

CONFIDENTIAL

F.R.Note No.31/1952
F.1005/11/116
September, 1952

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH AND FIRE OFFICES' COMMITTEE
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FIRES INVOLVING FLAMMABLE LIQUIDS AND OTHER DANGEROUS SUBSTANCES

An analysis of reports of fires attended by the N.F.S.
and Fire Brigades in the United Kingdom during 1948
by
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At the request of the Fire Service Department and E. Division of the Home Office, an analysis has been made of reports of fires involving certain dangerous substances, attended by the N.F.S. and Fire Brigades in the United Kingdom during 1948. The analysis is divided into two parts, the first of which summarises information on fires involving substances listed in the Petroleum (Inflammable Liquids and Other Dangerous Substances) Order 1947, (Statutory Rules and Orders No.1443 of 1947). The second part draws attention to certain fires involving substances not listed in the Order.

PART I. Fires involving substances listed in S.R.O.1443 of 1947

The primary division in the first part of the analysis is between fires occurring in industrial premises and fires occurring in other premises. Within each of these divisions there is a further subdivision into fires in which the substance involved was the source of ignition, fires in which the substance was the material first ignited, and fires in which the substance aided combustion but was neither the source of ignition nor the material first ignited.

Table I is a summary which relates the numbers of fires for various substances to the premises in which the fires took place.

Table II gives more detailed information on these fires and in addition shows the cause, the amount of damage and the number of casualties for each fire. There were no large fires and few fires where there was severe damage. One fire (No.15) in a testing laboratory, part of the premises of a scientific instrument manufacturer, was caused by leakage of a mixture of nitric and sulphuric acid and completely destroyed the contents of the laboratory. Another, involving an ethylamine still in the research laboratories of a plant manufacturing heavy chemicals (No.22), caused severe damage to the still. In a third fire (No.28), in premises belonging to a belting manufacturer, severe damage was caused by explosion to slate and glass roofs of two sheds, 120 ft. by 15 ft. and 60 ft. by 30 ft. The substance involved was celluloid waste; the source of ignition of the fire is unknown. It is possible that decomposition of the celluloid yielded inflammable gas.

Information in detail on the casualties sustained in the incidents is shown in Table III. There were no fatal casualties.

A diagrammatic summary showing the numbers of fires and the numbers of casualties for each material is given on the left of Fig.I.

PART II. Certain fires involving substances not listed in S.R.O.1443 of 1947

The second part of the analysis is for the purpose of drawing attention to certain fires, some of frequent occurrence, involving substances which, while they do not come under the provisions of the Petroleum (Inflammable Liquids and other Dangerous Substances) Order 1947, might well be considered suitable for inclusion in some similar legislation. The substances are divided into two groups, those which are in themselves the source of ignition and those in which the substance was the material first ignited. Table IV

FIRES INVOLVING FLAMMABLE LIQUIDS AND OTHER DANGEROUS SUBSTANCES

An analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom during 1948

Part I. FIRES INVOLVING SUBSTANCES LISTED IN S.R.O. 1443 OF 1947

Table I. Numbers of fires in relation to the premises involved.

Substance	Where the fire occurred	Number of fires	Number of casualties
<u>A. INDUSTRIAL PREMISES</u>			
<u>1. The substance involved was the source of ignition</u>			
Acetaldehyde	Chemical works	1	-
Nitric and sulphuric acid	Instrument manufacturers	1	-
Phosphorus and phosphide smoke compound	Royal Ordnance Factory Ammunition storage	4) 8 4)	-) 1)
Sodium	Chemical and dye manufacturers Bell foundry	2) 3 1)	- -
Sodium chlorate and other chemicals	Metallurgists Insecticide manufacturers	1) 2 1)	-
Sodium and other nitrates	Manufacturers	4	-
		19	1
<u>2. The substance involved was the material first ignited</u>			
Acetone	Chemical works Leather cloth manufacturers	1 } 2 1 }	- 2
Di-ethylamine	Chemical manufacturers	1	-
Di-ethyl ether	Metal flux manufacturers Tool manufacturers	1 } 2 1 }	- 3

Methylated spirit	Manufacturers Upholsterer	2) 3 1)	- -
Celluloid (scrap)	Manufacturers Film recovery plant	2) 3 1)	8 -
		11	13
<u>3. The substance involved was neither the source of ignition nor the material first ignited</u>			
Sodium nitrate	Chemical works - sulphuric acid plant	1	-
Total number of fires in industrial premises		31	14
<u>B. PREMISES OTHER THAN INDUSTRIAL</u>			
<u>1. The substance involved was the source of ignition</u>			
Nitric acid	Railway truck	1	-
Sodium chlorate and other chemicals	Steamship	1	-
Sulphuric acid	R.A.O.C. depot	1	-
Phosphorus	Schools and colleges	3)	-)
	Private houses	2)	3)
	Roadway and pavement	2) 9	-)
	Railway truck	1)	-)
	Royal Marine training range	1)	-)
Potassium chlorate and other chemicals	Private house	1	2
Potassium nitrate and other chemicals	Private house	2	1
		15	6

<u>2. The substance involved was the material first ignited</u>			
Di-ethyl ether	Pharmaceutical chemists Hospitals Doctor's surgery	3 } 3 } 7 1 }	3 } 4 } 7 - }
Methylated spirit	Retail shops Private houses and flats Other premises	5 } 10 } 18 3 }	1 } 3 } 10 6 }
Celluloid (scrap)	Departmental store Pumping station	1 } 2 1 }	1 } - }
		27	18
<u>3. The substance involved was neither the source of ignition nor the material first ignited</u>			
Sodium chlorate	Offices	1	-
Potassium chlorate	Pharmaceutical chemist	1	-
Potassium nitrate	General stores Ship	1 } 2 1 }	- -
		4	-
Total number of fires in non-industrial premises		46	24
Total number of fires involving substances listed in S.R.O.1443 of 1947		77	38

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Part I. FIRES INVOLVING SUBSTANCES LISTED IN S.R.O. 1443 of 1947

Table II. Details of fires with causes, damage and casualties.

