Fire Research Note

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GAS EXPLOSIONS IN DWELLINGS, 1969:
MATERIAL DAMAGE AND INJURIES

by

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FIRE
RESEARCH
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SUMMARY

Comparison of fire brigade reports of town and natural gas explosions suggests that the distributions of material damage are similar, and that an average of about 0.4 persons are injured per reported incident.

KEY WORDS: Casualties, comparison, distribution, domestic, gas explosion, loss.

MINISTRY OF TECHNOLOGY AND FIRE OFFICES' COMMITTEE
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INTRODUCTION

Local authority fire brigades each year attend a number of gas explosions, and send standard fire report forms on them to the Joint Fire Research Organization.

Town gas and natural gas, have rather different combustion characteristics and some difference in the severity of explosions would be expected. Any major differences would be likely to be reflected in the fire brigade reports and accordingly all reports received on incidents occurring in dwellings in Great Britain during 1969 were examined, and further relevant details obtained from fire brigades.

At the time of writing information was not readily available for 36 incidents in Greater London, which has therefore been excluded from this analysis. This exclusion, while it would affect a study of frequencies is unlikely to have any effect on the analysis of damage and injuries.

This note is intended to provide some information which will assist in current inquiries into the relative hazards of natural gas and town gas.

METHOD

All fire reports received for 1969 were examined, and where an explosion of mains gas was indicated, the fire authority attending was asked to obtain particulars of past or projected natural gas conversion, and an estimate of the material damage. Other information was obtainable from the standard fire report.

RESULTS

Reports received

Table 1

Town and natural gas explosions in dwellings, Great Britain 1969

	Town gas	Natural gas	Details awaited	Total
England	95	16	36	147
Wales and Monmouthshire	2	1	-	3
Scotland	5			5

Material damage and injuries

Table 2A

Town gas explosions, Great Britain 1969
(excluding Greater London)

Material damage (£)	Number of injuries 0	1	2	3	4	Total Incidents
0	4	7	1	-	-	12
1 - 30	15	4	2	-	-	21
31 - 100	19	8	-	-	-	27
101 - 300	12	7	-	-	-	19
301 - 1000	7	1	-	-	-	8
1001 - 3000	5	5	-	-	-	10
3001 - 10000	3	-	1	-	-	4
10001 -	-	-	-	-	1	1
Total Incidents	65	32	4	-	1	102
Total injuries	-	32	8	-	4	44

Table 2B

Natural gas explosions, Great Britian 1969
(excluding Greater Londom)

Material damage (£)	Number of injuries 0	1	2	3	4	Total Incidents
0	1	2	-	-	-	3
1 - 30	5	-	-	-	-	5
31 - 100	2	-	-	-	-	2
101 - 300	3	-	-	-	-	3
301 - 1000	1	1	-	-	-	2
1001 - 3000	-	-	-	-	-	-
3001 - 10000	2	-	-	-	-	2
10001 -	-	-	-	-	-	-
Total Incidents	14	3	-	-	-	17
Total injuries	-	3	-	-	-	3

Frequency distributions of material damage are illustrated in Fig. 1, and the relation between number of injuries and material damage in Fig. 2.

DISCUSSION

Fig. 1 suggests that the frequency distributions of material damage in town and natural gas explosions are similar. The graph for natural gas incidents is, however, based on only a small number (17). The proportion of explosions where the estimated material damage was over £100 in the year under review was, by coincidence, 41.2 per cent for each.

Fig. 2 suggests that the smaller town gas explosions are more likely to cause injuries than are medium-sized ones. The explanation of this apparent paradox is presumably that the small explosions come to the attention of fire brigades (and thus get reported) only when somebody is injured.

CONCLUSIONS

Fire brigade reports of town and natural gas explosions suggest that the distributions of material damage are similar, but the number of reports available on natural gas incidents is too small for this to be certain.

The average number of injuries (other than those requiring only first aid treatment) per reported incident is about 0.4.

ACKNOWLEDGMENTS

Thanks are due to the fire authorities concerned for their prompt response to requests for information.

