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VEHICLE FIRES ON MOTORWAYS IN 1969

by

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SUMMARY

It is estimated that during 1969 there were 570 vehicle fires on 1002 km of motorways in Great Britain, a frequency of 0.57 fires per km of motorway compared with a maximal estimate of 0.35 vehicle fires per km on other roads. A further 26 fires were reported on motorways in hazards other than vehicles (e.g. mobile outdoor plant).

There were 182 fires in cars and 282 in lorries, 110 of the latter being attributed to mechanical heat and sparks. The major causes of fires were engine (152), mechanical heat or sparks (148), wire and cable (100) and exhaust pipe (74). Only 24 fires were attributed to crashes.

Two hundred and thirty eight of the vehicle fires (42 per cent) were tackled before the arrival of the fire brigade and 144 of these required no further brigade assistance. Of those not tackled before the brigade arrived, 20 were self-extinguished; these were very small fires in which the item ignited (e.g. electric wiring) burnt itself out before the brigade arrived.

Of the 94 incidents which needed brigade assistance after unsuccessful fire fighting attempts only 6 required the use of jets by the brigade, a smaller proportion than with the fires that were not tackled before arrival of the fire brigade.

Four people died from fire injuries in motorway fires. A total of 185 persons were killed in motorway accidents due to crash or impact injuries.

KEY WORDS: Casualties, crash, extinguishing, fire statistics, vehicle, motorway.

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Introduction

The last detailed analysis of motorways fires was based on reports of incidents in 1964¹. At that time there were only 470 km (292 miles) of roads² classified as motorways in the United Kingdom and the analysis was confined to fires on the M.1 motorway. This analysis was undertaken to see whether the fire situation had altered by 1969 when there were 1002 km (622 miles)² of motorways. Except for the section on casualties, the analysis is based on information from a 1-in-2 sample of reports of fires attended by local authority fire brigades, the frequencies observed in the sample being doubled.

Vehicles involved

The distribution of the types of vehicle involved in fires on motorways is compared with that of vehicles on all roads in Table 1.

Table 1. Types of vehicles involved

	Vehicle fires on motorways		All fires in road vehicles	
	No.	Per cent	No.	Per cent
TOTAL	570*	100	16256	100
Cars	182	32	7952	49
Lorries	282	49	3676	23
Vans, shooting brakes, landrovers	56	10	2246	14
Tankers	22	4	282	2
Buses, coaches	24	4	560	3
Other vehicles	4	1	1540	9

* There were also 26 fires on motorways which did not involve vehicles. These fires were mainly in mobile outdoor plant.

1/ Mainly motor cycles.

The most obvious difference is the relatively bad record of lorries on motorways. There is also a difference between the fire frequencies per unit length of road for the two types of road. The rate for motorways was 0.57 fires/ of road. That for other roads, while less certain, was undoubtedly lower. Assuming the incidence to be uniform on all non-motorway roads the rate would be 0.057 fires/km. If, however, the majority of the fires were on trunk/principal roads the rate would be about 0.35 fires/km. The general accident rates on motorways when distances travelled are taken into account compare favourably with other roads³.

Times of occurrence

The times of calls to vehicle fires on motorways and to all vehicle fires are related to types of vehicle in Table 2.

Table 2. Time of call in relation to type of vehicle involved

	Vehicle fires on motorways		Motorways						All roads	
			Type of vehicle						All fires in road vehicles	
			Cars	Lorries	Vans	Tankers	Buses	Other vehicles		
No.	Per cent							No.	Per cent	
TOTAL	570	100	182	282	56	22	24	4	16256	100
0000-0159	38	7	16	14	2	2	4	-	976	6
0200-0359	20	4	4	10	6	-	-	-	474	3
0400-0559	28	5	2	18	6	2	-	-	278	2
0600-0759	44	8	8	24	8	4	-	-	738	4
0800-0959	54	9	16	38	-	-	-	-	1366	8
1000-1159	76	13	20	38	6	2	8	2	1648	10
1200-1359	40	7	12	18	6	2	2	-	1726	11
1400-1559	56	10	18	24	10	4	-	-	1756	11
1600-1759	66	11	22	32	4	4	2	2	1926	12
1800-1959	76	13	32	32	6	-	6	-	1946	12
2000-2159	44	8	22	18	2	2	-	-	1762	11
2200-2359	28	5	10	16	-	-	2	-	1648	10
Unknown, not called	-	-	-	-	-	-	-	-	12	-

The distributions of times of call are fairly similar, but there are marked divergences in that around 0400 - 0800 there appear to be more motorway fires than expected and in the periods 1200 - 1400 and 2000 - 2400 the reverse is true. This can largely be accounted for by the time distribution of lorry fires on the motorways. During the first mentioned period it is possible that, because there is less traffic on the motorways, lorries (which often start their journeys early) will travel faster and hence be more liable to develop tyre friction. This is known to be a frequent cause of lorry fires (see Table 3). The second period coincides approximately with the mid-day lunch break, during which time there will be fewer lorries moving on motorways, and the third period is one in which accident statistics show a high frequency of private vehicle accidents in towns.

Sources of ignition of fire

The sources of ignition of fire are related to the types of vehicle involved in Table 3.