Serial No.	Substance	Where the fire occurred	The cause of the fire	Damage	Casualties
<u>A. INDUSTRIAL PREMISES</u>					
<u>1. The substance involved was the source of ignition</u>					
<u>a. The substance involved ignited itself</u>					
1	Acetaldehyde	Chemical works (experimental section)	Oxidation of acetaldehyde in aluminium canister burst the canister	Negligible damage	-
2	Phosphorus	Royal Ordnance Factory - shell dump	The metal cap of a shell was pierced: the exposed phosphorus ignited spontaneously	Negligible damage	-
3	"	" " "	The heat of the sun expanded cracked shell cases: leaking phosphorus ignited tarpaulins and duckboards	Slight damage to tarpaulins and area of grass	-
4	"	" " " filler tank	White phosphorus in filler tank overflowed and ignited	Negligible damage	-
5	"	" " " storeroom	Loose screw caps on drums of white phosphorus led to ignition of phosphorus	12-400 lb. drums of white phosphorus damaged	-
6	"	Ammunition dump - open air storage	Spontaneous ignition of faulty phosphorus grenades	6 boxes of grenades damaged	-
7	"	War office - ammunition storage in open-ended blister hut	Decomposition of bomb casing exposed phosphorus which ignited spontaneously	A few grenades damaged	-

8	Phosphorus	Royal Army Ordnance Corps - ammunition storage in corrugated iron shelter	Spontaneous ignition of phosphorus leaking from smoke grenades	Slight damage to 6 boxes of grenades	-
9	Phosphides	Royal Air Force - stack of 4 gallon drums of white phosphide smoke compound	Deterioration of metal drum from exposure to weather allowed the compound to leak and led to spontaneous ignition	Damage to stack of 90 drums	Male, 40 yrs. Non-fatal
10	Sodium	Chemical manufacturers - still room	A piece of sodium accidentally put into a 40 gallon copper still containing methylated ether gave rise to chemical action and ignition	Still damaged and contents destroyed: flooring, wooden doors and outside wooden balcony damaged by fire	-
11	"	Dye manufacturers - distilling pan	Minor explosion in distilling pan scattered solvents over the floor and walls. Particles of sodium reacted with water on the floor and ignited solvents.	Slight damage to pan: wooden door destroyed and walls scorched	-
12	"	Bell foundry - underground store	Rainwater ignited sodium	Slight damage	-
<u>b. The substances involved was ignited through external mechanical action</u>					
13	Sodium chlorate	Insecticide and fertiliser manufacturers	A workman probed a drum containing sodium chlorate with a steel bar and caused ignition	4 drums of sodium chlorate damaged	-
14	Sodium chlorate, iron oxide and aluminium powder	Metallurgists	Workman mixing iron oxide with aluminium powder and sodium chlorate ignited the mixture by percussion	Slight damage to chemicals	-
<u>c. The substance involved ignited other materials through chemical action</u>					
15	Nitric and sulphuric acid	Scientific instrument makers - testing laboratory	Leakage of mixed nitric and sulphuric acid from a carboy ignited timber flooring and straw packing	Contents of laboratory destroyed - flooring damaged	-

16	Sodium and other nitrates	Non-ferrous metal manufacturers	Nitrate splashed from bath and ignited accumulated dust	No damage	-
17	"	Sparking plug manufacturers	Sodium nitrate bath boiled over	Damage to wooden screening	-
18	"	Electric instrument manufacturers	Nitrates from salt bath ignited wooden floor boards	18 sq.ft. of wooden flooring damaged	-
19	"	Aluminium rolling mills	Nitrate salts splashed by withdrawal of aluminium sheet from salt bath set fire to waste matter.	No damage	-
<u>2. The substance involved was the material first ignited</u>					
20	Acetone	Leather cloth manufacturers - mixing dept.	Friction of a dry film against walls of a boiler ignited acetone and other chemical vapour issuing from boiler	Small quantity of acetone and film destroyed by fire. Ceiling damaged by heat	Male, 30 yrs. Non-fatal Male, 47 yrs. Non-fatal
21	"	Manufacturing chemists	Acetone vapour in electric drying oven ignited by sparks from defective electric circuit	Oven and timber partition damaged by fire and explosion	-
22	Di-ethylamine	Chemical manufacturers - di-ethylamine still	Escaping di-ethylamine (Mixture containing 60% di-ethylamine) was ignited by electric heaters	Still severely damaged	-
23	Di-ethyl ether	Metal flux manufacturers - laboratory	Ether vapour ignited by lighted gas jet during water-bath vapourisation in fume cupboard in works laboratory	Slight damage to fume and dust extractor	-
24	"	Tool manufacturers - works first aid station	A bottle of methylated ether was dropped and broken. The vapour was ignited by static electricity from silk underclothing and stockings of the person cleaning up the spilt fluid	Wooden cupboards severely damaged by fire	Female, 33 yrs. Non-fatal Female, 34 yrs. Non-fatal Female - Non-fatal

