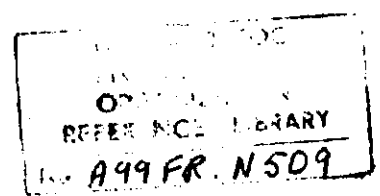


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**FIRE RESEARCH NOTE**

**NO. 509**

**FIRES IN EDUCATIONAL ESTABLISHMENTS IN THE  
UNITED KINGDOM 1957**

**BY**

**J. M. FIRTH and J. F. FRY**

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DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH AND FIRE OFFICES' COMMITTEE  
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UNITED KINGDOM 1957

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Summary

This report is a continuation of a series commenced in 1951<sup>(1)(2)(3)(4)</sup>.

There has been a gradual increase in the number of fires in educational premises during the last ten years. The proportion of fires due to smoking materials has risen noticeably.

The fire incidence and causal pattern during 1957 have been examined in detail and some comparisons are made with other years. The year 1957 was selected for the study since the Annual Statistical tables for that year were compiled from reports of all fires occurring in the United Kingdom.

Casualties in fires in schools have continued to be few in number and there were fewer casualties in 1957 than in 1954.

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Introduction

The annual fire incidence in educational establishments from 1950 to 1961 is depicted graphically in Fig.1. The graph exhibits a continuous upward trend with the numbers of fires showing a sharp rise in 1960 and 1961.

The analysis reported here is a continuation of the series commenced in 1951(1)(2)(3)(4); the year 1957 was selected for study as Annual Statistical tables were compiled from reports of all fires occurring in the United Kingdom in that year, and not from a sample of reports as is done for most years.

Table 1 shows details of the numbers of fires in the three major administrative areas of the United Kingdom during 1957 classified by the type of educational establishments in which they occurred.

Table 1

Fires in educational establishments in the  
United Kingdom 1957

Type of educational establishment	England & Wales	Scotland	Northern Ireland	United Kingdom
	No.	No.	No.	No.
Children's schools - non residential	440	45	10	495
" " - residential	91	4	1	96
Universities, technical colleges etc	73	9	1	83
Other establishments.	71	6	2	79
Total	675	64	14	753

"Other establishments" covers a variety of items including art and drama schools, language institutes, dancing academies, scout huts.

Causes and materials ignited.

The causes of fires and the materials ignited first in schools are compared with those occurring in all other buildings in tables 2 and 3 respectively.

It may be seen from Table 2 that the proportions of fires due to "cooking apparatus" and to "sundry apparatus and electrical installations" in universities and technical colleges are higher than in other educational establishments, which may be explained by the different type of use to which these buildings are put. It is surprising however to find that they are also higher than in other buildings generally.

Table 2

Source of ignition of fires in educational establishments. United Kingdom 1957

Source of ignition	Fires in educational establishments										Fires in all other buildings	
	Children's schools non-residential		Children's schools residential		Universities, technical colleges		Other establishments		All educational establishments		No.	%
	No.	%	No.	%	No.	%	No.	%	No.	%		
Space heating appliances, chimneys, flues.	137	27.7	19	19.8	13	15.7	14	17.7	183	24.3	13397	26.8
Cooking appliances	46	9.3	8	8.3	12	14.4	1	1.3	67	8.9	4578	9.2
Sundry apparatus and electrical installations*	54	10.9	10	10.4	26	31.3	5	6.3	95	12.6	6603	13.2
Naked lights.	54	10.9	15	15.6	6	7.2	17	21.5	92	12.2	6667	13.3
Smoking materials.	35	7.1	8	8.3	6	7.2	4	5.1	53	7.0	4918	9.8
Miscellaneous sources.	95	19.2	13	13.5	13	15.7	14	17.7	135	17.9	7691	15.4
Unknown sources.	74	14.9	23	24.0	7	8.4	24	30.4	128	17.0	6087	12.2
<b>Total</b>	<b>495</b>	<b>100.0</b>	<b>96</b>	<b>100.0</b>	<b>83</b>	<b>100.0</b>	<b>79</b>	<b>100.0</b>	<b>753</b>	<b>100.0</b>	<b>49941</b>	<b>100.0</b>

\*'Sundry apparatus' includes all apparatus not directly specified including electric motors, radios, blowlamps etc.

Table 3

Materials ignited first in educational establishments. United Kingdom 1957.

