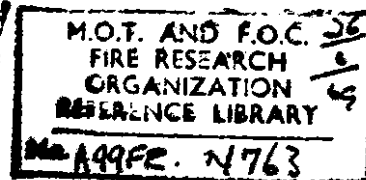


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# **Fire Research Note**

## **No. 763**

**PRELIMINARY ANALYSIS OF LARGE FIRES  
DURING 1968**

by

**G. RAMACHANDRAN and PATRICIA KIRSOP**

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PRELIMINARY ANALYSIS OF LARGE FIRES  
DURING 1968

by

G. Ramachandran and Patricia Kirsop

SUMMARY

This note contains a preliminary analysis of large fires during 1968. These are fires which cost £10 000 or more in direct damage. There were 1005 such fires during 1968 resulting in a total loss of £61.6 million. Of these 38 were in outdoor hazards some of which spread to buildings. The average loss per large fire, in static money terms decreased during the seven year period 1962 to 1968 although the total loss in static terms and the average loss at current values both increased.

KEY WORDS: Large, Fires, loss, Fire statistics.

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INTRODUCTION

During 1968 there were 1005 large fires in the United Kingdom each costing £10 000 or more. The direct loss in all these fires amounted to £61.6 million out of a total of £100 million in all fires during that year. The statistics on large fires provided in this note have been compiled from reports on these fires furnished by local authority fire brigades.

Data on financial losses provided by the British Insurance Association were received from the Fire Protection Association. Tables 1 to 10 with suffix A and table 11 relate to fires in buildings and those with suffix B to 38 fires in outdoor hazards. The outdoor fires include those which started outside but spread to buildings.

During the seven year period 1962 to 1968 the average losses per large fire were £52,600, £55,000, £57,800, £57,600, £54,300, £61,100 and £61,300 respectively. During the same period there was an increase of about 25 per cent in the index of retail prices. It thus appears that the average loss per large fire, in static money terms decreased during the period under consideration. The increasing trend in total loss in large fires is mainly due to the increasing frequency of these fires. Importance of measures aimed at early detection and suppression needs no further emphasis.

Table 1A

Frequency distribution of large fires in building

Size group (£ thousands)	Number of fires	Total damage (£ thousands)
10 to 15	291	3,558
16 to 20	150	2,756
21 to 25	93	2,197
26 to 30	67	1,907
31 to 35	46	1,537
36 to 40	41	1,585
41 to 50	55	2,537
51 to 75	61	3,825
76 to 100	35	3,119
101 to 150	41	4,933
151 to 200	30	5,335
201 to 250	16	3,668
251 to 500	30	10,847
501 to 1000	7	5,044
Over 1000	4	6,710
Total	967	59,558

Table 1B

Frequency distribution of large fires in outdoor hazards

Size group (£ thousands)	Number of fires	Total damage (£ thousands)
10 to 20	16	219
21 to 50	12	393
51 to 100	4	327
101 to 150	4	512
151 to 200	1	200
201 to 500	1	355
Total	38	2,006

Table 2A

## Breakdown of large fires in buildings according to occupancy

Occupancy	No. of large fires	Total cost (£ thousands)	Per cent of total cost of all large fires	Average cost per large fire (£ thousands)
<u>Manufacturing</u>				
1. Agriculture, forestry, fishing	28	460	0.77	16.5
2. Mining and quarrying	-	-	-	-
3. Food, drink and tobacco	34	3,631	6.10	106.8
4. Chemicals and allied industries	53	3,149	5.29	59.4
5. Metal manufacture	31	2,437	4.09	78.6
6. Engineering and electrical goods	56	6,621	11.12	118.2
7. Engineering and metal works unspecified	20	682	1.15	34.1
8. Shipbuilding and marine engineering	3	272	0.46	90.7
9. Vehicles	22	1,073	1.81	48.8
10. Metal goods, not elsewhere specified	15	1,229	2.06	81.9
11. Textiles	61	5,904	9.91	96.8
12. Leather, leather goods and fur	8	499	0.84	62.4
13. Clothing and footwear	21	1,680	2.83	80.0
14. Bricks, pottery, glass, cement	17	1,098	1.84	64.6
15. Timber, furniture	41	1,767	2.96	43.1
16. Paper, printing and publishing	42	3,290	5.52	78.3
17. Other manufacturing industries	49	7,123	11.95	145.4
18. Construction	14	269	0.45	19.2
Total	515	41,184	69.15	79.8
<u>Utilities</u>				
19. Gas, water and electricity	8	490	0.82	61.3
20. Transport and communication	53	3,328	5.59	62.8
Total	61	3,818	6.41	62.6
<u>Commercial</u>				
21. Distributive trades - Wholesale	45	1,920	3.22	42.7
22. " " - Retail	87	4,070	6.83	46.8
23. " " - Other dealers	35	1,146	1.93	32.7
Total	167	7,136	11.98	42.1

Cont'd.

