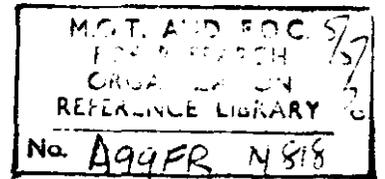


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Fire Research Note

No. 818

**COMPUTER PROGRAMS FOR PRODUCING THE
UNITED KINGDOM FIRE STATISTICS 1967 AND 1968**

by

S. E. CHANDLER

April, 1970.

FIRE RESEARCH STATION

F.R. Note No. 818.
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1967 and 1968**

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SUMMARY

This note records the computer programmes used for the production of annual tables of fire statistics in 1967 and 1968. It is intended primarily as an internal record but may be of interest to those compiling similar tables and those requiring material which may be retrievable from existing magnetic tapes.

KEY WORDS: Computer, Fire statistics.

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

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Introduction

The fire reports are classified into three main headings:-

- (i) Fires in buildings)
- (ii) Fires not in buildings) except those in (iii)
- (iii) Fires confined to grassland, railway embankments, stubble,
single trees, refuse, derelict buildings and buildings
under demolition.

Each fire report is coded onto a card, and the cards are then transferred to magnetic tape. The tables for the U.K. fire statistics are formed using the magnetic tape.

Consistency programs

There is a consistency program for each of the three groups of fires. These programs check the coding of all the items used in the annual tables, but not of any of the other items. Cards rejected by the programs have the brigade and call numbers printed out as well as the error diagnosis. The cards that are accepted have their data printed onto magnetic tape. It is assumed that the 'In building' information will be on one magnetic tape starting at block 1, and that the 'not in building' information will be on another tape starting on block 1, and that for the 'Grassland, etc' on another tape, again starting at block 1.

Magnetic tape store (i) 'In buildings' and 'not in building fires'

An array AA [1:25, 1:20] is used to transfer information to magnetic tape. That is there are 25 data cells per fire, and 20 fires are dealt with simultaneously. The standard "write binary" and "read binary" procedures are used for storage.

Fires which occurred in 1967 each have their information recorded as follows (corrections for 1968 are also shown).

(A) Magnetic tape - array AA [1:25, 1:20]

Data cell	Item
1	Brigade
2	Call Number
3	Month X 1000 + Day of Month X 10
4	Standard Industrial Classification (This was stored as a 4 digit number in 1967 - in 1968 it was stored as a 5 digit number to allow for high number of sub-divisions in S.I.C. 399 in the revised S.I.C. used in 1968. On the outdoor fires a 4 digit number was stored in both years).
5	Sub-group (Building regulations)
6	Sub-occupancy X 100 + Floor of origin (The fires which were overpunched X on col. 24 were converted to sub-occupancy + 100).
7	Method of call
8	Discovery-to-call
9	Time of call
10	Call-to-arrival X 100 + Arrival-to-control
11	Day of return X 10000 + Time of return
12	Risk category
13	Basic fuel
14	Appliance or installation
15	Material ignited first X 10 + further description (In 1968 this was modified to:- Material ignited first X 1000 + further description X 100 + further information)
16	Date of construction
17	No. of storeys X 10000 + Ground floor dimensions
18	Walling material X 10000 + Frame X 1000 + Roof covering X 10 + Floor construction
19	Extent of fire X 10 + Contributory factor
20	Sprinklers X 10000 + Fixed installations installed X 100 + Fixed installations operated.
21	Method of extinction before arrival of fire brigade. (In 1967 this was stored as 1st digit X 10000 + 2nd digit : in 1968 this was stored as 1st digit X 100 + 2nd digit).

Data cell	Item
22	Method of extinction by fire brigade (In 1967 this was stored as 1st digit X 10000 + 2nd digit: in 1968 this was stored as 1st digit X 100 + 2nd digit)
23	Specialist equipment
24	Rescues and escapes X 100 + non-fatal casualties X 10 + Fatal casualties
25	Major pumping appliances X 10000 + Other fire-fighting appliances X 100 + No. of men (In 1968 this was stored as:- Major pumping appliances X 10000 + Other fire-fighting appliances X 1000+ Special fire-fighting appliances X 100 + No. of men).

The record is terminated by a 500 on AA [1,H] where H is any number 1-20. The program prints up the incomplete block (G) and the number H followed by the statement "BLOCK AND NEXT FIRE".

