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

FIRES CAUSED BY FIXED HEATING APPLIANCES USING OIL AS FUEL
AN ANALYSIS OF REPORTS FROM FIRE BRIGADES IN THE UNITED KINGDOM, 1956

by

Mrs. J.E.L. Hinton

Summary

Fire Brigades in the United Kingdom attended 111 fires caused by fixed heating appliances using oil as fuel in 1956. Thirty of these occurred in private dwellings, 29 in industrial premises and 22 in a group of premises including schools, service premises, hotels and restaurants.

Thirty-three per cent of the incidents were due to leakage, spillage, or flooding, 24 per cent to flash-backs or blow-backs, and 20 per cent to radiated, conducted, or convected heat. In 10% of the incidents fire was caused by faults in the electrical system.

More than one third of the fires were caused by apparatus which was said to be defective in some way.

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INTRODUCTION

From a previous analysis of fires caused by oil burning appliances⁽¹⁾ it was found that, during the year 1956, fire brigades attended 111 incidents in the United Kingdom caused by fixed heating appliances using oil as a fuel. The Joint Fire Research Organization has received requests for information on such fires and it was felt that a more detailed examination of these incidents would prove useful.

TYPE OF APPARATUS AND PREMISES WHERE INSTALLED

Thirty of the incidents occurred in private dwellings, 29 in industrial premises and 22 in premises connected with education, the services, and hotels and restaurants. In about three quarters of the incidents it could be definitely established from the reports that the apparatus involved was a boiler installed for central heating. In industrial premises 19 incidents were caused by central heating boilers and 10 by boilers, furnaces and heaters which may have been used in industrial processes. Of the 11 incidents occurring in agricultural buildings 5 were caused by boilers used for sterilising equipment and 3 by boilers used for heating greenhouses.

CAUSES OF FIRE

The causes of fire are shown in Table 1. They have been classified rather differently from the method used in the previous note on fires caused by oil-burning appliances in order to bring out points peculiar to fixed heating appliances. Thirty-three per cent of the incidents were due to leakages, spillage or flooding, 24 per cent to flash-backs or blow-backs, 20 per cent to radiated, conducted or convected heat and 10 per cent to faults in the electrical systems. In more than one third of the reports examined the fires were caused by apparatus said to be defective in some measure.

DAMAGE

In about 70 per cent of the incidents considered the damage was reported to have been only slight, but in the remainder damage was more severe. There were 4 incidents which completely involved the building of origin; in three of these the fire also spread to neighbouring buildings.

DISCUSSION

In recent years the popularity of oil as an economical fuel has been increasing. There is evidence that more private individuals as well as industrial and commercial concerns have installed oil-fired boilers for central heating systems, and now that the 'clean air' act is in force there is reason to believe that this trend will continue. The number of fires reported as being due to oil-fired boilers and furnaces has also increased, but it is not at present possible to say whether there is an increase in the rate of fire incidence because no estimate of the number of installations in use is available. It is obvious that there are several fire risks associated with the use of oil as a fuel for central heating:-

- a) The normal hazard of any apparatus which employs a burner.
- b) The use of highly flammable liquid fuels.

c) The hazards associated with electrical auxiliary apparatus.

Indirectly, of course, the necessity for storing a large quantity of the fuel oil on the premises presents an additional hazard; indeed, in the reports considered, there were 5 incidents in which the fire was aggravated by the presence of considerable quantities of oil in the proximity of the boiler. In a further 14 of the reports of fires caused by oil fuelled boilers there was mention of quantities of oil, ranging from 50 gallons to 1,000 gallons, being stored in boilerhouses.

At least one third of the incidents reported were caused by apparatus defective in some way. The importance of careful maintenance of these installations is clearly indicated by the reports examined, particular danger points being the burners themselves, ignition systems and electrical auxiliary apparatus, and valves and pipe unions.

REFERENCE

FRY, J.F. and HINTON, Mrs. J.E.L. Fires caused by oil burning appliances in 1956.

D.S.I.R. & F.O.C. J.F.R.O. F.R. Note No. 333/1957.

TABLE 1

Fires caused by fixed heating appliances using oil fuel.

(An analysis of reports from Fire Brigades in the United Kingdom, 1956)

Causes of fire	Type of premises							Total
	Dwellings	Industrial premises	Commercial premises	Educational Public institutions Service premises Hotels, restaurants	Garages	Ships and other outdoor hazards	Agricultural premises	
Flash-backs and blow-backs caused by								
a) bad operation	-	2	-	2	-	-	-	4
b) defective apparatus	-	1	-	-	-	-	-	1
c) unknown cause	6	6	2	2	3	-	3	22
Leakage, spillage, flooding due to								
a) bad operation	3	1	-	1	-	-	-	5
b) defective apparatus	6	6	-	7	1	1	1	22
c) unknown cause	5	-	-	-	1	-	4	10
Faults in electrical equipment								
a) motor	2	-	1	-	-	-	-	3
b) ignition system	1	-	-	-	-	-	-	1
c) wiring	1	1	-	-	1	-	-	3
d) stoking system	-	2	-	-	-	-	-	2
e) thermostat	-	1	1	-	-	-	-	2
Overheating due to								
a) bad operation	-	-	-	-	-	-	-	-
b) defective apparatus	1	-	-	-	-	-	-	1
c) unknown cause	1	1	-	1	-	1	1	5
Radiated, conducted or convected heat	3	6	4	7	-	1	1	22
Other causes due to faults in apparatus	-	-	-	2	-	2	1	5
Other causes	1	2	-	-	-	-	-	3
Total fires	30	29	8	22	6	5	11	111
Apparatus known to be used for central heating	29	19	7	16	6	-	-	77