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FIRES INVOLVING LIQUID FUEL GAS APPARATUS ATTENDED BY THE N.F.S. AND FIRE BRIGADES IN THE UNITED KINGDOM 1947 - 1951

by
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Summary

Reports of 119 fires involving liquid fuel gas, during 1951, have been analysed and the results compared with a similar analysis for the four previous years.

This note supplements the information available in F.S.Notes No.103/1950 and No.131/1951 concerning fires involving liquid fuel gas apparatus attended by the N.F.S. and Fire Brigades in the United Kingdom. There were 361 incidents in the five years 1947-1951; 270 fires in which the liquid fuel gas was the material first ignited and 91 fires where the jets of the gas apparatus ignited materials other than the fuel gas.

Introduction

The first analysis of reports of fires involving liquid fuel gas, in F.S.Note No.103/1950, used the term "Calor Gas", and only reports in which Calor gas was specifically mentioned were analysed. The second analysis, F.S.Note No.131/1951, included, for the year 1950 only, fires involving propane, butane, Bottogas, Butagas and Pyrogas as well as Calor gas. Bottogas, Butagas, Pyrogas and Calor Gas are essentially mixtures of propane and butane and the proportion of either constituent may vary from 0 to 100 per cent. In the analysis of reports of fires for 1951 the term liquid fuel gas is used to describe any of the gases mentioned above.

The proportion of fires in 1950 and 1951 involving liquid fuel gases which were described by names other than Calor gas was small compared with the total number of such fires, so that figures for the various years can be compared with reasonable accuracy.

1. Fires in which liquid fuel gas was the material first ignited.

The frequency of fires in which liquid fuel gas was the material first ignited increased from 68 in 1950 to 84 in 1951. Table I shows that the increase is mainly in fires in houses and flats and caravans, and probably reflects a greater use of the fuel gas in these dwellings. It can be seen from Table II, which shows the number of incidents for each reported source of leakage, that during the five years at least half of the fires were due to leakages from the cylinder valve or union; it has been assumed that the source of leakage reported as "cylinder", is in fact a leakage from one of these two components. Twenty-nine fires occurred while cylinders were being changed. In Table III the sources of ignition of the fires are analysed. There were 16 fires reported where a naked flame was being used to search for a leak in the gas apparatus.

Of the 137 incidents involving houses and flats 96 (70 per cent) were confined to the room of origin; 27 (20 per cent) of the fires spread beyond the room of origin, but damaged less than half the dwelling, and 14 (10 per cent) damaged more than half the dwelling. Eleven (27 per cent) of the other buildings and 20 (28 per cent) of the road vehicles were seriously damaged or completely destroyed.

In the 270 incidents there were 139 casualties; 86 were males and 46 females (the sex of 7 was not reported). The casualties were all adults except two

/girls

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girls aged 15 years and three boys aged 5½, 11 and 14 years. Five casualties, two men and three women, proved to be fatal. Sixty-seven of the casualties occurred in houses and flats, 21 in other buildings, 36 in road vehicles and 14 in rivercraft and vessels in harbour.

2. Fires in which materials other than the liquid fuel gas were ignited first, the gas jet of the apparatus being the source of ignition.

There were 91 incidents in which the gas jet of liquid fuel gas apparatus ignited other materials. The hazards in which the fires took place are indicated in Table IV. Thirty-six (40 per cent) of the fires occurred in buildings, 25 (27 per cent) in caravans and 21 (23 per cent) in other road vehicles. Table V gives an analysis of the source of ignition of these 91 fires.

The distribution of damage due to these fires was as follows: in 7 of the 11 fires in houses and flats damage was confined to the room of origin. Two of the fires spread beyond the room of origin and damaged less than half the dwelling, and 2 fires damaged more than half the dwelling. Eight of the other buildings and 22 of the road vehicles, including 16 caravans, were seriously damaged or destroyed.

There were 10 male, non-fatal casualties in the 91 incidents.

Conclusions.

The numbers of fires involving liquid fuel gas, attended by Fire Brigades, have shown a marked increase from one year to the next, except for the years 1948 and 1949. This increase is noticeable in both the categories into which the fires are classified.

a) those in which the fuel gas was the material first ignited, and

b) those fires in which the jets of the fuel gas apparatus ignited materials other than the gas.

Estimates are available of the total sales of liquid fuel gas, from which it is possible to calculate a rate. The assumption has been made that the total sales reflect to a considerable degree the usage of the fuel gas. It has been found that the rate of incidence of fires calculated as the number of fires per 1,000 tons of gas sold has remained sensibly constant at about 2.2 for each of the years 1947-51. It is reasonable to conclude that the increase in the numbers of fires reflects a greater use of the gas, and is not the result of any increase in the risk associated with the fuel.

TABLE 1

THE FREQUENCY OF FIRES IN WHICH THE LIQUID FUEL GAS WAS THE MATERIAL FIRST IGNITED IN RELATION TO THE HAZARD INVOLVED.

Analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom, 1947-1951.