When further cards are added, first the existing data is copied to a new tape and the incomplete block read down - the first card of a new batch overwrites the 500 of the previous run. This is achieved by the use of a data tape specifying G and H as defined above.

(B) Magnetic tape store - grassland, etc. (1967/8)

Data cell	Item
1	Brigade
2	Call Number
3	Day of Month
4	Month
5	Hazard (single digit)
6	Time of call
7	Fuel
8	Appliance or installation
9	Method of extinction before arrival of fire brigade
10	Method of extinction by fire brigade (The notes about items 21 and 22 on the previous list (A) apply to items 9 and 10).

The record is terminated as for the fires "in buildings" and "not in buildings", except that H lies between 1 and 50.

Programs producing the U.K. fire statistics

Ideally there should be one program for each set of fires, but limitations on computer space in the I.C.L. 1905E machine at Building Research Station makes this impossible. It is necessary to run four programs for the "in buildings" fires, two for the "not in buildings" fires and one for the "grass and heath, etc" fires. A full list of the programs is shown:-

<u>1967</u>	<u>1968</u>	<u>Description</u>
FC01	FC21	Consistency - in buildings
FC02	FC22	Consistency - not in buildings
FC03	FC23	Consistency - grass and heath, etc
FC04	FC24	In buildings - "one way" tables
FC5C	FC25	In buildings - "two way" tables except hazard by time and hazard by place of origin (in buildings)
FC5T	FC2T	Hazard by time and hazard by place of origin (in buildings)
FC06	FC26	Casualty tables and cause by place of origin in dwellings
FC07	FC27	Not in buildings - "one way" tables (including casualties)
FC08	FC28	Not in buildings - "two way" tables
FC09	FC29	Grass and heath, etc

These programs perform the following operations:

- (i) Space allocation: Matrices corresponding to the required tables are set up within the computer core store and zeroised.
- (ii) Transformation routines: The original code for each item represented in the tables is transformed to a code corresponding to the number of the row or column in the tables relating to the item. An array AT [1:19] is used for the purpose of storing the new code for each fire as it is read. The items in AT [1:19] that are used in the tables are shown below:-

AT [1]	Brigade
AT [2]	Call number (AA [2,H] used on "not in buildings" - used for "Month" on FC27
AT [3]	Hazard (2 way classification) - used for "Method of Call" on FC20 and "Month" on FC24

AT [4]	Hazard (1 way classification) - used for the special hazard classification in Hazard by Brigade table in FC20
AT [5]	Sub occupancy
AT [6]	Not used
AT [7]	Time of call
AT [8]	Source of ignition (2 way classification)
AT [9]	Source of ignition (1 way classification)
AT [10]	Material ignited first
AT [11]	Extent of fire (in buildings)
AT [12]	Sprinklers
AT [13]	Method of extinction - used for extent of fire (not in buildings) in FC28
AT [14]	Not used
AT [15]	Non-fatal casualties
AT [16]	Fatal casualties
AT [17]	Region (i.e. England and Wales, Scotland or Northern Ireland) - formed directly from AA [1,H]
AT [18]	Not used
AT [19]	Source of ignition - dwellings table

Similarly, an array AT [1:8] is used in the compilation of the tables for fires confined to grassland, heathland, etc. The items in AT [1:8] are:-

AT [1]	Brigade
AT [2]	Call number
AT [3]	Month
AT [4]	Hazard
AT [5]	Time of call
AT [6]	Source of ignition - check table (This table is produced with a more detailed breakdown for cause than AT [7] produces. This table is not published.)
AT [7]	Source of ignition
AT [8]	Method of extraction

The fire records are passed through section (ii) and then added as in (iii). Addition is completed when the 500 on AA [1,H] is read.

(iii) Addition routine

Each fire is added into the appropriate cells of each table by referring to the information on AT [1:19]. In all two-way tables, each fire is added to the appropriate marginal totals and the grand total. The reading of the 500 causes the program to stop reading the magnetic tape and start the printing operations.

(iv) Printing

Rows limited to the size of page are printed out in turn; some tables are therefore printed out in several parts. At this stage marginal totals should be compared in case the computer fails to accumulate properly during either stage (ii) or stage (iii). This is to ensure that there are no inconsistencies between tables. It is recommended that all tables are computed manually in at least one direction, either horizontally or vertically.