25	Methylated spirit	Engineers and brassfounders - enamelling shop	Employee knocked over 5-gallon mixture of methylated spirit and naphtha and the liquid was ignited by flame from a nearby gas enamelling oven	Machinery and enamelled goods damaged: employees clothes and other property destroyed	-
26	"	Silverware and cutlery manufacturers - office	A lighted spirit stove was being filled up and the spirit. overflowed and was ignited	Slight damage to office desk	-
27	"	Upholsterer and polisher - workshop shed	Methylated spirit fumes fired by lighted oil stove	Small workshop shed severely damaged	-
28	Celluloid (scrap)	Belting manufacturers - waste store	Waste celluloid ignited: the source of ignition is unknown	Slight damage to materials. Severe damage by explosion to shed roofs	Male, 57 yrs. Non-fatal Male, 28 yrs. Non-fatal Male, 23 yrs. Non-fatal Male, 24 yrs. Non-fatal Male, 23 yrs. Non-fatal
29	"	Brush manufacturers - saw mill	Spark from electric cutting machine ignited celluloid dust	Damage to building and contents	Male, 30 yrs. Non-fatal Male, 19 yrs. Non-fatal Male, 30 yrs. Non-fatal
30	"	Celluloid film recovery works - film washing shop	Celluloid sweepings in contact with caustic soda ignited by sun's rays	Slight damage to celluloid film washing machine	-
3. The substance involved was neither the source of ignition nor the material first ignited					
31	Sodium nitrate	Chemical works - sulphuric acid plant	Hessian sacks, heated by some form of sulphur burner entered into chemical reaction with nitrate of soda and unspecified foreign matter.	12 bags of sodium nitrate damaged	-

E. NON-INDUSTRIAL PREMISES.

1. The substance involved was the source of ignition

a. The substance ignited itself

32	Phosphorus	British Railways - box wagon	Faulty phosphorus smoke ammunition	Slight damage to wagon	-
33	"	Royal Marine training range	Phosphorus bombs used in training	3 acres of common land	-
34	"	Technical College - gas testing room	Students playing with pieces of phosphorus ignited overalls hanging nearby	Damage to overall	-
35	"	Girls High School - science class-room	Phosphorus fell on to the floor while being removed from defective container and ignited floor boarding	Slight damage to flooring	-
36	"	High School - chemical laboratory	Phosphorus ignited, presumably through exposure to the air	Superficial damage to interior of laboratory	-
37	"	Private house - bathroom	Spontaneous ignition of phosphorus due to evaporation of the fluid in the phosphorus container	Slight damage to room and contents	-
38	"	Private house - 1st floor room	Boy experimenting with chemicals, spilled bottle containing phosphorus. The phosphorus ignited flooring	Slight damage to room and contents	Male 52 yrs. Non-fatal Female 47 yrs. Non-fatal Male 15 yrs. Non-fatal
39 and 40	"	Local authority - roadway and pavement	Unspecified substance containing phosphorus ignited by oxidation	No damage to roadway	-

41	Potassium nitrate, charcoal, sodium chlorate and sulphur	Private house - second floor	Spontaneous ignition of a mixture of the chemicals mentioned ignited bedding after explosion	Slight damage to bedding	-
<u>b. The substance involved was ignited because of external mechanical action</u>					
42	Potassium chlorate, aluminium sulphate and unspecified catalyst	Private house - ground floor	An explosion took place while the occupier was mixing the chemicals mentioned	Window frames blown out	Male, 46 yrs. Non-fatal Male, 9 yrs. Non-fatal
43	Potassium nitrate, charcoal and barium chlorate	Private house - first floor	An explosion took place when a boy mixed the chemicals mentioned in a closed vessel	Damage by explosion to first floor	Male, 15 yrs. Non-fatal
44	Sodium chlorate and charcoal	Steamship - hold	Small quantity of sodium chlorate and charcoal, residue from cargo ignited by friction	Slight damage to hatch cover	-
<u>c. The substance involved ignited other materials through chemical action</u>					
45	Nitric acid	British Railways - truck	Acid in carboys splashed and ignited straw	No damage to truck	-
46	Sulphuric acid	P.A.O.C. depot	Acid leaking from containers set fire to wooden packing cases	12 packing cases destroyed	-
<u>2. The substance involved was the material first ignited</u>					
47	Di-ethyl ether	Pharmaceutical chemists	Heat from electric fire burst bottle of ether; vapour ignited by fire	Small quantity of stock damaged	-
48	"	" "	Ether vapour coming into contact with lighted gas ring	Slight damage to room and contents	Female, 35 yrs. Non-fatal
49	"	" "	Bottle of ether broken; gas radiator ignited ether vapour	Slight damage to wood and glass partition	Female, 19 yrs. Non-fatal Male 27 yrs. Non-fatal

50	Di-ethyl ether	Hospital dispensary	Bottle of ether dropped; ether splashed on to electric fire and flames ignited wooden cupboard	Slight damage to cupboard	Male, 53 yrs. Non-fatal Male, 13 yrs. Non-fatal
51	"	Hospital laboratory	Ether vapour ignited by flame of gas operated refrigerator	Damage to window and partition wall by explosion	Female 20 yrs. Non-fatal Female 28 yrs. Non-fatal
52	"	Hospital - medicine store	Bottle of ether dropped on floor and part of contents spilled. A spark was generated by grit under the door when the door was closed and this ignited ether fumes and set fire to wooden shelving	Quantity of chemicals and medicines destroyed or damaged - wooden shelving scorched	-
53	"	Doctor's surgery - drug store	Doctor's assistant was transferring ether from one bottle to another; the vapour was ignited by a gas jet	Quantity of medicines destroyed; floor and door frame scorched	-
54	Methylated spirit	Chemist's shop	Bottle of methylated spirit dropped on floor ignited by gas fire	5 per cent of contents destroyed	-
55	"	Retail furnishers	Methylated spirit vapour ignited by heat from adjacent coal fire	No damage	-
56	"	Furnishers - polishing shop	Methylated spirit vapour ignited by flame from gas fire	25 per cent of polishing shop damaged	-
57	"	Hardware store - oil store	Discarded match ignited spilt methylated spirit	20 per cent of contents of shop damaged	Male 15 yrs. Non-fatal
58	"	Fish fryer	Methylated spirit in bottle in close proximity to Primus heating stove vapourising and becoming ignited	Stove severely damaged	-

