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**Fire Research Note
No. 782**

AN EXPERIMENT IN ESTIMATING FIRE LOSSES

by

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SUMMARY

Parameters of a fire loss distribution are estimated from a sample of fire reports; the reports not containing any financial information.

Key Words: Brigade, correlation, distribution, loss.

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MINISTRY OF TECHNOLOGY AND FIRE OFFICES' COMMITTEE
JOINT FIRE RESEARCH ORGANIZATION

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INTRODUCTION

Some local authority fire brigades obtain estimates of the direct financial loss incurred in the fires they attend but most do not.

Since information of this kind is essential for operational research projects involving investment decisions, an attempt has been made to see whether estimates of a useful degree of accuracy can be made by simply reading reports giving other particulars of the fires.

METHOD

The values for "estimated amount of damage" recorded on 100 fire report forms made out by a county borough fire brigade were concealed by small self-adhesive labels. Two members of the staff of the Joint Fire Research Organization then estimated the damage themselves, aided by the other information contained in the forms and by common sense. One of the estimators (A), who was fairly new to fire research, had spent one day studying fire reports from this and other brigades, some with and some without loss estimates, and had the general knowledge of values acquired by a housewife. The other (B), a senior member of the scientific staff, had over 20 years experience of fire research, including occasional reference to fire reports.

The fires were the first 100 fires, other than chimney fires, attended by the brigade during 1967, and appear to be typical of fires attended by fire brigades.

RESULTS

The distributions of direct loss derived from the three sources can be specified by their deciles, and are thus compared in Table 1.

Table 1

Deciles	A's estimates (£)	B's estimates (£)	Fire brigade reports (£)
1/10	100	200	150
2/10	40	50	50
3/10	26	40	18
4/10	20	20	10
5/10	9	5	3
6/10	5	1	1
7/10	0	0	0
8/10	0	0	0
9/10	0	0	0

Tables 2A and 2B show that when all losses under £1 are grouped together the order of magnitude of the "guessed" estimates agrees with the fire brigade reports for 73 and 76 per cent of fires respectively,

Table 2A

		Fire brigade reports						TOTAL
		Nil	£1 -9	£10 -99	£100 -999	£1 000 -9 999	£10 000 -99 999	
A's estimates	Nil	31	-	-	-	-	-	31
	£1 -9	2	14	3	-	-	-	19
	£10 -99	-	9	25	3	1	-	38
	£100 -999	-	-	4	3	2	-	9
	£1 000 -9 999	-	-	-	2	-	1	3
	£10 000 -99 999	-	-	-	-	-	-	-
	TOTAL	33	23	32	8	3	1	100

Table 2B

		Fire brigade reports						TOTAL
		Nil	£1 -9	£10 -99	£100 -999	£1 000 -9 999	£10 000 -99 999	
B's estimates	Nil	32	2	-	-	-	-	34
	£1 -9	1	13	3	-	-	-	17
	£10 -99	-	7	24	2	-	-	33
	£100 -999	-	1	4	6	2	-	13
	£1 000 -9 999	-	-	1	-	1	1	3
	£10 000 -99 999	-	-	-	-	-	-	-
	TOTAL	33	23	32	8	3	1	100

Tables 2A and 2B are illustrated in Figure 1.

The performance of the two estimators may be compared by extracting information from Tables 2A and 2B, as follows.

Table 3

Agreement with order of magnitude of fire brigade reports (all losses under £1 grouped)	A	B
Right	73	76
One out (either way)	26	22
Two out (either way)	1	2

DISCUSSION AND CONCLUSIONS

It is sometimes suggested that there is no point in firemen recording the estimated financial loss in the fires they attend, since in individual cases large errors are known to be possible.

There seems no justification for this pessimism, since, for a typical sample of fires, quite consistent parameters for the loss distribution may be obtained by somebody who has not even seen the fires, and has no specialised experience. Experience may not count for much after a certain point is reached.

When figures are not available from the more usual sources, losses as estimated from reading fire reports appear to form a useful substitute.

If professional valuations were to be obtained only for a small proportion of large fires, it is likely that many loss distributions could be specified accurately enough for many practical purposes.

