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

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DEATHS DUE TO FIRE IN 1960

by

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Summary

An analysis has been made of reports of incidents attended by Fire Brigades during 1960, in which fatal casualties occurred.

Of the total of 529 fatalities reported, 75 were in incidents resulting from smoking materials.

Incidents in which there was ignition of clothing while being worn resulted in 122 fatalities, and those in which bedding was ignited caused 64 deaths.

There were 65 fatalities among children under 5 years old, and 206 among persons over 65 years of age.

About 74 per cent of the fatal casualties occurred in private houses and flats, about 18 per cent in other buildings and the rest out of doors.

Two hundred and eighty three fatal casualties occurred in fires which were confined to the room of origin, and two hundred and forty six in fires which spread beyond the room of origin. It can be seen, therefore, that a large proportion of fatalities was associated with fires in which the material damage was relatively small.

Among the 65 fatalities among children under 5 years old, at least 10 were alone at the time of the fire, and in the group of 206 casualties among persons over 65 years old, at least 17 were alone at the time of the fire.

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## DEATHS DUE TO FIRE IN 1960

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### Introduction

An analysis has been made of the reports of incidents attended by Fire Brigades in the United Kingdom during 1960 in which fatal casualties occurred. Data concerning the causes of fire, the age and sex of the casualties, fire-fighting and rescues and escapes, occupancies in which fires occurred, and causes of death have been collected. There were 529 fatalities reported during the year; this figure is not the full total of deaths due to fire, since detailed information was available only on those occurring in incidents attended by Fire Brigades.

### Cause of Fire

The causes of the fires are analysed in Table 1. Seventy five of the fatal casualties (14.2 per cent of the total) resulted from fires caused by smoking materials, a large proportion of them being the result of smoking in bed. One hundred and twenty two (23.1 per cent of the total) occurred in incidents caused by the ignition of clothing while being worn, and in 65 of these incidents, an open fire ignited the clothing.

### Age and Sex of Casualties

The ages and sex of the fatal casualties are analysed in Table 2. The overall casualty rate in the fires attended by Fire Brigades in the United Kingdom during 1960, for persons of all age groups, was approximately 10 per million of population.

There were 65 fatalities among children under 5 years old, a rate of approximately 16 per million in the age group. From information contained in the 22 Research Reports which dealt with fatalities in this age group, it appears that at least 10 of the children were alone at the time of the incidents. Two hundred and six of the fatal casualties were over 65 years of age; this corresponds to a rate of approximately 27 per million persons in the age group. From information contained in the 48 Research Reports which dealt with fatalities in this age group, it appears that at least 17 of the casualties were alone at the time of the incident.

Some 60 per cent of the casualties were accounted for in the above two age groups, the remaining 254 being in the 6-65 age group. This corresponds to a rate of approximately 6 per million persons in the age group.

This is confirmation that the life hazard of fire is considerably greater among the aged and the very young than in the remainder of the population. Medical evidence has established that the chances of recovery from serious burns decrease considerably with increasing age, so that the fatality figures are not necessarily proportional to the frequencies of injury in the different age groups.

Table 1.

Causes of fires in which deaths occurred

Cause of Fire	AGE GROUP					Total
	Under 5 yrs	6-15 yrs	16-65 yrs	Over 65 yrs	Unknown age	
Ignition of bedding by:-						
Smoking materials or matches	2	-	19	23	1	45
Candle or night light	1	-	2	4	-	7
Open fire	2	-	1	-	-	3
Electric fire	-	-	1	2	-	3
Oil stove or lamp	-	-	-	3	-	3
Electric blanket	-	-	-	3	-	3
Ignition of clothing on person by:-						
Smoking materials or matches	-	-	2	1	-	3
Candle or night light	1	-	3	1	-	5
Open fire	10	6	17	32	-	65
Gas fire	-	-	3	5	-	8
Electric fire	1	1	5	18	-	25
Gas cooker or ring	-	1	4	5	-	10
Oil stove	-	-	2	2	-	4
Slow combustion stove	-	1	-	-	-	1
Other	-	-	-	1	-	1
Smoking materials set fire to contents or structure	2	1	10	14	-	27
Fire in grate set fire to contents or structure	5	1	5	11	-	22
Flammable liquid on fire	-	1	3	2	-	6
Gas apparatus igniting contents or structure	-	-	3	4	-	7
Electric apparatus igniting other contents	-	-	5	5	-	10
Electric wires, rails etc.	-	-	-	1	-	1
Candle igniting other contents	-	-	-	2	-	2
Oil stove igniting other contents	9	1	11	10	-	31
Fire in grate igniting petrol	-	1	1	-	-	2
Children playing with fire	14	8	2	-	-	24
Collision or motor crash	-	1	6	-	-	7
Aircraft crash	-	-	7	-	-	7
Other causes	1	1	31	5	-	38
Unknown causes	17	15	72	52	3	159
<b>Total</b>	<b>65</b>	<b>39</b>	<b>215</b>	<b>206</b>	<b>4</b>	<b>529</b>
Rate per 10 <sup>6</sup> in age group	16	6		27	-	10

