves, another 29 per cent by oil burning stoves and lamps, and about 15 per cent by gas appliances. It should be noted that these figures relate only to those fires in which flammable liquids were ignited first and that there were many fires in which the appliances mentioned set light to other materials. An analysis of all fires in dwellings caused by oil burning appliances during 1948 has been reported elsewhere⁽²⁾.

Some 60 per cent of the fires involving paraffin were started by oil burning appliances and another 25 per cent by open fires. Of the fires involving petrol about 50 per cent were started by open coal fires, another 35 per cent by gas appliances, lighted matches and cigarettes, or other naked lights, and 11 per cent by oil burning appliances.

It will be noted that paraffin was often set alight by the appliance burning it, but petrol in most cases was set alight when being used in the proximity of naked lights, etc.

CASUALTIES

It is seen from Table II that most of the casualties, both fatal and non-fatal, occurred in fires involving paraffin, petrol, lighter fuel and the "other and unspecified mineral oils". Owing to the small numbers of fires in most of the categories it is not possible to establish many differences between casualty rates per 100 fires, but the rate for non-fatal casualties in fires involving petrol is significantly higher than that for those involving paraffin. Rubber solution was involved in 3 fires, in each of which there were casualties, 4 in all, but because of the small number of fires this apparently high rate of incidence should not be taken to indicate that rubber solution is inherently more dangerous than other flammable liquids.

Comparison of casualty rates with those in other kinds of fires in dwellings cannot be readily made but it is noteworthy that the 452 fires igniting flammable liquids, which constituted less than 1 per cent of the fires in buildings, caused nearly 7 per cent of all non-fatal civilian casualties in fires attended by the Fire Services in 1948.

The distributions of casualties according to sex and the circumstances causing the fire are shown in Tables III and IV. There were two suicides, both women, among the fatal casualties and of the remaining 14 fatal casualties, 12 were women. Six of the 14 accidental deaths occurred to women aged 60 years or more. From a broad comparison with the population figures for the

United Kingdom in 1948, it appears probable that the death rate in these fires is higher for women than men and to some extent this applies particularly to elderly women. In this connexion it should be borne in mind that women tend to be in the home more frequently than men. There was no predominating cause of fire among the incidents causing fatalities.

There were more male than female non-fatal casualties although more women than men were injured when using flammable liquids to light or assist burning of open fires. This may be because rather more women than men are concerned with lighting fires and consequently more women are exposed to risk. It is not sufficiently realized that extreme caution is needed when using flammable liquids and a considerable proportion of the fatal and severe non-fatal casualties occurred when the liquids had been left in open containers near open fires or other naked lights.

Approximately one-third of the persons injured received burns to the hands, and a further third suffered general severe burning.

CAUSES OF THE FIRES

The majority of the fires were due to carelessness or negligence such as refilling oil burning appliances whilst still alight, or over-filling them; striking matches in the presence of flammable vapour given off from liquids; knocking over oil or spirit burning appliances; placing containers of flammable liquids near heating appliances and allowing pitch or tar to boil over.

Some fires were reported to be caused by defects or explosions in oil or spirit burning appliances, or to overheating of such appliances. These amounted to less than 20 per cent of all fires igniting flammable liquids and in most cases the fuel of the appliance concerned was the material ignited first.

CONCLUSIONS

The extent to which Fire Brigade attendances are a complete record of fires igniting flammable liquids is unknown and difficult to estimate. It is likely that the dangerous practice of using paraffin or petrol to assist the burning of open fires is widespread and that more fires are caused by this means than Fire Brigade attendances in 1948 would indicate. The injury rate is undoubtedly high in these fires. While there are fires caused by defects or overheating of appliances, the high proportion of fires due to ignorance and carelessness suggests that only an increased appreciation of the dangers of flammable liquids can reduce the numbers of fires caused by them.