Material ignited first	Fires in educational establishments										Fires in all other buildings	
	Children's schools Non-residential		Children's schools residential		Universities, technical colleges		Other establishments		All educational establishments			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Solid fuels, oils and gases.	30	6.1	2	2.1	8	9.6	1	1.3	41	5.4	4196	8.4
Wooden and paper goods.	89	18.0	11	11.5	6	7.2	8	10.1	114	15.1	4147	8.3
Clothing and textiles.	25	5.1	4	4.2	5	6.0	6	7.6	40	5.3	3341	6.7
Furniture and furnishings.	33	6.7	19	19.8	8	9.6	4	5.1	64	8.5	6327	12.7
Wooden building materials and fittings.	102	20.6	12	12.5	11	13.2	15	19.0	140	18.6	8848	17.7
Food.	27	5.5	4	4.2	14	16.9	3	3.8	48	6.4	3360	6.7
Electrical insulation.	25	5.1	7	7.3	6	7.2	1	1.3	39	5.2	3589	7.2
Miscellaneous materials including chemicals.	100	20.2	16	16.7	20	24.1	20	25.3	156	20.7	11455	22.9
Unknown materials.	64	12.9	21	21.9	5	6.0	21	26.6	111	14.7	4678	9.4
Total	495	100.0	96	100.0	83	100.0	79	100.0	753	100.0	49941	100.0

As in other buildings, space heating appliances and their associated chimneys and flues appear to start a high proportion of fires in educational establishments and 27.7 per cent of the fires in children's non-residential schools were ignited by them. "Smoking materials" appear less frequently as the source of ignition of fires in schools than they do of fires in buildings generally, but the difference is smaller than might be expected and, as will be shown in a later section of this note, fires due to this cause appear to be increasing.

Wooden and paper goods appear to be frequently ignited first in children's schools (Table 3), while wooden building materials and fittings are ignited more frequently in non-residential schools than in other educational establishments or other buildings.

Comparison between post-war and pre-war schools.

Since 1945 a considerable number of new schools have been erected using materials and constructional methods not previously used in school construction. To obtain information on the effect of this on fire incidence the frequency of fires in the post-war schools has been compared with that in schools built earlier.

Table 4 shows the numbers of fires in the various categories of educational establishment divided into those of pre-war and those of post-war construction.

Table 4

Fires in educational establishments of pre-war and post-war construction

Type of educational establishment	Pre-war construction	Post-war construction	Total
	No.	No.	No.
Children's schools - non-residential	425	70	495
Children's schools - residential	90	6	96
Universities, technical colleges	65	18	83
Other establishments	70	9	79
Total	650	103	753

Because of the small frequencies in all classes other than non-residential children's schools comparisons of causes and materials ignited have been possible for this particular group only. The relevant figures are given in Tables 5 and 6.

Table 5 shows that the proportion of fires started by space heating appliances was not appreciably lower in post-war than in pre-war schools; it should be noted, however that these figures take no account of numbers at risk (which are not known to the Organization) and if there is an appreciable difference between the rates of incidence in post-war and pre-war schools comparison of proportions due to different causes is not entirely satisfactory.

Table 5

Causes of fire in children's non-residential schools

Source of ignition	Pre-war construction		Post-war construction		Total	
	No.	%	No.	%	No.	%
Space heating appliances, chimneys, flues.	120	28.2	17	24.3	137	27.7
Cooking appliances.	32	7.5	14	20.0	46	9.3
Sundry apparatus and electrical installation.	44	10.4	10	14.3	54	10.9
Naked lights.	50	11.8	4	5.7	54	10.9
Smoking materials.	27	6.4	8	11.4	35	7.1
Miscellaneous sources.	88	20.7	7	10.0	95	19.2
Unknown sources.	64	15.1	10	14.3	74	15.0
Total	425	100.0	70	100.0	495	100.0

Cooking appliances appear to have accounted for a significantly higher number of fires in post-war schools than would be expected if the two populations were the same; this is the only cause for which a statistically significant difference is apparent.

From Table 6 it appears that the ignition of food occurred more frequently in post-war schools than would be expected if the two populations were the same and this agrees with the frequency figures for cooking appliance fires.

Table 6 also shows that the proportion of fires in post-war schools in which wooden building materials and fittings were ignited was lower than that in pre-war schools.

