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# Fire Research Note No. 654

BEHAVIOUR WHEN FACED WITH FAT PAN FIRES

by

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

## BEHAVIOUR WHEN FACED WITH FAT PAN FIRES

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### INTRODUCTION

Many domestic fires result from pans containing fat or oil, used for frying, being allowed to overheat.

Fire brigades are called to some of these fires, and record for each incident what action was taken to control the fire before their arrival.

A sample of reports has been analysed to see what actions are commonly taken, and what their consequences are.

### INCIDENTS EXAMINED

Reports on all fires attended by Surrey Fire Brigade were examined for one year, 1964. At this time the fire authority area had not been reduced by the London local government reorganisation.

All fires involving the overheating of pans containing fat (or oil) were examined in detail, and exactly 100 were found that could be regarded as "typical" domestic incidents in which a pan had been allowed to overheat on a gas or electric ring; the subsequent fire had been discovered by the occupier, who had then called the fire brigade.

Incidents where the pan had been in an oven, the fire had been discovered by somebody other than the occupier, the fire brigade had not been notified until after the fire had been extinguished, or that had occurred in chip shops, etc, were among a number not included in the analysis.

### RESULTS

#### Consequences of fires

Fire brigade estimates of the direct financial loss in each fire varied from nil to £300. The total was £4278.

Some also caused personal injuries. Of the 100 fires examined, 6 resulted in injuries, requiring hospital treatment to 8 persons.

For purposes of comparison with other damage, an average cost of £200 per injury has been assumed (roughly the cost of about 6 weeks in-patient hospital treatment).

The actual injuries suffered by the 8 persons are given in Appendix 1.

Consequential losses, (and the costs of attendance by the fire brigade) have not been included in this analysis.

#### Method of fire fighting employed

A summary of the methods employed to deal with the fires, and their consequences, is given in Table 1.

Table 1.

#### Fat pan fires, Surrey 1964 Success of "First aid" fire fighting by method employed

Method employed	Number of fires	Number out on F.B. arrival	Percentage out on F.B. arrival	Average loss exc. injuries	Average loss inc. injuries
Water from garden hose	3	0	(0)	(£117)	(£117)
Smothering with sand, earth etc.	5	0	(0)	(£ 66)	(£106)
Water from buckets, bowls etc.	26	19	73	£ 57	£ 65
Extinguisher (any type)	7	3	(43)	(£ 50)	(£ 50)
Switch off, leave alone etc.	34	12	35	£ 37	£ 37
Smothering with lid	2	2	(100)	(£ 32)	(£ 32)
Smothering with towel, cloth, etc.	8	8	(100)	(£ 10)	(£ 10)
Removal outside	15	14	93	£ 23	£103
<b>TOTAL</b>	<b>100</b>	<b>58</b>	<b>58</b>	<b>£ 43</b>	<b>£ 59</b>

#### Day and time of discovery

Table 2 summarises the day of the week on which the fires occurred, and compares measures of the success of "first aid" fire fighting. The midday and evening periods are considered separately for Mondays to Fridays, and the more

exact time of discovery on these days is illustrated in Figure 1. The association with the usual times for midday and evening meals is obvious.

Table 2

Fat pan fires, Surrey 1964  
Success of "first aid" fire fighting  
by time of discovery

<u>Time of discovery</u>	<u>Number of fires</u>	<u>Number out on F.B. arrival</u>	<u>Percentage out on F.B. arrival</u>	<u>Average loss exc. injuries</u>	<u>Average loss inc. injuries</u>
<b>MONDAYS TO FRIDAYS</b>					
1100 to 1659	25	13	52%	£31	£63
1700 to 2259	50	28	56%	£53	£69
Other times	2	2	..	..	..
	<u>77</u>	<u>43</u>	56%	£46	£64
<b>SATURDAYS</b>					
	14	10	71%	£41	£41
<b>SUNDAYS</b>					
	<u>9</u>	<u>6</u>	(67%)	(£18)	(£40)
	<u>100</u>	<u>58</u>	58%	£43	£59

DISCUSSION

Fire fighting methods

The action normally recommended for dealing with a fat pan fire is smothering with a lid or a damp cloth. On the few occasions that such methods are adopted, they seem to be successful in extinguishing the fire before the arrival of the fire brigade, with a minimum of damage.