Table 2

Age and sex of fire fatalities

Age of casualty in years	Number of Deaths		
	Male	Female	Total
less than 5	27	38	65
6-15	17	22	39
16-40	57	30	87
41-65	60	68	128
Over 65	67	139	206
Unknown Age	4	-	4
Total	232	297	529

Two hundred and thirty two of the casualties were male, a rate of approximately 9 per million, and 297 were female, a rate of approximately 11 per million.

Premises, time of discovery and extent of fire

An analysis of the premises in which fatal casualties occurred is given in Table 3. Three hundred and ninety casualties, (73.7 per cent of the total) occurred in the home, 43 in industrial premises, and 39 outdoors. It is often stated in propaganda leaflets and similar publications that the home is the most dangerous place from the point of view of fire. In the sense that most fire fatalities occur in the home, this is undoubtedly true but, if the numbers of occupants and periods of occupation were taken into account, it is by no means certain that these figures would show the home to be inherently more dangerous than other occupancies.

Table 3

Premises in which fire fatalities occurred

Hazard in which fire started	Number of Deaths in fires
House	322
Flat	67
Maisonette	1
Caravan	10
Public Houses, Hotels and Boarding Houses	9
Hospitals, Homes, Insti- tutions	9
Schools, colleges	2
Shops and stores	16
Commercial premises	7
Industrial premises	43
Aircraft	4
Other outdoor hazard	39
Total	529

The total numbers of fatalities are shown in relation to the extent of the fires in Table 4.

Table 4

Extent of fires in which fatalities occurred

Extent of fire	Number of casualties in fires
Confined to: room of origin	283
Confined to: floor of origin	39
Confined to: hazard of origin	149
Spread to other hazard	58
<b>Total</b>	<b>529</b>

Two hundred and eighty three casualties (53.5 per cent of the total) occurred in fires which were confined to the room of origin; thus it can be seen that a large number of deaths occurred in small fires which did not cause a large amount of material damage. This is not surprising since a major cause of fire was ignition of clothing on person. The proportion of small fires would be even greater if the Registrar General's figures of fatalities were taken into account since these include a large number of fatal incidents not attended by Fire Brigades.

The numbers of fatalities are shown in relation to times of discovery of the fires in Fig. 1. Of the total of 529 fatal casualties, 192 (approximately 36 per cent) occurred in fires which were discovered between 8 a.m. and 3 p.m., and there was a peak frequency at about mid-day. In addition to the fatalities shown in Fig. 1, there were 44 associated with late calls and 5 in which the times of discovery of the fires were not reported.

Fire-fighting, rescues and escapes

Table 5

Fire fighting personnel and use of breathing apparatus

Fire Fighting Personnel	Numbers of casualties in fires		Total
	Breathing apparatus used	Breathing apparatus not used	
Fought by Fire Brigade and not by other	73	178	251
Not fought by Fire Brigade and fought by other	0	126	126
Fought by Fire Brigade and fought by other	26	90	116
Not fought by Fire Brigade and not fought by other	0	36	36
<b>Total</b>	<b>99</b>	<b>430</b>	<b>529</b>

The types of personnel engaged in fighting fires in which fatalities occurred, in relation to the use of breathing apparatus, are analysed in Table 5. Fires resulting in 79 deaths (18.7 per cent of the total) necessitated the use of breathing apparatus, but the majority of the casualties occurred in fires in which fumes and smoke apparently caused no difficulty in entering the premises on fire; this would appear to support the statement made earlier that a large number of deaths occurred in fires that were not accompanied by a large amount of material damage.

Some indication of the size of a fire is given not only by the information on spread but also by the type of equipment that has to be used for extinction. The frequencies with which major pumps and hydrants were used on fatal fires are given in Table 6; such equipment was required in 108 (24%) of the 450 fires in which fatalities occurred. It is known (1) that about 15 per cent of all fires attended by Fire Brigades are extinguished with jets from pumps or hydrants. Hence it appears that for fires attended by Fire Brigades, although most of the deaths occur in the smaller fires, the chance of a fatality resulting from a fire is greater in the larger fires than in the smaller ones.