Table 6

Materials ignited in children's non-residential schools

Material first ignited	Pre-war construction		Post-war construction		Total	
	No.	%	No.	%	No.	%
Solid fuels, oils & gases.	21	4.9	9	12.9	30	6.1
Wooden and paper goods.	79	18.6	10	14.3	89	18.0
Clothing and textiles.	21	4.9	4	5.7	25	5.1
Furniture & furnishings.	32	7.5	1	1.4	33	6.7
Wooden building materials and fittings.	97	22.8	5	7.1	102	20.6
Food	13	3.1	12	17.1	25	5.1
Electrical insulation	22	5.2	5	7.1	27	5.5
Miscellaneous materials including chemicals.	84	19.8	16	22.9	100	20.2
Unknown materials.	56	13.2	8	11.4	64	12.9
Total	425	100.0	70	100.0	495	100.0

The increase in fire incidence.

Fig.1 shows that there has been a noticeable increase in the annual frequency of fires in educational establishments especially from 1959 to 1961. To obtain some indication of the causes contributing to this increase the 1957 figures have been compared with estimates obtained from a 1 in 4 sample of all fires reported by Fire Brigades in 1960.

The frequencies of fires attributed to various sources of ignition are given in Table 7 from which it appears that all but "miscellaneous sources" showed an increase. The increase in the numbers of fires caused by smoking materials is statistically significant.

Table 7

Sources of ignition of fires in educational establishments  
United Kingdom 1957 and 1960

Source of ignition	1957		1960		Total	
	No.	%	No.	%	No.	%
Space heating appliances, chimneys, flues	183	24.3	208	23.1	391	123.7
Cooking appliances	67	8.9	96	10.7	163	9.9
Sundry apparatus and electrical insulation	95	12.6	144	16.0	239	14.6
Naked lights	92	12.2	108	12.0	200	12.0
Smoking materials	53	7.0	120	13.3	173	10.5
Miscellaneous sources	135	17.9	80	8.9	215	13.0
Unknown sources	128	17.0	144	16.0	272	16.5
Total	753	100.0	900	100.0	1653	100.0

From an examination of the materials ignited first in these fires it appears that more than proportional increases occurred in the ignition of food and in the ignition of unknown materials, while there was a decrease in the frequency with which electrical insulation was ignited.

Casualties in fires in educational establishments - 1957

During 1957 22 fire incidents in educational establishments involved 27 casualties, one of which (a member of the Fire Brigade) died. England and Wales had 20 incidents, there were two in Scotland and none in Northern Ireland. On the assumption that the number of establishments at risk have increased and also that the school population has increased, the figures compare favourably with those for 1954<sup>(4)</sup> when there were 21 fires involving 30 casualties (non fatal) in schools in England and Wales. Only 3 children became casualties in 1957 compared with 9 in 1954. Brief details are given in Table 8 of the fires involving casualties.



Table 8

Fire incidents with casualties in educational establishments  
United Kingdom 1957

Source of ignition	Material ignited first	Supposed cause of fire	Number of incidents
Gas cooker, gas boiler etc.	Town gas	Blowback when lighting burners	6
Gas ring	Fat	Overheating of fat on gas ring	2
Sodium or phosphorus	Sodium or phosphorus	Spontaneous combustion	4
(1) Nitric acid (2) Bunsen burner	Alcohol) Alcohol)	Accident in chemical experiment	2
Blowlamp	Petrol	Careless use of blow-lamp	2
Unknown	Unknown	Unknown	6*
Total			22

\*Includes one incident with 6 casualties, one of which was fatal, all F.B. personnel. All other incidents had one casualty.

Of the adult casualties, 9 were Fire Brigade personnel and the remainder were non-teaching staff of the schools such as caretakers and kitchen hands.

Injuries were, in the main, slight with the exception of the fatality which occurred during the fire fighting operations when 5 other fire brigade personnel were injured at a fire in a former mansion adapted for use as a school.

#### Conclusions

Cooking appliances and various other types of apparatus (mainly electrical) are more frequent causes of fire in universities and technical colleges than in other educational establishments or in other buildings generally. Cooking appliances also appear to cause a higher proportion of the fires in post-war non-residential schools than in pre-war ones, but it is not known whether this is related to different amounts of cooking done in the two groups of schools.

As in other buildings a high proportion of the fires (27.7 per cent) in children's non-residential schools appear to be started by heating appliances and there is little difference between post-war and pre-war schools in this respect. The ignition of wooden building materials and fittings occurs in a smaller proportion of the fires in post-war schools than of those in pre-war schools and differences in construction may be partly responsible for this.

Smoking materials appear to cause only a slightly smaller proportion of fires in schools than of those in other buildings, and from a comparison between the 1957 and the 1960 figures it appears that this cause is increasing.