Table 2A (Cont'd)

Breakdown of large fires in buildings according to occupancy

Occupancy	No. of large fires	Total cost (£ thousands)	Per cent of total cost of all large fires	Average cost per large fire (£ thousands)
<u>Others</u>				
24. Insurance, banking, finance	4	45	0.08	11.3
25. Professional and scientific services	58	1,811	3.04	31.2
26. Cinema, theatres, radio, sport	23	1,125	1.89	48.9
27. Catering, hotels	60	1,848	3.10	30.8
28. Miscellaneous services	30	993	1.67	33.1
29. Public administration and defence	11	798	1.34	72.5
30. Private residential houses	32	591	0.99	18.5
31. Private flats and maisonnettes	3	175	0.29	58.3
32. Unoccupied premises, private sheds, garages	2	24	0.04	12.0
33. Multiple tenure, mixed occupancies	-	-	-	-
34. Not specified	1	10	0.02	10.0
Total	224	7,420	12.46	33.1
Grand total	967	59,558	100.00	61.6

Table 2B

Breakdown of large fires in outdoor hazards according to occupancy

Occupancy	No. of large fires	Total cost (£ thousands)	Per cent of total cost of large fires in outdoor hazards	Average cost per large fire (£ thousands)
Outdoor storage	6	228	11.4	38.0
Refuse and rubbish tips, dumps and heaps	1	20	1.0	20.0
Gas works plant and mains	4	208	10.4	52.0
Transformer, electrical sub station generator	1	100	5.0	100.0
Tar boiler	3	54	2.7	18.0
Chemical plants	6	392	19.5	65.3
Other outdoor plants	3	120	6.0	40.0
Machinery and electrical goods	2	61	3.0	30.5
Textile industry	2	40	2.0	20.0
Other manufacturing industries	2	26	1.3	13.0
Manufacturers of paper and board	1	355	17.7	355.0
Transport, storage	1	140	7.0	140.0
Distributive trades	4	217	10.8	54.3
Others	2	45	2.2	22.5
Total	38	2,006	100.0	52.8



Table 3A

Source of ignition of large fires in buildings

Source of ignition	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Naked light	7	234	33.4
Malicious or intentional ignition	92	5,018	54.5
Children with fire	15	529	35.3
Mechanical heat or sparks	22	995	45.2
Rubbish burning	1	15	15.0
Smoking materials	85	3,812	44.8
Electric appliances and installations			
Cooking appliances	4	62	15.5
Space heating	14	565	40.4
Wire and cable	50	1,917	38.3
Others	52	2,946	56.7
Total	120	5,490	45.8
Gas appliances and installations	12	995	82.7
Oil appliances	10	179	17.9
Acetylene appliances and installations	8	2,735	341.9
Other miscellaneous known causes	101	5,691	56.3
Total (known causes)	473	25,693	54.3
Unknown causes	494	33,865	68.5
Total (all causes)	967	59,558	61.6

Table 3B

Source of ignition of large fires in outdoor hazards

Source of ignition	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Matches - children with, paper, sticks etc.	4	73	18.3
Mechanical heat and sparks	1	85	85.0
Natural occurrences	1	30	30.0
Rubbish burning	7	695	99.3
Smoking materials	3	122	40.7
Spontaneous combustion	2	95	47.5
Chimney, stove pipe, flue	1	101	101.0
Wire and cable	1	35	35.0
Supply apparatus	1	100	100.0
Other and Unknown	1	15	15.0
Engine (including tractor, aircraft)	1	35	35.0
Oxyacetylene cutting and welding apparatus	2	42	21.0
Tar boiler	1	10	10.0
Others	2	215	107.5
Unknown	10	353	35.3
Total	38	2,006	52.8