If a fire is fairly large when discovered, it may be difficult, or appear difficult, to turn off the source of heat. Provided no other action is attempted before the arrival of the fire brigade, the damage may still not be very large. In fact, the fire may burn itself out.

When water is applied to a fire, this tends to increase the damage, presumably by spreading burning fat about the room. Application of earth or sand, or reliance on whatever fire extinguisher happens to be available, do not seem particularly effective methods.

The action that is often taken, and stands out as completely inappropriate, is removal of the pan out of doors. Although the fire is usually prevented from doing much damage to the room, 15 fires dealt with in this way resulted in 6 serious injuries.

#### Assistance available

At the midday period on Mondays to Fridays, in a typical household, the housewife may be the only person present when a fire is discovered. Any members of the family who go out to work are more likely to be within call during the evening and at weekends.

If more than one person is in the house, it might be expected that one would call the fire brigade while another dealt with the fire.

Table 2 illustrates that fires occurring in the evenings and at weekends seem slightly less serious than those occurring around midday on Mondays to Fridays.

#### Economic background

While the estimated direct financial loss in the fires examined came to £4278, this is only part of the total cost of fires of this type.

Not only are there the serious personal injuries recorded for these fires, and the consequential losses, but also the cost of several miscellaneous fires attended by the fire brigade and not included in the analysis.

Undoubtedly, there are also many more fires completely unknown to the fire brigade, in which the loss may be appreciable.

A working estimate for the total loss in the county due to fires of this type would be £30 000. The population to which this must be related is about 1 500 000, giving a cost of the order of £0.02 per person per annum (with a very wide margin of uncertainty).

This could be reduced by two basic approaches; a successful educational campaign, or introduction of some physical device to prevent fat pans overheating. Neither would be justifiable beyond the point at which it cost more than the fires it prevented happening.

Suppose some educational approach, such as a publicity campaign, seemed likely to reduce losses of this kind by 50%. Making use of the estimate above, it would be worth spending anything up to £0.01 per person per year, or the unexpectedly high figure of £15 000 p.a. in this county.

The alternative would be some form of thermostat to be fitted on every gas and electric ring. If this was not entirely foolproof, but again was successful in reducing the total loss by 50%, a calculation can be made to indicate what its maximum cost should be.

Assuming 4 persons per household (i.e. per cooking appliance), and that the thermostatic device had a reliable life of 10 years, the maximum acceptable additional cost per cooker would be £0.4.

#### CONCLUSIONS

The most effective methods of dealing with fat pan fires are the recommended ones of turning off the source of heat and smothering with a damp cloth. Application of water tends to increase the damage, and removal of the pan out of doors tends to increase very greatly the risk of personal injury.

There is some evidence that fires are less serious when there are more people in the house.

Fat pan fires cost something of the order of £0.02 per person per year, but the figure cannot be estimated at all accurately.

It would be worth spending several thousand pounds a year on local educational campaigns, if they could be shown to bring about a significant improvement in behaviour. The alternative would be for a physical means of preventing overheating, such as a pan-sensing thermostat, to be fitted to cookers. This would seem to be justified if the additional cost was less than about ten shillings per cooker.



APPENDIX 1

Injuries suffered

The following six fires were extinguished before the arrival of the fire brigade, but eight persons required hospital treatment.