59	Methylated spirit	Foot clinic - over shop	Bottle of methylated spirit dropped near gas fire which ignited the spilt spirit	Slight damage to paintwork and contents	Female, 31 yrs. Non-fatal Female, 25 yrs. Non-fatal
60	"	Poultry dresser	Methylated spirit poured into a tray of burning spirit was ignited	No damage to structure or contents	Female, 36 yrs. Non-fatal Male 46 yrs. Non-fatal Male, 39 yrs. Non-fatal
61	"	Hotel - still room	Vapour from lighted methylated spirit stove ignited by spark from petrol lighter	Slight damage to stove	Male, 28 yrs. Non-fatal
62	"	Hut used as a house - kitchen	Heat from Primus stove exploded bottle of methylated spirit setting light to woodwork	30 sq.ft. of wall scorched. Clothing destroyed	-
63	"	Private house - kitchen	Heat from gas cooker caused explosion in bottle of methylated spirit	Some of contents of kitchen damaged by fire	-
64	"	" " ground floor	Methylated spirit accidentally splashed on to electric bowl fire by occupier while cleaning clothes with the spirit	Damage to contents of room	-
65	"	" " first floor	Child playing with small toy steam engine set fire to bottle of methylated spirit with matches	No damage	-
66	"	" " ground floor	Spirit overflowed and was ignited when lighted Primus stove was moved by occupier	Slight damage to room and contents	-
67	"	" " garden	Child ignited vapour from methylated spirit stove with lighted paper	No damage	Male, 10 yrs. Non-fatal

68	Methylated spirit	Private flat - kitchen	Vapour from methylated spirit being used for making floor polish ignited by flame from gas stove	Slight damage to curtains and table	Female, 21 yrs. Non-fatal
69	"	Private flat	Contents of a bottle of methylated spirit being used to light domestic stove became ignited	No damage	-
70	"	Residential flats - passage	Vapour from lighted methylated spirit stove ignited by spark from cigarette lighter	Stove slightly damaged by fire	Male, 39 yrs. Non-fatal
71	Methylated spirit and paraffin	Private house - kitchen	Primus stove catching fire while being primed set fire to wooden top to sink	Sink top and primus stove destroyed	-
72	Celluloid (scrap)	Departmental store - boiler room	Employee destroying celluloid tokens in boiler furnace. Flashback caused by down-draught ignited nearby box of similar tokens	No damage to structure	Male, 71 yrs. Non-fatal
73	"	Pumping station - in destructor	Heat from destructor fire ignited celluloid cuttings	Roof of building damaged	-
<u>3. The substance involved was neither the source of ignition nor the material first ignited</u>					
74	Sodium chlorate	Auctioneers - toilet	Workmen using blow lamp ignited a bag of sodium chlorate	Bag of sodium chlorate damaged by fire	-
75	Potassium chlorate (fertilizer)	Chemist - storeroom	Flame from gas still igniting bags of garden fertilizer	35 lbs. potassium chlorate destroyed	-
76	Potassium nitrate	General stores - corn store	Suspected cause of fire was a lighted cigarette end thrown down which ignited sacking impregnated with potassium nitrate	Slight damage to floor boards	-
77	"	Ship - hold	Dropped light ignited bags of potassium nitrate	Slight damage to 15 bags of potassium nitrate and 12 bags of potatoes	-

FIRES INVOLVING FLAMMABLE LIQUIDS AND OTHER DANGEROUS SUBSTANCES

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Part I. FIRES INVOLVING SUBSTANCES LISTED IN S.R.O. 1443 OF 1947

Table III. Nature of injuries received by casualties.

No. of fire	Casualty	Nature of injuries	Supposed cause of fire
<u>A. INDUSTRIAL PREMISES</u>			
9	Male - 40 yrs.	Both hands burned by phosphorus	Spontaneous ignition of white phosphide compound leaking from drum
20	Male - 30 yrs.	Burns on face, arms and chest	Friction of dry film dragging against walls of boiler ignited acetone and other chemical vapour issuing from boiler
	Male - 47 yrs.	Burns on face and hands, shock	
24	Female - 33 yrs.	2nd degree burns to both legs below knees and both wrists, 1st degree burns to face and singeing	Vapour from broken bottle of di-ethyl ether on floor ignited by static spark from silk under-clothing and stockings of person clearing up the exposed fluid
	Female - 34 yrs.	2nd degree burns to both forearms and 1st degree burns to face with singeing of hair etc. (detained in hospital)	
	Female -	Slight shock	
28	Male - 57 yrs.	Scalp lacerations	Waste celluloid ignited by unknown agent
	Male - 28 yrs.	Scalp lacerations	
	Male - 23 yrs.	Superficial burns to face	
	Male - 24 yrs.	Superficial burns to face	
	Male - 23 yrs.	Superficial burns to face	
29	Male - 30 yrs.	Slight burns to left hand	Spark from electric cutting machine ignited celluloid dust
	Male - 19 yrs.	Slight burns to right arm	
	Male - 30 yrs.	Slight burns to left arm	