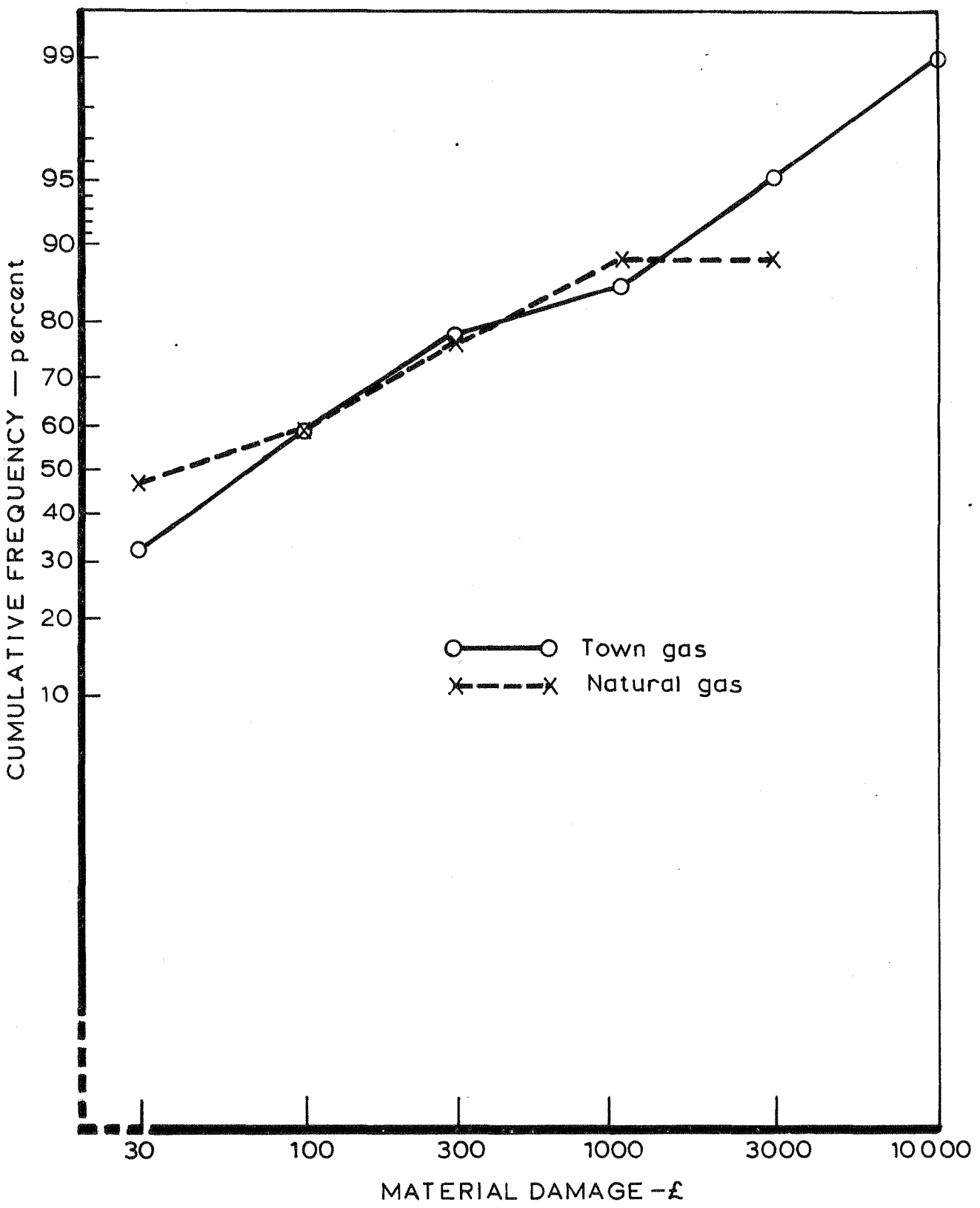

FIG. 1 GAS EXPLOSIONS IN DWELLINGS, GREAT BRITAIN 1969 (EXCLUDING GREATER LONDON) FREQUENCY DISTRIBUTIONS OF MATERIAL DAMAGE, TOWN AND NATURAL GAS