Table 4A

Department where large fires in buildings started

Where fire started	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Chimneys flues etc.	2	31	15.5
Animal sheds, barns	21	336	16.0
Car parks	1	50	50.0
Garages, garden sheds	6	88	14.7
Ash pits, refuse rooms, dust extractors	7	516	73.7
Contractors, workmans huts	3	72	24.0
Boiler rooms, engine rooms	12	709	59.1
Drying, heat treatments sections	43	2,295	53.4
Factory sections (not specified)	133	12,870	96.8
Loading bays, packing departments	29	4,026	138.8
Paint spraying, paint shops, paint store, etc.	18	950	52.8
Workshops	44	1,744	39.6
Power houses, generators, switchgear, sub stations	3	135	45.0
Telephone exchange	1	15	15.0
Transformer	2	37	18.5
Store, stockrooms, warehouse	249	18,274	73.4
Laboratory, research department	10	929	92.9
Laundry, washhouse	8	210	26.3
Projection suite, stage, back stage	4	121	30.3
Assembly rooms, dance halls, auditorium, cinema	10	571	57.1
Lecture room, classroom	7	198	28.3
Cloakroom, laboratory, wash room, bathroom	4	413	103.3
Hall, corridor, stairs, landing	12	478	39.8
Office	43	1,631	37.9
Place of worship	8	126	15.8
Rest room, writing room	4	50	12.5
Shop	17	1,001	58.9
Showroom, display hall	5	192	38.4
External structures, porch etc.	4	166	41.5
Bar	9	444	49.3
Bedroom, dormitory	13	284	21.8
Kitchen	12	370	30.8
Living room, lounge, dining room (domestic) recreation room	7	219	31.3
Mess hut, canteen, restaurant	11	644	58.5
Pavilion	3	186	62.0
Roof space	21	788	37.5
Neon lighting	1	10	10.0
Not applicable, (e.g. building under construction, derelict, demolition, unoccupied.	25	1,382	55.2
Unknown or not stated	155	6,997	45.2
<b>Total</b>	<b>967</b>	<b>59,558</b>	<b>61.6</b>

Table 4B

Department where large fires in outdoor hazards started

Where fire started	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Railway rolling stock	1	35	35.0
Field or open land	2	45	22.5
Yard unspecified	2	150	75.0
Factory Yard	6	480	80.0
Outdoor plant	13	721	55.5
Outdoor storage - other than fuel	5	208	41.6
Others	5	304	60.8
Unknown	4	63	15.8
<b>Total</b>	<b>38</b>	<b>2006</b>	<b>52.8</b>

Table 5A

Extent of spread of large fires in buildings

Extent of spread	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Confined to exterior components and common service spaces	1	75	75.0
Confined to room of origin	55	1,260	22.9
Confined to floor of origin if fire spread from room of origin	69	3,918	56.8
Confined to building of origin - single compartment	6	106	17.7
Confined to building of origin Multi compartment, single storey	195	9,163	47.0
Confined to building of origin Multi compartment, multi storey	416	27,035	65.0
Extent unknown	58	2,369	40.8
Extended to adjoining buildings	73	4,462	61.1
Extended to separate buildings	37	6,446	174.2
Extended to other hazards	24	1,645	68.5
Extended to adjoining and separate buildings	2	102	51.0
Extended to adjoining buildings and other hazards	5	224	44.8
Extended to separate buildings and other hazards	12	1,639	136.6
Extended to adjoining and separate buildings and other hazards	7	938	134.0
Extended from a building	6	108	18.0
Extended from a building and then extended to other buildings and hazards	1	68	68.0
Total	967	59,558	61.6

Table 5B

Extent of spread of large fires in outdoor hazards

Extent of spread	No. of fires	Total cost (£ thousands)	Average cost per (£ thousands)
Confined to hazard of origin	16	814	50.9
Extended to building	13	849	65.3
Extended to other hazards	4	151	37.8
Extended to buildings and other hazards	3	170	56.7
Unknown	2	22	11.0
Total	38	2,006	52.8

Table 6A

Number of jets used to extinguish large fires in buildings

Number of jets	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
0	46	1,119	24.3
1	58	1,488	25.7
2	120	5,516	46.0
3	133	3,563	26.8
4	123	3,859	31.4
5	94	3,046	32.4
6	84	3,288	39.1
7	55	4,685	85.2
8	55	3,490	63.5
9	30	3,937	131.2
10	23	3,459	150.4
11	16	2,553	159.6
12	18	3,122	173.4
13	8	931	116.4
14	10	2,438	243.8
15-19	21	5,632	268.2
20-24	9	1,735	192.8
25-29	2	674	337.0
30 and above	5	2,679	535.8
Not stated	57	2,344	41.1
Total	967	59,558	61.6