B. NON-INDUSTRIAL PREMISES

38	Male - 52 yrs. Female - 47 yrs. Male - 15 yrs.	Slight burns to both hands (not detained) Burns to both hands and arms (not detained) Slight burns to both hands (not detained)	Boy experimenting with chemicals, spilled bottle containing phosphorus, which ignited flooring
42	Male - 46 yrs. Male - 9 yrs.	Burns and cuts to hands Burns and cuts to face	Explosion by mixing aluminium sulphate, potassium chlorate, and a catalyst while carrying out chemical experiments
43	Male - 15 yrs.	Burns and cuts to face and left arm (detained in hospital)	Boy mixing potassium nitrate, charcoal and barium chlorate in a closed vessel
48	Female - 35 yrs.	Slight burns on right hand and slight shock	Ether vapour coming into contact with lighted gas ring
49	Female - 19 yrs. Male - 27 yrs.	Multiple burns to face, hands and legs Slight burns to face	Gas radiator ignited ether gas, owing to bottle being broken
50	Male - 53 yrs. Male - 13 yrs.	Slight facial burns and singeing of hair Slight facial burns and singeing of hair	Employee dropping bottle of ether, which broke and the ether splashed on to electric fire, igniting wooden cupboard
51	Female - 20 yrs. Female - 28 yrs.	Burns on head, arms and legs Burns on arms	Ether vapour ignited by coming into contact with flame of gas operated refrigerator
57	Male - 15 yrs.	Hair scorched	Employee discarding lighted match, ignited spilt methylated spirit
59	Female - 31 yrs. Female - 25 yrs.	Slight burns to legs Shock	Winchester of methylated spirit dropped near gas fire which ignited the spirit

60	Female - 36 yrs. Male - 46 yrs. Male - 39 yrs.	2nd degree burns to arms, legs-(detained in hospital) 2nd degree burns to arms, legs- " 2nd degree burns to fingers of right hand	Methylated spirit ignited by being poured into a tray containing burning spirit
61	Male - 28 yrs.	Slight facial burns and shock	Vapour from lighted methylated spirit stove ignited by spark from petrol lighter
67	Male - 10 yrs.	Burns on head and face	Child ignited vapour from methylated spirit stove with lighted paper
68	Female - 21 yrs.	Both feet and legs and left hand burned	Vapour from methylated spirit being used for making floor polish ignited by flame from gas stove
70	Male - 39 yrs.	Slight burns to face and neck, shock	Spark from cigarette lighter ignited vapour from methylated spirit
72	Male - 71 yrs.	Slight burns to hands and forearms. Hair singed	Employee destroying celluloid tokens in boiler furnace. Flashback caused by downdraught ignited similar tokens in box nearby

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Part III. FIRES INVOLVING SUBSTANCES NOT LISTED IN S.R.O. 1443 OF 1947

Table IV. Numbers of fires in relation to the premises involved

Substance	Where the fire occurred	Number of fires	Number of casualties
<u>1. The substance involved was the source of ignition</u>			
Iron sulphide) Iron oxide)	Gas works Steel works - gas plant	23 1	- 2
		24	2
<u>2. The substance involved was the material first ignited</u>			
Lighter fuel	Hospital Hostel, Hotel, public house Retail shops Private houses and flats	1) 3) 7) 49 38)	1) 2) 2) 23 18)
Methyl chloride	Cinema Wholesale and retail food shops Private house	1) 5) 7 1)	-) 2) -)
Adhesive solution for rubber floor coverings	Offices Retail shops Private houses and flats	2) 3) 8 3)	-) 4) 8 4)
		64	33
Total number of fires involving substances not listed in S.R.O. 1443 of 1947		88	35

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Part II. FIRES INVOLVING SUBSTANCES NOT LISTED IN S.R.O.1443 of 1947

Table V. Details of fires with causes, damage and casualties

Chemical	Where fire occurred	Cause of fire	No. of Fires	Damage	Casualties
<u>1. The substance involved was the source of ignition</u>					
Iron sulphide) Iron oxide)	Gas works - purifying boxes	Spontaneous ignition	23	Damage to purifying boxes and contents	
	Steel works - gas producer plant	Mixture of gas and air ignited by spontaneous combustion of iron oxide and sulphur	1	Steel tank 20' x 10' severely damaged by explosion	Male 62 yrs. Non-fatal Male 60 yrs. Non-fatal
			24		
<u>2. The substance involved was the material first ignited</u>					
Adhesive solution (petroleum base) for rubber floor coverings	Savings Bank	Vapour of solution ignited by -	1) The ground floor and contents of the electrical goods shop were destroyed. There was slight damage to rooms and contents in the other fires	
	Builder's yard - office	" " " " office fire	1		
	Electrical goods shop	" " " " gas radiator	1		Female 27 yrs. FATAL Male 28 yrs. Non-fatal Male 33 yrs. Non-fatal
		" " " " electric fire	1		
	Dyers and cleaners	" " " " gas ring	1		Female 46 yrs. Non-fatal
	Private flat - bathroom	" " " " gas jet of water heater	1		Male 44 yrs. Non-fatal Female 45 yrs. Non-fatal

Adhesive solution (petroleum base) for rubber floor covering	Private house	Vapour of solution ignited by pilot jet of water heater	1		Male 21 yrs. Non-fatal Male 35 yrs. Non-fatal
	General shop	Spark from cigarette belonging to the workman who was laying the floor covering ignited vapour from the adhesive solution	1	No damage	-
	Private house - bedroom	Workmen heated tin of adhesive solution over an oil heater, the solution boiled over and set light to woodwork	1	Woodwork damaged. Walls and ceilings scorched	-
			8		
Methyl chloride	Cinema - office	Fumes ignited by gas fire whilst service engineer was attending to refrigerator pipes	1	Office and contents and refrigerator slightly damaged	-
	Private house	Service engineer dismantling refrigerator caused methyl chloride to leak, the fumes were ignited by the flame of a Tilley lamp	1	No damage	-
	Bakery - store house	Faulty connection on methyl chloride cylinder caused leakage of the contents which were ignited by a workman's blowlamp	1	Slight damage to room and contents	-
	Ice-cream manufacturers	Methyl chloride escaping from refrigerator plant; fumes ignited by - gas cooker flame	1	Slight damage to compressor	-
	Butcher	" " " gas ring	1	Slight damage to contents	-
	Butcher - refrigerator motor room	" " " naked flame	1	No damage	Male 29 yrs. Non-fatal