Neither the sharp increase in the frequency of fires in educational establishments between 1959 and 1960 nor the gradual increase from 1950 onwards appears to be attributable to any one cause of fire, and almost all causes showed some increase between 1957 and 1960.

The number of fire casualties in schools is low and the number in 1957 was lower than that in 1954. It appears that children are generally safer from fire at school than at home.

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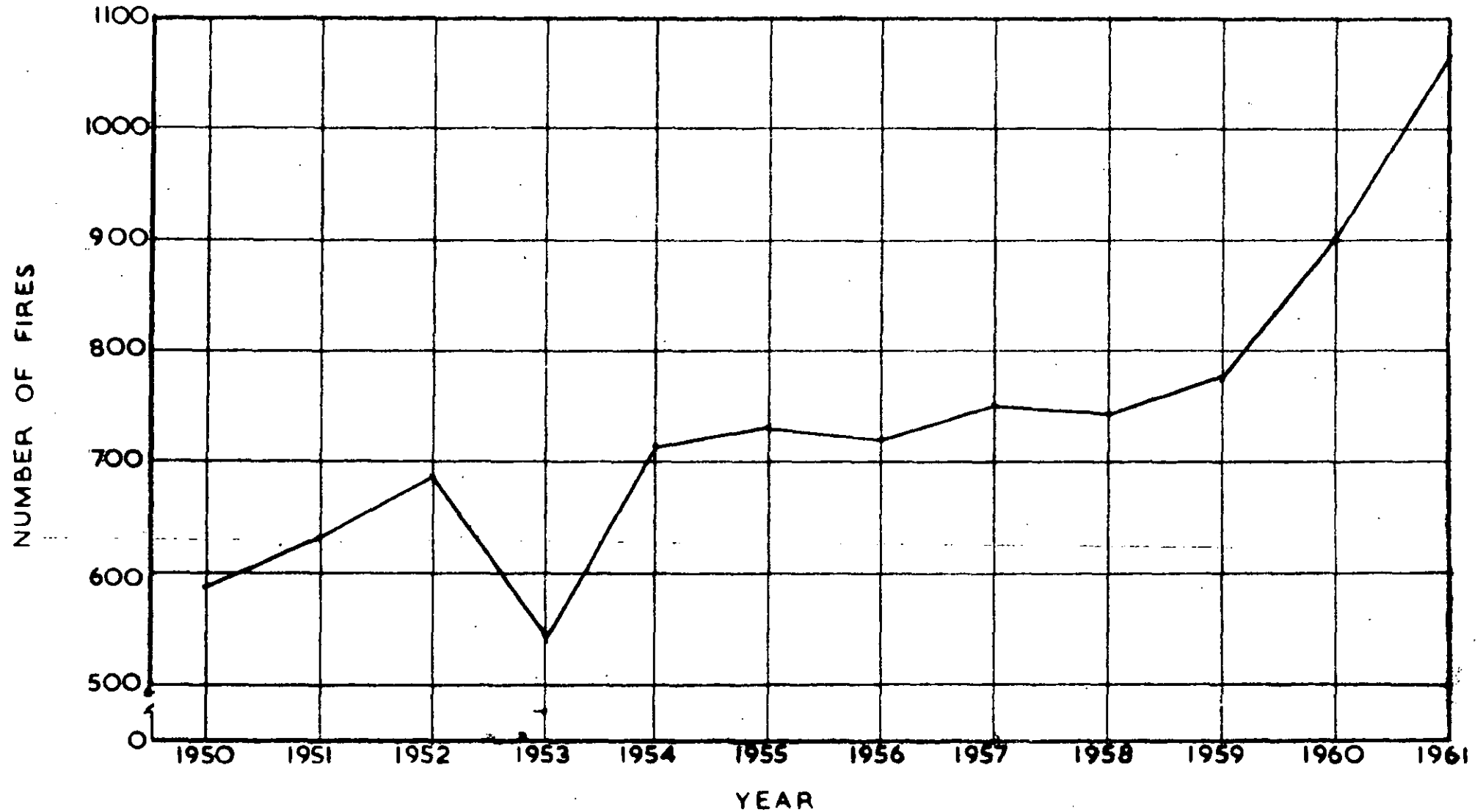


FIG. I. NUMBERS OF FIRES IN EDUCATIONAL ESTABLISHMENTS, UNITED KINGDOM 1950 - 1961