Method of fire fighting	Injuries
1. Removal to open air	(a) Severe shock (b) Burns to head and arms
2. Removal to open air	(a) Burns to one hand (b) Burns to buttock and leg
3. Removal to open air	Burns to both hands
4. Removal to open air	Burns to both hands
5. Smothering with sand	Burns to both feet
6. Water from bucket	Burns to one hand

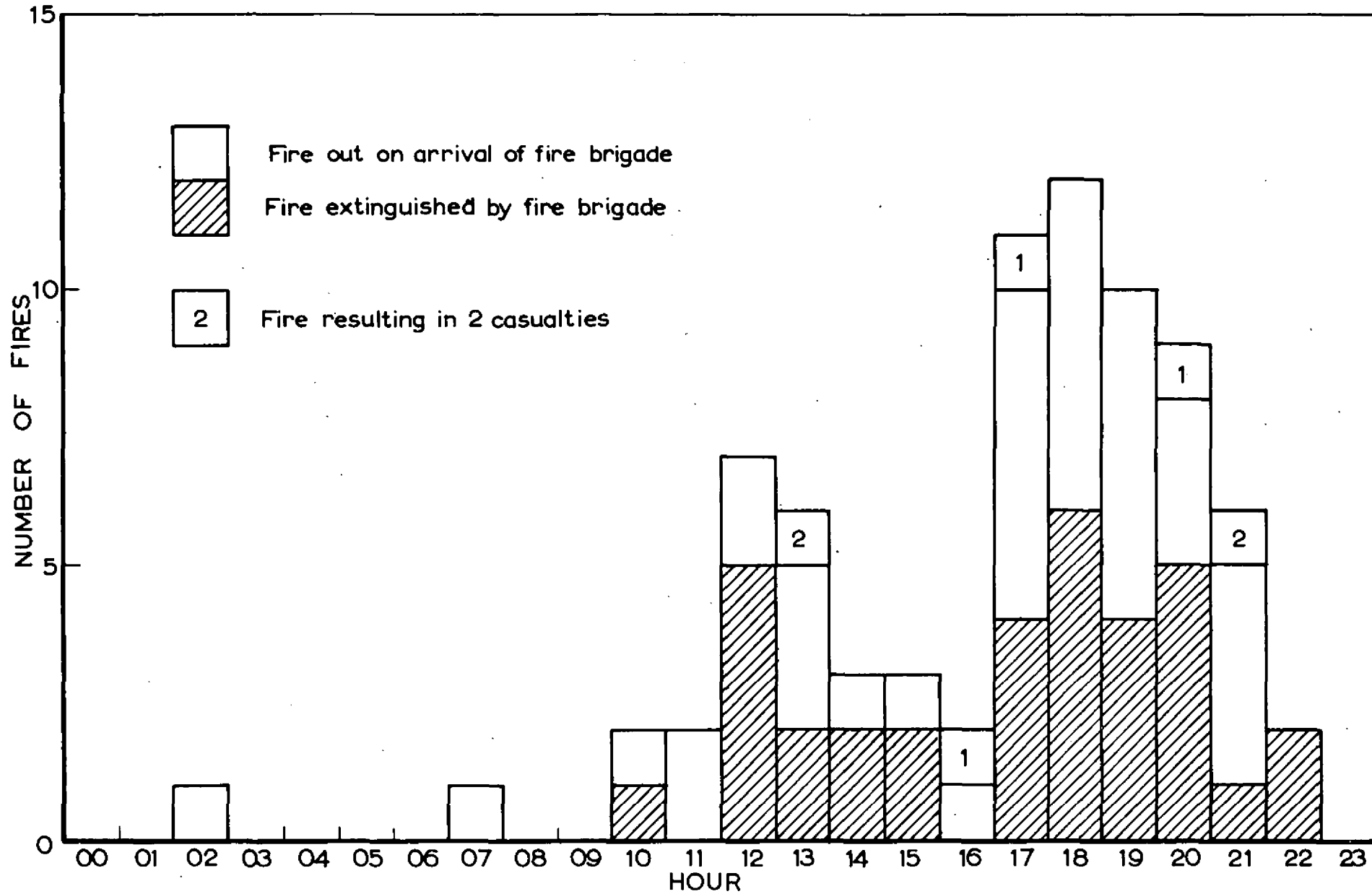


FIG. 1. TIME OF DISCOVERY OF 77 FAT PAN FIRES (MONDAYS TO FRIDAYS) SURREY 1964