Methyl chloride	Confectioners - store	Methyl chloride escaping from refrigerator plant; fumes ignited by coal gas jet resulting in an explosion	1	150 sq.ft. of roof of single storey store destroyed. Walls badly damaged, machinery damaged, contents destroyed	Male 28 yrs. Non-fatal
Lighter fuel	Hospital ward	Cigarette lighter lighted in oxygen tent	1	Oxygen tent, wearing apparel bed linen	Male 54 yrs. FATAL
	Public house	Customer unscrewing top of bottle of lighter fuel, splashed contents on to domestic fire, the flame flashed back to the bottle which exploded and spread burning fuel to the walls of the room	1	Wallpaper and paintwork of room damaged	Male 37 yrs. Non-fatal
	Private house	Bottle of lighter fuel placed near domestic fire exploded	1	Room and contents damaged	Female 48 yrs. Non-fatal
		Child playing with cigarette lighter and bottle of lighter fuel	1	Settee, easy chair and soft furnishings damaged	Male 11 yrs. Non-fatal
	Private flat	Children playing with lighted candle ignited lighter fuel	1	Slight damage	-
	Drapers shop	Lighter fuel vapour ignited by coal fire	1	Slight damage to contents	Male 10 yrs. Non-fatal
	Private house or flat	Lighter fuel vapour ignited by - domestic fire	5	Damage to contents of rooms	Female 40 yrs. Non-fatal
		" " " cigarette lighter	4	Damage to contents of rooms	Female 30 yrs. Non-fatal Male 23 yrs. Non-fatal
		" " " cigarette end	1	do.	-
		" " " gas cooker jet	1	do.	-

Lighter fuel	Private house or flat	Lighter fuel used to light domestic fire flashing back to and igniting bottle of fuel	3	Damage to rooms and contents in 2 incidents; damage to contents only in remaining incident	Female 29 yrs. Non-fatal Male 21 yrs. Non-fatal
		Lighter fuel used to light domestic fire, vapour igniting and setting fire to contents of room	4	Contents damaged in 2 houses. Slight damage to structure as well as contents in 1 house and 1 flat	Female 22 yrs. Non-fatal Female 70 yrs. Non-fatal
	Hostel	Lighter fuel thrown on to domestic fire or boiler, the fuel or vapour igniting	1	Slight damage to door	-
	Hotel	" " " " "	1	No damage	Male 24 yrs. Non-fatal
	Private house	" " " " "	8	Damage to rooms and contents	Male 1 $\frac{1}{2}$ yrs. Non-fatal Male 32 yrs. Non-fatal Female 5 yrs. Non-fatal Female 14 $\frac{1}{2}$ yrs. Non-fatal Female 21 yrs. Non-fatal
	Newsagent, tobacconist	Lighter fuel bottle accidentally broken; fuel or vapour ignited by coal, fire, gas fire, electric fire, lighted spill	3	Severe damage to contents of ground floor rooms in one shop. Slight damage to contents of room of origin in other two shops	-
	Private house	" " "	6	Slight damage to rooms and contents	Male 17 yrs. Non-fatal
	Departmental store - tobacco kiosk	Lighter fuel spilt or bottle accidentally overturned; vapour ignited by domestic fire, electric fire, ideal boiler, lighted match, spark caused by dropped cigarette lighter	1	Slight damage to contents	Female 18 yrs. Non-fatal
	General shop		1	No damage by fire	-
	Private house		3	Slight damage to rooms and contents	Male 4 yrs. Non-fatal

Lighter fuel	Tobacconists kiosk	Lighter fuel capsules accidentally knocked off counter by employee, ignited by electric fire	1	Slight damage to kiosk and a quantity of lighter capsules, tobacco and cigarettes destroyed.	-
			49		

FIRES INVOLVING FLAMMABLE LIQUIDS AND OTHER DANGEROUS SUBSTANCES

An analysis of reports of fires attended by the N.F.S. and Fire Brigades in the United Kingdom during 1948