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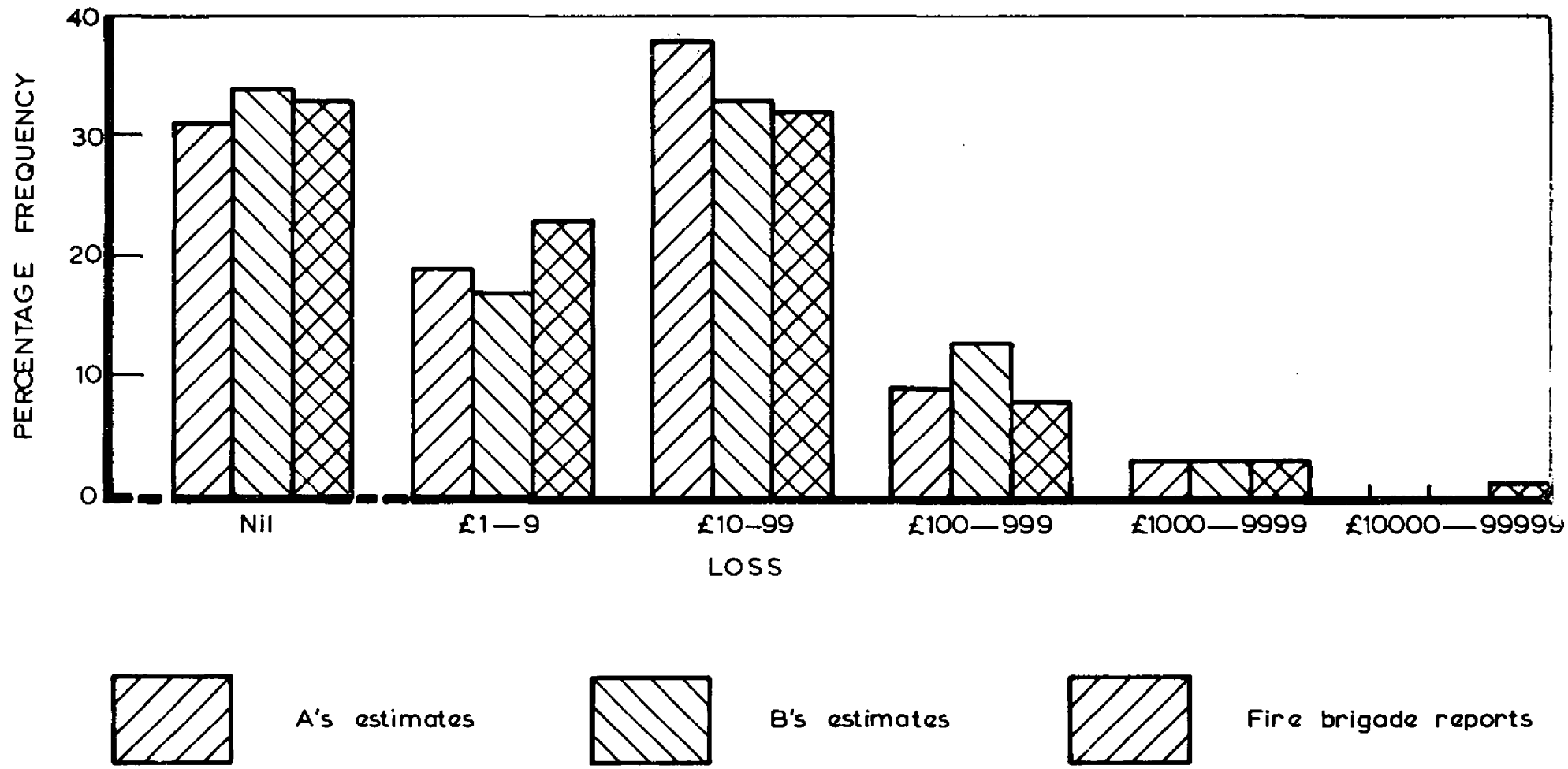


FIG. 1. COMPARISON OF ESTIMATED LOSS DISTRIBUTIONS