References

1. MILLAR, D.W. Fires involving flammable liquids and other dangerous substances, 1948. Department of Scientific and Industrial Research and Fire Offices' Committee Joint Fire Research Organization F.R. Note No.31/1952.
2. TURNER, J.D. and WALLACE, J. Fires in dwellings caused by oil burning appliances, 1948. Department of Scientific and Industrial Research and Fire Offices' Committee Joint Fire Research Organization F.S. Note No.113/1950.

Table I

SOURCES OF IGNITION OF FIRES INVOLVING FLAMMABLE LIQUIDS IN THE HOME

An analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom during 1948

Source of ignition		Paraffin	Petrol	Lighter fuel	Other unspecified mineral oils *	Methylated spirit	Paint removers and thinners	Paints and varnishes	Rubber solution	Pitch and tar	Waxes	Other miscellaneous liquids	Total
Coal or coke	fire	38	62	30	3	-	7	1	-	10	2	4	157
	boiler, range or stove	-	5	2	2	1	-	-	-	2	1	1	14
Electric	cooker	2	-	-	3	-	-	-	-	1	2	-	8
	other appliances	-	1	-	1	1	-	-	-	1	-	-	4
Coal gas	cooker, ring	2	18	4	2	2	5	4	-	11	4	-	52
	other appliances	4	4	-	-	-	2	1	2	1	-	-	14
Oil or paraffin	blow lamp	1	8	-	2	-	1	-	-	1	-	-	13
	cooker, oven	12	-	-	1	-	-	-	-	-	-	-	13
	lamp	10	2	1	2	-	-	-	-	-	-	-	15
	stove with wick	50	1	-	11	-	-	-	-	-	1	-	63
	stove without wick ...	12	-	-	1	3	-	-	-	1	-	-	17
	other appliances	7	3	6	3	1	-	-	1	-	-	-	21
Matches, candles, cigarettes and other naked lights		17	23	4	7	2	6	-	-	2	-	-	61
Total		155	127	47	38	10	21	6	3	30	10	5	452

* Possibly including fires involving paraffin

Table II

NUMBERS OF CASUALTIES IN FIRES INVOLVING FLAMMABLE LIQUIDS IN THE HOME

An analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom during 1948

	Paraffin	Petrol	Lighter fuel	Other mineral oil	Methylated Spirit	Paint remover and thinners	Paints and varnishes	Rubber solution	Pitch and tar	Waxes	Other miscellaneous liquids	Total
Fatal casualties	8 ⁽¹⁾	6	-	2	-	-	-	-	-	-	-	16
Non-fatal casualties	43	69	21	15	3	6	-	4	5	4	3	173
Fatal casualties per 100 fires ...	5.2	4.7	-	5.3	-	-	-	-	-	-	-	3.5
Non-fatal casualties per 100 fires	27.7	54.3	44.7	39.5	≠	≠	≠	≠	≠	≠	≠	38.3

(1) Including two suicides

≠ Rates not calculated owing to smallness of numbers involved.