Hazard involved	1947	1948	1949	1950	1951	Total
Buildings						
Private residential houses and flats	20	23	23	32	39	137
Canteens, coffee stalls, restaurants	-	3	2	1	2	8
Guest house, hotel, public house	1	2	-	-	-	3
Holiday huts	-	1	2	1	-	4
Farm building	-	-	-	1	-	1
Factories, workshops, stores etc.	-	-	-	10	7	17
Other buildings	1	-	1	1	5	8
Hazards other than buildings						
Road vehicles						
Caravans	4	3	5	9	17	38
Canteens, coffee stalls, kitchens	1	6	2	8	5	22
Fish and chip vans	-	-	5	1	2	8
Other road vehicles	-	1	1	-	1	3
Craft on inland waters and in harbour	1	5	3	3	3	15
Liquid fuel gas apparatus in open at holiday camp	-	-	2	-	-	2
Factory yard	-	-	-	1	2	3
Miscellaneous	-	-	-	-	1	1
Total	28	44	46	68	84	270

TABLE 2

THE FREQUENCY OF FIRES IN WHICH THE LIQUID FUEL GAS WAS THE MATERIAL FIRST IGNITED IN RELATION TO THE REPORTED SOURCE OF LEAKAGE

Analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom, 1947-1951.

Note: The figures in brackets refer to the number of incidents in which cylinders were being changed.

Reported source of leakage	1947	1948	1949	1950	1951	Total
Cylinder valve	4(2)	5(1)	10(2)	7(1)	12(3)	38
Cylinder union	3	5(1)	11	9(1)	12(1)	40
Cylinder	10(4)	17(4)	6(1)	15(3)	19(2)	67
Connection, joint, pipe, tubing, between cylinder and gas jets	6	9	15	24	20	74
Delayed ignition at liquid fuel gas ring	-	1	-	1	4	6
Unknown	5	7(2)	4(1)	12	16	44
Miscellaneous	-	-	-	-	1	1
Total	28	44	46	68	84	270

TABLE 3

THE FREQUENCY OF FIRES IN WHICH THE LIQUID FUEL GAS WAS THE MATERIAL FIRST IGNITED IN RELATION TO THE SOURCE OF IGNITION.

Analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom, 1947-1951.

Source of Ignition	1947	1948	1949	1950	1951	Total
Liquid fuel gas apparatus	6	16	17	20	34	93
Candle, cigarette, wax taper	1	3	2	1	3	10
Cooker, stove, (fuel unspecified)	-	3	2	1	3	9
Electric fire	1	-	-	1	-	2
Fire in grate	7	3	3	4	4	21
Match	5	9	6	16	13	49
Oil lamp, stove	-	2	-	3	6	11
Slow combustion stove	2	3	3	3	1	12
Miscellaneous	2	-	3	4	8	17
Unknown	4	5	10	15	12	46
Total	28	44	46	68	84	270

TABLE 4

THE FREQUENCY OF FIRES IN WHICH MATERIALS OTHER THAN THE LIQUID FUEL GAS WERE IGNITED FIRST, THE JET OF THE LIQUID FUEL GAS APPARATUS BEING THE SOURCE OF IGNITION, IN RELATION TO THE HAZARD INVOLVED.

Analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom 1947-1951.

Hazard Involved	1947	1948	1949	1950	1951	Total
Buildings						
Private residential houses and flats	1	-	2	3	5	11
Canteens, coffee stalls, restaurants, confectioners	-	2	3	2	1	8
Factories, workshops	-	-	-	5	3	8
Farm and quarry buildings	1	2	-	-	-	3
Guest house, hotel, public house	-	-	-	-	2	2
Holiday huts	-	-	-	1	-	1
Other buildings	-	-	-	-	3	3
Hazards other than buildings						
Road vehicles						
Caravans	4	3	3	8	7	25
Canteens, coffee stalls, kitchens	-	2	-	1	5	8
Fish and chip vans	-	-	2	4	5	11
Other road vehicles	1	-	1	-	-	2
Craft in harbour	-	-	-	2	2	4
Rail siding, scrap-merchants yard, barrack yard	-	-	-	2	1	3
Wharf	-	1	-	-	-	1
Miscellaneous	-	-	-	-	1	1
Total	7	10	11	28	35	91

TABLE 5

THE FREQUENCY OF FIRES IGNITING CONTENTS AND STRUCTURE OF THE HAZARD INVOLVED, IN RELATION TO THE TYPE OF LIQUID FUEL GAS APPARATUS CAUSING IGNITION.

Analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom 1947-1951.

Type of liquid fuel gas apparatus	Number of fires igniting		Total
	Contents	Structure of hazard	
Cookers, stoves, rings	38	18	56
Fires, heaters, radiators	10	3	13
Lamps	2	-	2
Bakers prover plant	-	1	1
Iron	1	-	1
Liquid fuel gas burner	9	5	14
Miscellaneous	2	1	3
Unknown	-	1	1
Total	62	29	91