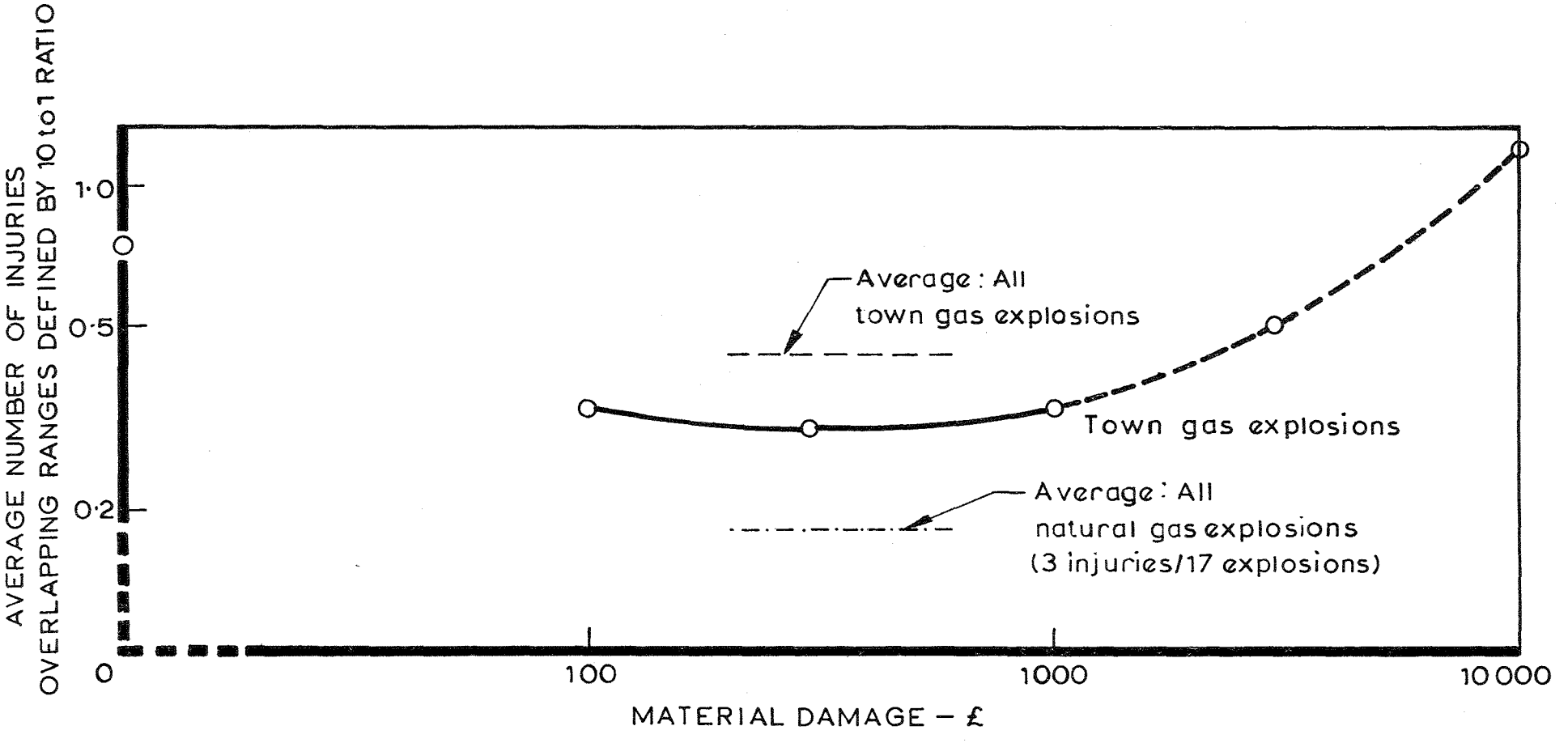

FIG.2 GAS EXPLOSIONS IN DWELLINGS, GREAT BRITAIN 1969 (EXCLUDING GREATER LONDON) AVERAGE NUMBER OF INJURIES v MATERIAL DAMAGE