Table III

CASUALTIES AND CAUSES OF IGNITION OF FLAMMABLE LIQUIDS IN THE HOME

An analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom during 1948

Reported circumstances which caused fires to ignite flammable liquids	Number Of fires	Fatal casualties /	Nature of injuries to non-fatal casualties					Non-fatal casualties		
			Burns to hands	Burns to face or head	Other restricted burns	Multiple burns	Other injuries excluding burns e.g. cuts	Total injuries	Total male	Total female
Throwing of paraffin or other oil on to an open fire to assist burning	33	4	5	3	2	3	1	14	6	8
Throwing of petrol or other volatile spirit on to an open fire to assist burning	69	1	15	5	11	8	1	40	15	25
Negligence during or after servicing an oil or spirit burning appliance, e.g. refilling it whilst still alight, filling it to excess	34	2	2	-	1	8	-	11	7	4
Negligent acts with regard to flammable liquids, e.g. striking matches in the presence of flammable liquids, leaving flammable liquids in ovens and applying heat	19	-	1	1	-	3	-	5	3	2
Knocking over an oil or spirit burning appliance	13	-	1	-	-	1	2	4	3	1
Knocking over or spilling from a container of flammable liquid in the presence of heating appliance or naked light	32	2	4	-	3	3	2	12	9	3
Allowing tar or pitch to boil over and ignite, heating of paraffin wax, rubber solution, enamel, etc.	38	-	4	-	2	1	1	8	6	2
Bursting or explosion of closed containers of flammable liquids in proximity of heating appliances	35	-	3	1	-	6	2	12	7	5
Ignition of vapour from open containers of flammable liquids by open fires, gas jets, etc. e.g. dry cleaning clothes cleaning vehicle components, etc.	84	5	17	3	-	17	2	39	27	12
Defects in oil or spirit burning appliances, e.g. leakages from reservoirs, faulty feed pipes, defective burners, etc.	39	-	2	1	-	2	-	5	3	2
Overheating of oil or spirit burning appliances	29	-	-	-	-	2	-	2	1	1
Explosions in oil or spirit burning pressure appliances, e.g. Primus stoves	7	-	1	2	-	4	4	11	8	3
Other circumstances not covered by above	17	1	4	1	-	1	3	9	2	7
Unknown	3	1	-	-	-	-	1	1	1	-
Total	452	16	59	17	19	59	19	173	98	75

/ Including two suicides

Table IV

FATAL CASUALTIES IN FIRES INVOLVING FLAMMABLE LIQUIDS IN THE HOME

An analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom during 1948

Material first ignited	Source of ignition	Casualties	Nature of injuries	Reported cause of fire
Paraffin	Coal fire	Female - 83 years	Severe burns to hands and face, shock	Vapour from paraffin lamp in contact with open coal fire
Paraffin	Coal fire	Female - 64 years	General severe burns	Paraffin was used to flare up open coal fire and it flashed back on to victim
Paraffin	Coal fire	Female - 60 years	Extensive burns	Paraffin used to flare up open coal fire, victim splashed by burning paraffin
Paraffin	Coal fire	Male - 78 years	Extensive burns	Paraffin thrown on to open coal fire, flash back on to victim
Paraffin	Gas fire	Female - 53 years	Burns and asphyxia	In attempting to light a Valor oil stove from a gas fire, paraffin was spilt and ignited
Paraffin	Lighted match	Female - 75 years	Extensive burns to the body, asphyxia	Lighted match ignited paraffin spilled from a lamp
Paraffin	-	Female - 58 years	Extensive burns	SUICIDE: paraffin ignited deliberately by unknown means
Paraffin	-	Female - 33 years	Multiple burns to arms and chest, shock	SUICIDE: paraffin poured deliberately over the body and ignited
Petrol	Coal fire	Female - 40 years	Extensive burns, shock and pneumonia	Petrol vapour came in contact with open coal fire and was ignited
Petrol	Coal fire	Female - 51 years	Severe burns and shock	Petrol thrown on open coal fire in error for paraffin and flashed back
Petrol	Gas ring	Female -	Severe burns	Petrol poured from one bottle to another, vapour ignited by nearby gas ring
Petrol	Gas cooker	Female - 30 years	Extensive burns to about 55 per cent of body, shock	Petrol vapour ignited by the flame of a gas cooker
Petrol	Gas cooker	Female - 68 years	Severe burns to arms, body, and legs	Bottle of petrol fell on to lighted gas cooker, broke, and contents ignited
Petrol	Oil stove	Female - 68 years	First degree multiple burns and toxæmia	Lighted oil stove filled with petrol in error, vapour exploded and ignited
Paraffin and petrol mixture	Lighted match	Male - 51 years	Extensive burns and shock	Lighted match ignited and exploded a mixture of petrol and paraffin vapour
Diesel oil	Coal fire	Female - 28 years	General severe burns and shock	Diesel oil used to flare up open coal fire flashed back