Part II. FIRES INVOLVING SUBSTANCES NOT LISTED IN S.R.O. 1443 of 1947

Table VI. Nature of injuries received by casualties

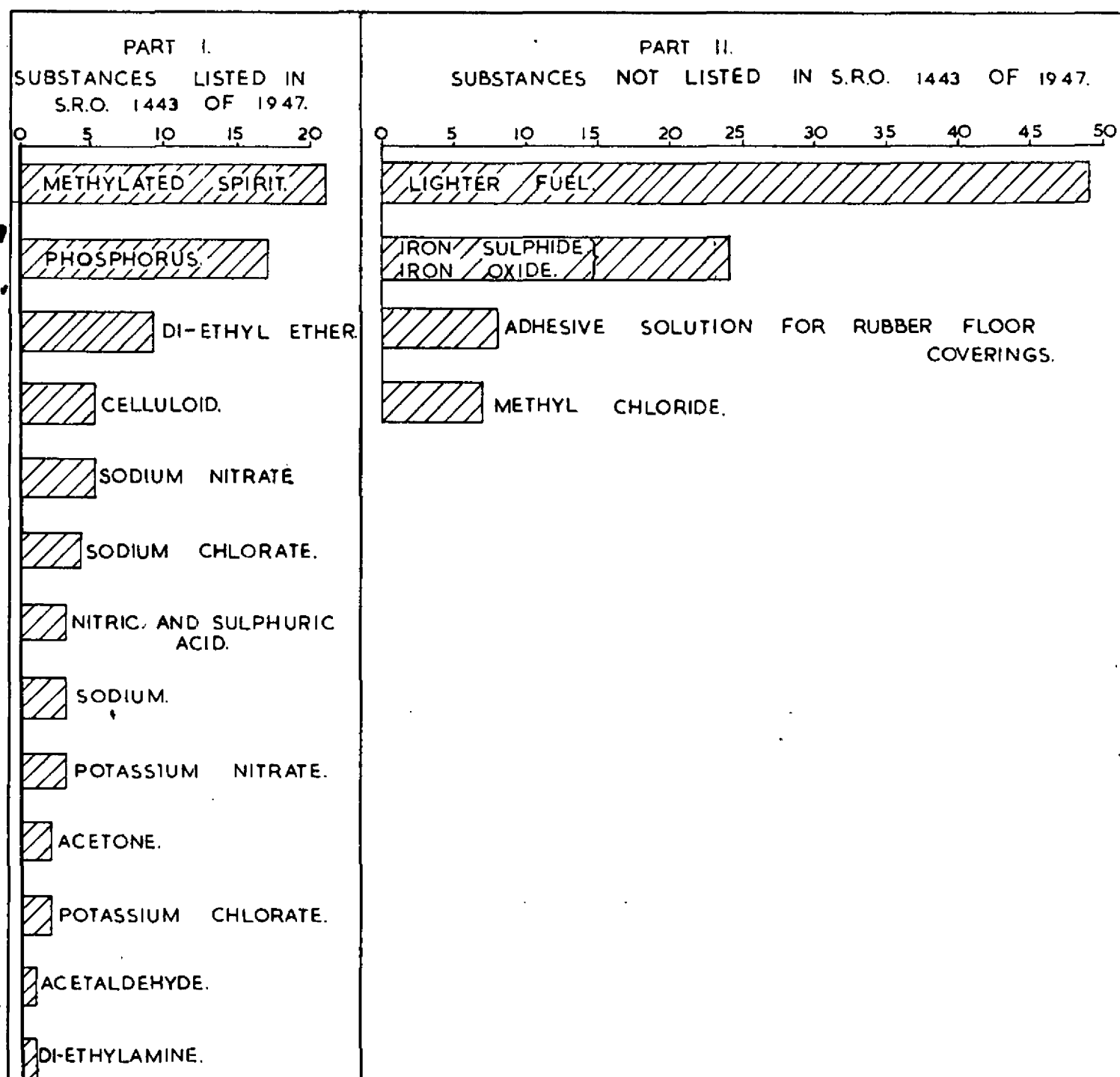
Where fire occurred	Chemical	Casualties	Nature of injuries	Supposed cause of fire
Steel works - gas producer plant	Iron oxide and sulphur	Male - 62 yrs. Male - 60 yrs.	Multiple injuries to head and body Slight injury to head	Mixture of gas and air in contact with iron oxide and sulphur ignited by chemical action
Electrical goods shop	Adhesive solution for rubber floor coverings	Male - 28 yrs. Female - 27 yrs. Male - 33 yrs.	Burns Burns - FATAL Burns	Vapour from solution for rubber floor coverings ignited by electric fire
Dyers and cleaners	"	Female - 46 yrs.	Burns on face, both hands, right leg and shock	Vapour from solution for rubber floor coverings coming into contact with lighted gas ring
Private flat - bathroom	"	Male - 44 yrs. Female - 45 yrs.	Burns on both arms and face Slight burns to both arms and face	Gas jet of a domestic water heater ignited vapour from solution for rubber floor coverings
Private house	"	Male - 21 yrs. Male - 35 yrs.	Burns on arms and face, shock Burns on arms and face, shock	Pilot jet of domestic water heater ignited vapour from solution for rubber floor coverings
Butcher's shop - refrigerator room	Methyl chloride	Male - 29 yrs.	Forehead slightly burned. Graze to left elbow	Methyl chloride escaped from refrigerating plant, ignited by flame

Confectioners shop - store	Methyl chloride	Male - 28 yrs.	Right hand slightly burned	Methyl chloride escaped from compressor, ignited by lighted coal gas burner, causing an explosion
Hospital ward	Lighter fuel	Male - 54 yrs.	Burns to hands and face. FATAL	Cigarette lighter ignited in an oxygen tent
Public house	" "	Male - 37 yrs.	Both hands severely burned (detained in hospital)	Lighter fuel splashed on to domestic fire, flashed back to bottle
Private house	" "	Female - 18 yrs.	Burns to right arm	Bottle of lighter fuel, placed near domestic coal fire, exploded
Private house	" "	Male - 11 yrs.	Slight burns to right leg and right forearm	Child playing with bottle of lighter fuel and cigarette lighter
Draper's shop	" "	Male - 10 yrs.	Severe burns to right hand, slight burns to left hand and leg	Vapour from lighter fuel bottle ignited by domestic fire
Private house or flat	" "	Female - 40 yrs.	Severe burn to right hand	Vapour of cigarette lighter fuel ignited by heat from domestic fire
"	" "	Male - 23 yrs. Male - 35 yrs.	Severe burns to right shoulder and arm Slight burns on right arm	Ignition of lighter fuel vapour by flame from fire, set fire to clothing on person
"	" "	Female - 30 yrs.	Burns on right hand	Vapour from lighter fuel in contact with domestic coal fire