Table 6

Major pumps used to fight fires

Number of major pumps and hydrants used to extinguish fire	Number of casualties in fires	Number of fires
0	366	342
1	96	76
2	24	19
3	7	6
4	2	1
5	3	2
6	1	1
7	-	-
8 or more	29	2
Unknown	1	1
Total	529	450

An analysis is given in Table 7 of unsuccessful rescue attempts together with information on the floor of origin of the fires. The greatest numbers of such attempts were made in fires which originated on the ground floor and there were 307 failures to achieve rescue from this level either because the casualty died before entrance could be effected or because death occurred after rescue. The majority of deaths (418) occurred on basement, ground and first floor levels whilst only 42 are known to have occurred at 2nd floor level and above. It is thus clear that any effect height of building might have had in hindering rescue must have been small. There are at present insufficient data to provide evidence as to the relative safety of different storeys.

Table 7

Rescue attempts

Rescue attempts	Floor of Origin								
	Not Appli- cable	Ground	First	Sec- ond	Third	Fourth or above	Base- ment	Un- known	Total
Death occurred before rescue could be effected	38	245	76	9	16	7	6	6	403
Death occurred after rescue	4	62	21	6	1	3	8	21	126
Total	42	307	97	15	17	10	14	27	529

Causes of death

An analysis of the causes of death recorded by coroners is given in Table 8. As might be expected, 57.8 per cent of the total fatalities were due either to burns directly, or to the effects of burns. About 29 per cent were the result of asphyxiation or the effects of smoke.

Table 8

Causes of deaths due to fire

Cause of Death	Number of Casualties in fires
Due to burns directly	113
Due to effects of burns	193
Asphyxiation	112
Shock	8
Not stated or unknown	11
Due to effects of smoke	43
Other injuries	28
More than one of above	21
Total	529

Numbers of fatalities in each incident

In only 35 incidents out of a total of 450 was there more than one fatal casualty, and these fires in which there were multiple casualties included one in which there were 19 deaths and another in which there were 10.

Room of origin of fires in dwellings

The room of origin of the 400 fatal fires that occurred in dwellings is shown in Table 9. One hundred and seventy six (44 per cent) of the fatal casualties were in fires in living rooms, 96 (24 per cent) in bedrooms and 47 (11.8 per cent) in kitchens. Exposure to danger from fire will depend

Table 9

Room of origin of fires in dwellings

Type of dwelling	Room of origin								Total
	Living room	Kitchen	Dining room	Bed-room	Stairs	Bath-room	Other	Un-known	
House	151	32	4	75	1	1	5	53	322
Flat	24	13	-	21	-	-	-	9	67
Maisonette	1	-	-	-	-	-	-	-	1
Caravan	-	2	-	-	-	-	-	8	10
Total	176	47	4	96	1	1	5	70	400

both on the time spent in a room and on the sources of ignition present. Special changes such as the elimination of open fires can be expected to change the proportions of deaths occurring in different rooms.

Conclusions

The open fire is again revealed as the main source of danger. One hundred and twenty two fatalities (23.1 per cent of the total) resulted from the ignition of clothing on person, and of these 65 were due to clothing being ignited by an open fire.

Carelessness with smoking materials, particularly when smoking in bed, is shown to be an important cause of fire fatalities since 75 of the fatal casualties reported by Fire Brigades in 1960 (14 per cent of the total) were caused by fires due to smoking materials. Of these, 45 were due to people smoking in bed and dropping cigarette ends or lighted matches among the bedclothes.

Other studies have shown that fire is particularly hazardous to the young and old and this is again borne out by the results of the present analysis. Over 50 per cent of the fatalities were either children under 5 years of age, or persons over 65 years of age. Of the 139 fatalities among elderly women over 65 years of age, 55 (39.6 per cent of the total) were due to "ignition of clothing on the person". In a number of cases, nightdresses were ignited by open fires.

There were, in all, 65 deaths due to ignition of clothing being worn among people over 65 years old. The total of 55 female deaths thus represents 84.6 per cent of the total due to this cause among the age group.

An appreciable number of fatalities in the old and in the young occurred among those who were left alone at the time of the fires.

In the majority of fires in which there were fatalities there was only one death per incident. This, together with the information on the number



of times breathing apparatus was used to enter premises, the number of major pumps used to extinguish the fires and the extent of the fires all tend to support the view that most casualties occur in small fires, in which the material damage is slight although the chance of a large fire resulting in fatalities is probably higher than that of a small fire.

