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Fire Research Note No. 813

TOWN GAS EXPLOSIONS IN DWELLINGS

by

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SUMMARY

An examination has been made of fire brigade reports of incidents involving explosions of town gas in dwellings during the 12 years 1957 - 68. The average annual frequency was about 84 but appears to be increasing. The average rate of incidence is about 5.0 per 10^8 therms of gas sold. About 48 per cent of incidents cause some structural damage and in 38 per cent of these it is considered "severe".

KEY WORDS: Explosion; dwellings; gas, town; statistics.

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INTRODUCTION

At the time of the public enquiry into the collapse of flats at Ronan Point following a gas explosion, the Fire Research Station was able to provide some statistical information obtained from reports of fires attended by fire brigades in the United Kingdom. The reporting and classification systems used by the Research Station are concerned primarily with fires and it was therefore necessary to make a special examination of all reports of incidents in which an explosion had been recorded to produce the statistics required. Because of the urgency of the matter a quick preliminary analysis was made and the results were communicated to the Committee of Enquiry who published the figures in their report¹.

In compiling the evidence all reports of gas explosions in dwellings were used and these were sub-divided into those causing structural damage and those causing superficial damage only. Structural damage was defined as any damage to floors, walls, ceilings or roofs, but did not include that confined to windows and doors. This provided an estimate of the risk which erred on the safe side by including many incidents in which the structural damage was only slight.

Following the publication of the Ronan Point report the Ministry of Housing and Local Government required further information on the severity of damage to be expected from explosions, and the fire brigade reports were re-examined with this in mind. This note contains the results of the further examination of reports of gas explosions and those of an examination of reports for an additional two years (1967 and 1968).

FREQUENCIES

The results of the further examination of fire brigade reports for the period 1957 - 1966 are given in Table 1, together with those for 1967 and 1968. The table given shows the number of gas explosions in dwellings in the United Kingdom in each year (estimated from the sample of fire brigade reports examined), the number in which there was some structural damage and the number in which the structural damage could be considered

"severe". Damage was classified as "severe" when so described by the brigade, or when it appeared from the report that there had been cracking or movement of walls, floors, ceiling joists or roof members, but not where it had been confined to plaster only, however extensive this damage had been.

Table 1 Frequencies of town gas explosions in dwellings in the United Kingdom (estimated from samples of fire brigade reports).

Year	Sampling fraction	Total No. gas explosions	Structural damage	
			Total No.	No. with severe damage
1957	1/1	70	29	8
1958	1/4	64	36	4
1959	1/4	88	64	28
1960	1/4	72	36	20
1961	1/2	46	18	8
1962	1/2	70	50	24
1963	1/6	84	30	-
1964	1/2	80	52	24
1965	1/1	76	36	14
1966	1/1	97	42	22
1967	1/1	104	31	12
1968	1/4	156	64	20
Total		1007	488	184

In the 12 year period considered there were 1007 town gas explosions reported of which 48 per cent caused some structural damage. In about 38 per cent of the incidents with structural damage the damage was classified as "severe".

RATE OF INCIDENCE

The frequency of gas explosions would be expected to depend in part on the quantity of gas used. Table 2 shows the annual frequencies related to the amounts of gas sold in Great Britain (listed in the Annual Abstracts of Statistics²).

Table 2 Frequency of explosions and gas sales in dwellings in Great Britain

Year	No. of explosions	Gas sold million therms	Explosions per 10^8 therms
1957	69	1306	5.3
1958	60	1318	4.6
1959	84	1266	6.6
1960	72	1279	5.6
1961	46	1281	3.6
1962	68	1383	4.9
1963	84	1519	5.5
1964	78	1596	4.9
1965	75	1851	4.0
1966	96	2130	4.5
1967	104	2382	4.4
1968	152	2762	5.5
Total	988		AV. 5.0

The annual frequency of gas explosions in dwellings reported by fire brigades in Great Britain appears to be increasing, but in relation to the quantity of gas sold for domestic use has fluctuated around an average level of 5.0 per 10^8 therms.

CONCLUSIONS

The average annual incidence of town gas explosions in dwellings was about 84 in the twelve years 1957 - 68, but appears to have been increasing towards the end of the period. In relation to the amount of gas sold for domestic use the explosion frequency fluctuated about a level of 5.0 per 10^8 therms and, up to and including 1968, there has been no indication of a change from this level. Forty eight per cent of incidents cause some structural damage and in 38 per cent of these the damage is severe.

ACKNOWLEDGMENT

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REFERENCES

- (1) Report presented to the Minister of Housing and Local Government of the enquiry into the collapse of flats at Ronan Point, Canning Town. Min. of Housing and Local Govt., London, 1968. H.M. Stationery Office.
- (2) Annual Abstract of Statistics. Central Statistical Office, London, Annual H.M. Stationery Office.