Private house or flat	Lighter fuel	Female - 40 yrs.	Shock	Petrol lighter ignited vapour from spilt lighter fuel
"	" "	Female - 29 yrs.	Burns to right knee and shock	Lighter fuel used to light domestic coal fire flashed back to and ignited the bottle of fuel
"	" "	Male - 21 yrs.	Burns to right hand	Lighter fuel used to light domestic fire, the flame flashed back to the bottle, which was dropped, scattering fuel over floor and furniture
"	" "	Female - 22 yrs. Female - 70 yrs.	Burns to right arm Shock	Lighter fuel used to light fire; the vapour ignited and set fire to bed and blankets
Hotel	" "	Male - 24 yrs.	Mild burns to the chest, burns to one hand and face	Lighter fuel thrown on to domestic boiler; flashed back and ignited clothing on person
Private house	" "	Male - 1 $\frac{1}{2}$ yrs.	Slight burn to forehead. Received treatment at infirmary	Lighter fuel used to help domestic fire; fumes ignited
"	" "	Female - 14 $\frac{1}{2}$ yrs.	Burns to face and shock	Child throwing lighter fuel on to fire caused flashback, igniting tablecloth and clothing
"	" "	Male - 32 yrs. Female - 5 yrs.	Burns to right hand and left forearm Shock, and severe burns to calf of right leg	Lighter fuel, used to rekindle fire, ignited.
"	" "	Female - 21 yrs.	Slight burns to right hand and shock	Lighter fuel, used to rekindle coal fire, ignited

Private house	Lighter fuel	Male - 17 yrs.	Slight burn to left hand. Shock	Bottle of fuel dropped in hearth ignited by domestic coal fire
Departmental store - tobacco kiosk	" "	Female - 18 yrs.	Slight burn on right leg	Vapour from overturned bottle of lighter fuel ignited by electric fire
Private house	" "	Male - 4 yrs.	Burns to face and right leg	Lighted match ignited vapour from overturned bottle of lighter fuel

(A) THE NUMBER OF FIRES FOR EACH MATERIAL INVOLVED.



(B) THE NUMBER OF CASUALTIES IN FIRES INVOLVING EACH MATERIAL.

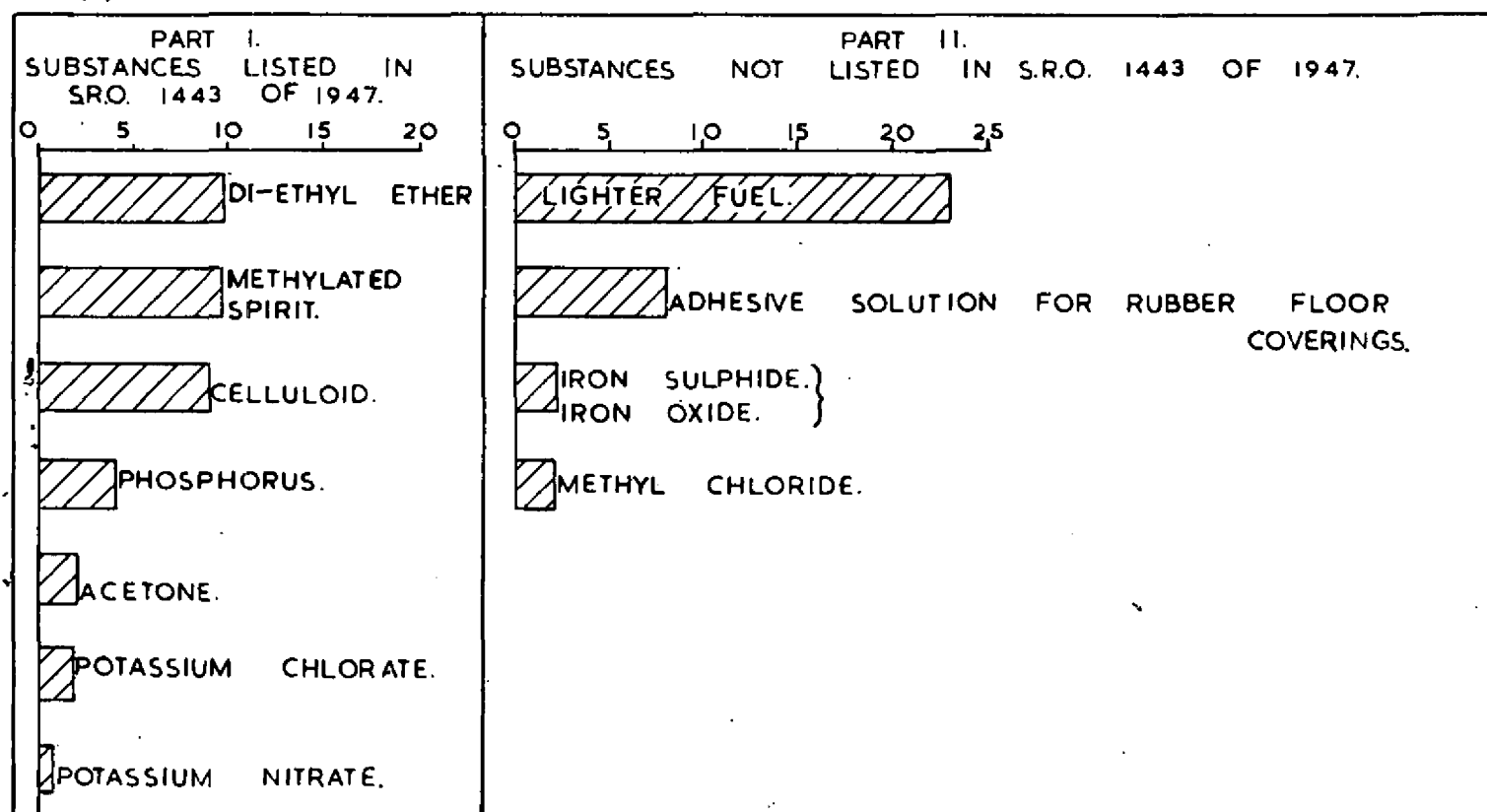


FIG. I. FIRES INVOLVING FLAMMABLE LIQUIDS AND OTHER DANGEROUS SUBSTANCES.