A large proportion of fatalities occurred in fires originating in the living room, but social changes, such as the gradual elimination of open fires, would be expected to alter materially the situation in the future.

Although fire fatalities occur throughout the 24 hours of the day, there was a distinct peak frequency around mid-day and in 1960 there was a second, less pronounced peak between 7 and 8 p.m.

#### Reference

- (1) United Kingdom Fire Statistics 1960 London, Her Majesty's Stationery Office, 1961

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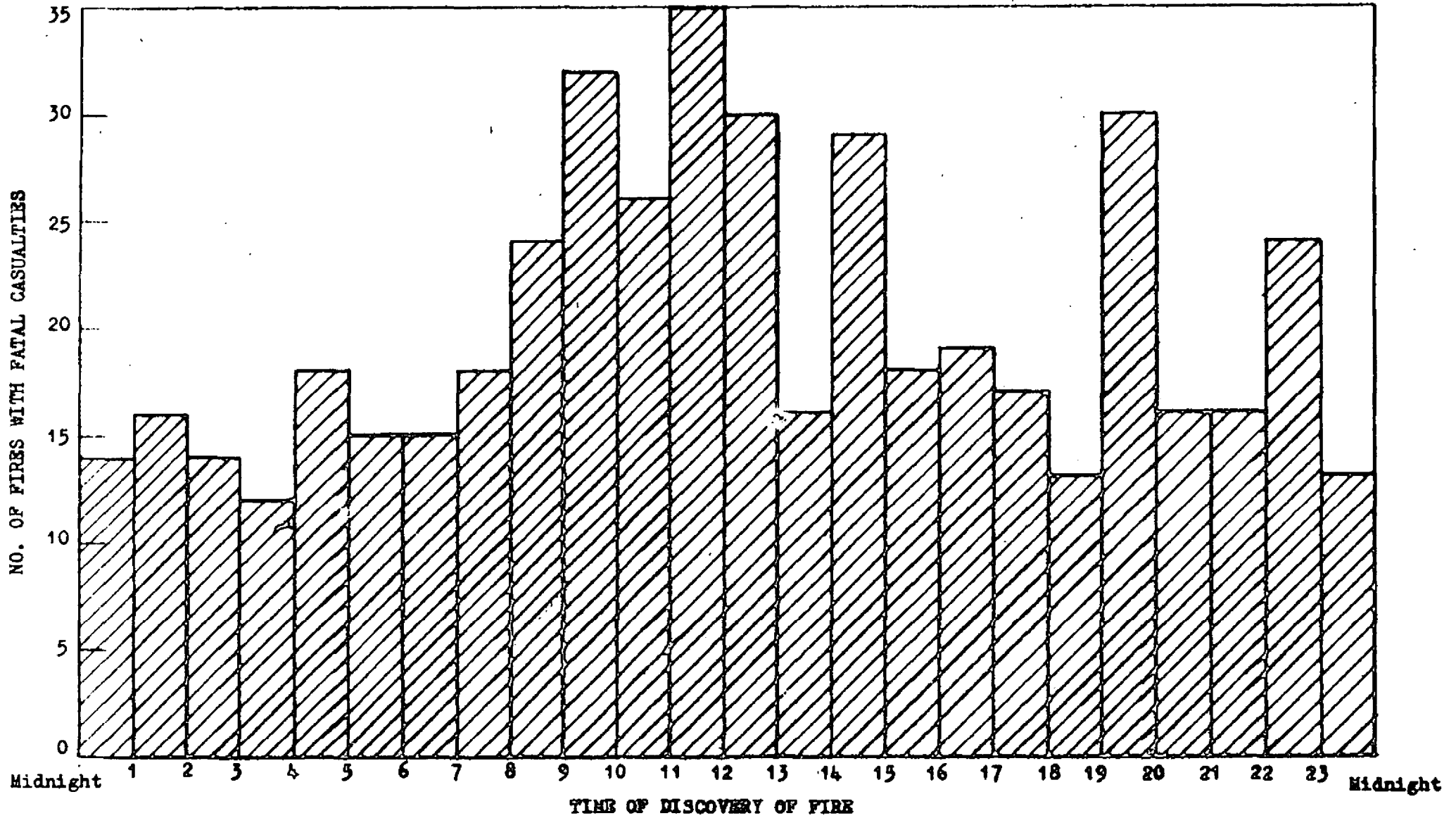


FIG. I. DEATHS DUE TO FIRE IN 1960  
Reports from Fire Brigades in the United Kingdom, 1960