Table 6B

Number of jets used to extinguish large fires in outdoor hazards

Number of jets	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
0	2	115	57.5
1	1	31	31.0
2	5	198	39.6
3	6	247	41.2
4	2	27	13.5
5	3	177	59.0
6	5	89	17.8
7	1	13	13.0
8	1	28	28
9	1	355	355
10	5	352	70.4
11	1	11	11.0
12	1	131	131.0
13	-	-	-
14	-	-	-
15-19	2	210	105.0
20-24	-	-	-
25-29	-	-	-
30 and above	-	-	-
Not stated	2	22	11.0
Total	38	2,006	52.8



Table 7A

Year of construction of buildings involved in large fires

Period of construction	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Before 1800	24	555	23.1
1800-1849	28	1,130	40.3
1850-1899	185	8,290	44.9
19th Century (unspecified)	37	2,259	61.0
1900-1914	192	7,952	41.4
1915-1918	5	439	87.8
1919-1939	156	11,755	75.4
1940-1945	17	1,253	73.8
1946-1950	48	3,141	65.4
1951-1955	19	1,615	85.0
1956-1960	63	8,192	130.0
1961-1965	54	5,581	103.4
1966-1968	47	3,233	68.8
20th Century (unspecified)	7	304	43.4
Not known	85	3,859	45.4
Total	967	59,558	61.6

Table 7B

Year of construction of buildings involved  
in large fires that started outside

Period of construction	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Before 1800	-	-	-
1800 - 1849	-	-	-
1850 - 1899	3	63	21.0
19th Century (unspecified)	2	166	83.0
1900 - 1914	1	25	25.0
1915 - 1918	-	-	-
1919 - 1939	1	140	140.0
1940 - 1945	2	45	22.5
1946 - 1950	1	28	28.0
1951 - 1955	1	60	60.0
1956 - 1960	-	-	-
1961 - 1965	5	495	99.0
1966 - 1968	3	245	81.7
20th Century (unspecified)	1	14	14.0
Not known, not applicable	18	725	40.3
<b>Total</b>	<b>38</b>	<b>2,006</b>	<b>52.8</b>

Table 8A

Distribution of large fires in buildings according to time of day

Time of call	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
00.01 - 01.00	50	4,388	87.8
01.01 - 02.00	48	1,885	39.3
02.01 - 03.00	49	2,670	54.5
03.01 - 04.00	44	2,269	51.6
04.01 - 05.00	40	3,196	79.9
05.01 - 06.00	26	1,742	67.0
06.01 - 07.00	25	1,825	73.0
07.01 - 08.00	25	1,860	78.4
08.01 - 09.00	16	391	24.4
09.01 - 10.00	20	840	42.0
10.01 - 11.00	23	2,144	93.2
11.01 - 12.00	30	1,400	46.7
12.01 - 13.00	30	2,017	67.2
13.01 - 14.00	40	1,937	48.4
14.01 - 15.00	42	2,411	57.4
15.01 - 16.00	42	3,193	75.1
16.01 - 17.00	45	2,060	45.8
17.01 - 18.00	41	3,526	86.0
18.01 - 19.00	40	1,553	38.8
19.01 - 20.00	35	2,001	57.2
20.01 - 21.00	46	1,756	38.2
21.01 - 22.00	55	2,821	51.3
22.01 - 23.00	54	3,420	63.3
23.01 - 00.00	43	5,744	132.9
Unknown or not stated	58	2,509	43.3
<b>Total</b>	<b>967</b>	<b>59,558</b>	<b>61.6</b>

Table 8B

Distribution of large fires in outdoor  
hazards according to time of day

Time of call	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
00.01 - 01.00	-	-	-
01.01 - 02.00	1	85	85.0
02.01 - 03.00	-	-	-
03.01 - 04.00	142	146	73.0
04.01 - 05.00	2	40	20.0
05.01 - 06.00	1	15	15.0
06.01 - 07.00	-	-	-
07.01 - 08.00	1	100	100.0
08.01 - 09.00	2	50	25.0
09.01 - 10.00	-	-	-
10.01 - 11.00	52	51	25.5
11.01 - 12.00	6	224	37.3
12.01 - 13.00	1	82	82.0
13.01 - 14.00	1	28	28.0
14.01 - 15.00	552	558	277.5
15.01 - 16.00	53	55	18.3
16.01 - 17.00	12	12	12.0
17.01 - 18.00	99	99	30.0
18.01 - 19.00	-	-	-
19.01 - 20.00	2	83	41.5
20.01 - 21.00	-	-	-
21.01 - 22.00	3	185	61.7
22.01 - 23.00	2	153	76.5
23.01 - 00.00	1	30	30.0
Unknown or not stated	2	22	11.0
Total	2,056	2,098	52.8