Table 3. Sources of ignition in relation to type of vehicle

Source of ignition	TOTAL	Type of vehicle					
		Cars	Lorries	Vans	Tankers	Buses	Other vehicles
TOTAL	570	182	282	56	22	24	4
Engine	152	68	52	16	-	14	2
Mechanical heat or sparks	148	12	110*	6	16	4	-
Wire and cable	100	42	32	24	-	2	-
Exhaust pipe	74	26	36	4	4	4	-
Other vehicle faults	8	8	-	-	-	-	-
Crash or collision	24	14	4	6	-	-	-
Smoking materials	18	2	14	-	-	-	2
Spontaneous combustion	12	-	12	-	-	-	-
Unknown	34	10	22	-	2	-	-

*Mainly tyre friction incidents

The table shows that, as at the time of the 1964 analysis¹, the most serious problem is that of lorry fires attributed to mechanical heat and sparks which accounted for 110 of the 282 lorry fires on motorways (39 per cent). Faults in the engine and electrical wiring were the most common causes of car fires. The number of fires attributed to crashes was only 24, (only 4 per cent of the total number of motorway fires).

The fires due to vehicle faults have been analysed further. Of the reports of 152 fires in the engine, 52 made reference to a faulty engine, 30 to leakage of flammable liquids (i.e. oil or petrol) and 6 to combustible items being placed too close. Of the 148 reports of fires attributed to mechanical heat or sparks, 28 mentioned specific faults (e.g. flat tyre). All but two of the wire and cable fires resulted from faulty equipment or wiring. Of the 74 fires attributed to exhaust pipes, leakage of oil or petrol was known to account for 20.

Methods of extinction of fires

Motorways pass through rural areas and interchange points are sometimes over 16 km (10 miles) apart. Emergency telephones are provided at 1.6 km (1 mile) intervals. It might therefore be considered advisable to carry some form of extinguisher. However, over half of the fires were not tackled before the arrival of the fire brigade (see Table 4).

Table 4. Attack on fires before and after arrival of fire brigade

Type of attack	Type of vehicle					
	Car	Lorry	Van	Tankers	Buses	Other vehicles
Small fire self-extinguished before arrival of fire brigade	4	12	2	2	-	-
Others not tackled before arrival of fire brigade	86	186	22	4	12	2
Tackled, but not extinguished before arrival of fire brigade	30	38	6	14	6	-
Tackled successfully before arrival of fire brigade	62	46	26	2	6	2
Percentage tackled before arrival of fire brigade	51	30	57	73	50	50

It is noticeable that the proportion of lorry fires tackled before the arrival of the fire brigade was lower than for other vehicles. This conclusion is similar to that arrived at for vehicle fires on all roads⁴. It is probable that lorry fires, particularly those that originate at the rear of the lorries, are not discovered so early as other vehicle fires.

The methods of attack used before and after the arrival of the brigade (where applicable) are shown in Tables 5 and 6 respectively.

Table 5. Method of attack used before the arrival of fire brigade (where applicable)

Method of attack before the arrival of fire brigade	Fires extinguished	Fires not extinguished
TOTAL	144	94
Removal	8	2
Beating, smothering, sand, etc	30	6
Water (small quantities)	6	-
C.T.C. extinguisher	42	26
Other vapourising liquid	4	2
Dry powder	12	28
Other types of extinguisher	4	12
More than one type of extinguisher	6	14
Other methods	32	4

Table 6. Method of extinction used by fire brigade

Brigade method of extinction	Fires tackled before arrival of brigade	Fires not tackled before arrival of brigade
TOTAL	238	332
Sand, earth, etc	-	2
Extinguishers	6	20
Hose reel jets (water in tank only)	82	224
Jets from pumps and hydrants	4	44
Jets and hose reels	2	22
No brigade action	144	20*

*Minor fires, self extinguished before arrival of brigade

Table 5 shows that 144 of the 238 fires tackled before the arrival of the fire brigade were successfully extinguished. C.T.C. and dry powder extinguishers appear to have been the most frequent methods of attack. C.T.C. extinguishers were successful on 62 per cent of the occasions on which they were used, as compared with a 30 per cent success record with dry powder extinguishers. Other vapourizing liquid extinguishers would be expected to be as effective as C.T.C., but were recorded on only a few occasions.

Table 6 shows that only six (6 per cent) of the 94 fires which were unsuccessfully tackled before the arrival of the brigade required the use of jets (other than hose reels) by the brigade. This compares favourably with the 66 (20 per cent) of incidents requiring the use of jets for extinction amongst the fires not tackled before the arrival of the fire brigade.

Casualties

Four people died through fire or smoke injuries in three fires on motorways in 1969.

The casualty figures for all motorway accidents during the year were 185 fatal casualties, 984 serious injuries and 1848 slight injuries. These figures compare favourably with other roads when related to the distances travelled³.

Discussion and conclusions

There were 570 vehicles on motorways in 1970 of which 182 (32 per cent) were cars and 282 (49 per cent) were lorries. Lorries have a comparatively bad fire record on motorways where they are able to travel faster than on ordinary roads. This tends to increase the risk of tyre or frictional heat and about 40 per cent of lorry fires on motorways are attributed to this cause. Lorry fires are most frequent between 0800 and 1200.

The most frequent source of ignition of vehicle fires on motorways is the engine (27 per cent of incidents). Mechanical heat and sparks account for 26 per cent of the fires, wire and cable incidents for 18 per cent and 13 per cent are attributed to heat from exhaust pipes. Only an estimated 24 fires in 1969 were attributed to crashes or collisions.

Because of the rural nature of motorways and the distances from fire stations to the fires it may be especially worthwhile for vehicles travelling on motorways to carry some form of fire extinguisher. Almost 30 per cent of the fires are successfully extinguished before the arrival of the fire brigade, or are very small fires which do not require fire fighting either before or after the brigade arrives. Even those tackled without complete success are extinguished more easily by the brigade than those that are not tackled at all.

During 1969 there were four deaths due to fire injuries in motorway fires while a total of 185 fatal casualties was recorded in all motorway accidents. The fire rate per kilometre of road is higher for motorways than other roads, although the general accident rate on motorways is lower when account is taken of distances travelled.

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