Table 9A

Monthwise distribution of large fires in buildings

Month	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
January	93	5,777	62.1
February	71	5,381	75.8
March	102	6,568	64.4
April	98	6,015	60.4
May	93	6,457	69.4
June	72	6,796	94.4
July	62	4,763	76.8
August	85	4,897	57.6
September	63	2,720	43.2
October	73	3,843	54.0
November	84	3,145	37.4
December	71	3,196	45.6
Total	967	59,558	61.6

Table 9B

Monthwise distribution of large fires in outdoor hazards

Month	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
January	1	10	10.0
February	2	375	187.5
March	6	287	47.8
April	5	207	41.4
May	7	152	21.7
June	4	111	27.8
July	5	305	61.0
August	1	82	82.0
September	-	-	-
October	1	140	140.0
November	6	337	56.2
December	-	-	-
Total	38	2,006	52.8

Table 10A

Distribution of large fires in buildings according to day of week

Day	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Sunday	115	8,043	69.9
Monday	143	7,617	53.3
Tuesday	157	10,975	69.9
Wednesday	132	8,761	66.4
Thursday	140	9,060	64.7
Friday	157	9,443	60.1
Saturday	123	5,659	46.0
Total	967	59,558	61.6

Table 10B

Distribution of large fires in outdoor hazards according to day of week

Day	No. of fires	Total cost (£ thousands)	Average cost per fire (£ thousands)
Sunday	2	35	17.5
Monday	2	47	23.5
Tuesday	5	335	67.0
Wednesday	8	252	31.5
Thursday	11	478	43.5
Friday	4	484	121.0
Saturday	6	375	62.5
Total	38	2,006	52.8

Table 11

## Distribution of losses in manufacturing industries and distributive trades

	Cost range (£ thousands)													
	10-20		21-50		51-100		101-250		251-500		Over 500		All large fires	
	No. of fires	Total cost (£ thousands)	No. of fires	Total cost (£ thousands)	No. of fires	Total cost (£ thousands)	No. of fires	Total cost (£ thousands)	No. of fires	Total cost (£ thousands)	No. of fires	Total cost (£ thousands)	No. of fires	Total cost (£ thousands)
1. Food, drink, tobacco	15	204	9	303	4	322	3	523	1	300	2	1,979	34	3,631
2. Chemicals and allied industries	22	322	19	663	5	354	5	950	1	310	1	550	53	3,149
3. Metal manufacture	12	181	11	366	3	256	2	284	2	800	1	550	31	2,437
4. Engineering and electrical goods	23	325	13	366	3	205	12	1,687	2	790	3	3,248	56	6,621
5. Engineering and metal works unspecified	13	201	5	174	1	55	-	-	1	252	-	-	20	682
6. Shipbuilding and marine engineering	1	10	1	25	-	-	1	237	-	-	-	-	3	272
7. Vehicles	8	111	8	283	3	220	3	459	-	-	-	-	22	1,073
8. Metal goods, not elsewhere specified	5	73	5	160	1	59	3	562	1	375	-	-	15	1,229
9. Textiles	17	212	21	677	5	363	11	1,947	7	2,705	-	-	61	5,904
10. Leather, leather goods and fur	2	26	3	76	1	85	2	312	-	-	-	-	8	499
11. Clothing and footwear	3	47	7	220	5	417	5	711	1	285	-	-	21	1,680
12. Bricks, pottery, glass, cement	7	96	4	119	4	255	-	-	2	628	-	-	17	1,098
13. Timber, furniture	16	214	17	582	4	213	3	483	1	275	-	-	41	1,767
14. Paper, printing and publishing	18	287	10	327	5	352	5	851	4	1,473	-	-	42	3,290
15. Other manufacturing industries	17	266	20	678	4	281	3	516	3	1,102	2	4,250	49	7,123
16. Distributive trade - wholesale	23	341	14	438	3	175	4	592	1	374	-	-	45	1,920
17. Distributive trade - retail	50	701	24	739	6	431	4	672	1	350	2	1,177	87	4,070
18. Distributive trade - other dealers	18	276	13	441	3	236	1	193	-	-	-	-	35	1,146

F.R. Note 763.



