NATIONAL BUREAU OF STANDARDS REPORT

10 864

DRAPERY AND CURTAIN CASE HISTORIES
DATA ELEMENT SUMMARY

U.S. DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

NATIONAL BUREAU OF STANDARDS

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Office of Standard Reference Data—Office of Technical Information and Publications—Library—Office of Public Information—Office of International Relations.

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[1] Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.
[2] Part of the Center for Radiation Research.
[3] Located at Boulder, Colorado 80302.

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U.S. DEPARTMENT OF COMMERCE

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ABSTRACT

A preliminary examination of 1,567 computerized case histories from the NBS Flammable Fabric Accident Case and Testing System has found 77 incidents in which curtains and draperies were involved in fires. This report is a summary of information relating to these 77 incidents, and includes the location of incidents, ignition sources, personal injury, fabrics involved and personal characteristics of victims. Fifteen people died from these fires and 32 others were injured. Curtains or draperies were the first fabric item to ignite in 28 of 55 curtain and drapery incidents in which the ignition source is known.

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1. INTRODUCTION

The Fire Technology Division of the National Bureau of Standards (NBS) is involved in a continuing investigation into the deaths, injuries and economic losses resulting from accidental burning of fabric products. This work is being carried out as a result of the responsibilities given to the Department of Commerce under the Flammable Fabrics Act (15 U.S.C. 1193 as amended, Sec. 3, Public Law 90-189, 81 Stat. 568). The Act authorizes the Secretary of Commerce to promulgate new and amended flammability standards or other regulations, including labeling, for a fabric, related material, or product, when such a standard is needed to protect the public against unreasonable risk of the occurrence of fire leading to death, personal injury, or significant property damage. Under the Act, each standard, regulation, or amendment promulgated must be based on findings that there is a need for protecting the public against unreasonable fire risks. The Act also requires that any standard, regulation or amendment promulgated be reasonable, technologically practicable, and appropriate, and that it be limited to such fabrics, related materials, or products which have been determined to present such unreasonable risks. Flammable fabrics items being examined at NBS include children's sleepwear, mattresses, upholstered furniture and other furnishings.

The present report is a preliminary summary of case history data related specifically to drapery and curtain fires. These data have been compiled from the Flammable Fabric Accident Case and Testing System (FFACTS) data bank at NBS. The data collected in this system are being used to evaluate the need for establishing standards and to aid in the

selection of test methods and the identification of hazardous fabric items. In this report, an initial attempt is made to identify the significant variables in fires involving curtains and draperies. The summary that follows indicates that draperies (curtains) were involved in 77 fire incidents. Curtains or draperies ignited in 74 of these incidents.

In the 77 drapery (curtain) incidents, 47 people were injured - 15 fatally. For 29 cases in which the information was available, property losses totaled $138,835. Ninety percent of these incidents occurred in private residences where ignition began predominantly in the kitchen, bedroom and living room.

2. DATA BASE

2.1 FFACTS

Data used in these studies have been gathered from public safety organizations, especially the Food and Drug Administration (FDA), and state and local fire departments. FDA investigators from 39 district offices in the United States compile reports on accidental fires involving fabric products, and where possible, they also obtain samples of any remains of these products. The reports and samples are forwarded to NBS where the information is evaluated for incorporation into a data bank. A system known as the **Flammable Fabric Accident Case and Testing System** (FFACTS) has been devised at NBS to systematically process and analyze the reported data. If the FDA reports meet the FFACTS System requirements of relevancy and adequacy, they are analyzed; and the composition, weight, construction and flammability of the fabric products involved are determined in the laboratory. The reported information is then reviewed in light of the laboratory test results, coded and entered into the FFACTS computerized data base. More than 200 different data elements can be coded for each incident.

While the incidents reported here are not statistically representative of all such incidents in the United States, they are random events investigated without preference and, consequently, are believed to be representative of fabric related fires. These incidents exhibit many common characteristics which provide a valuable insight into the nature of the hazard and establish the relative importance of the various factors and circumstances that are involved.

2.2 Drapery and Curtain Data

At the time of this report, the FFACTS data base contained 1567 fabric fire cases involving 3,488 fabric items. From these, 77 fires involving curtains and draperies were found involving a total of 82 curtains and draperies. None of the fabrics was identified as having been contaminated by flammable liquids. The 77 incidents directly involved 69 persons, 47 of whom were injured.

The following case history summary does not distinguish between draperies and curtains. While the case history reports mention 44 fabric items listed as draperies and 39 listed as curtains, there does not seem to be any firm distinction in the use of the two terms. The words are usually used interchangeably and when distinctions are made, they do not seem to be universal. Consideration was given to the possibility of artificially defining the distinction in terms of fabric weight, but this would limit the sample data to only 38 incidents from which samples were recovered and weighed; and therefore was rejected.

3. SUMMARY OF CASE HISTORY DATA

3.1 Location of Incidents

The 77 drapery (curtain) incidents used in this report occurred in 20 states and the District of Columbia. Table 1a shows that a large number of cases in the FFACTS system have come from California, Colorado, Massachusetts, Michigan and Iowa. Prior to late 1970, FDA's investigative efforts were limited to burn study teams in the latter four states where the emphasis was almost exclusively on garment fires; hence the comparatively small number of drapery (curtain) fires from these states. In late 1970,

FDA accelerated and expanded its investigations resulting in a large number of cases from California. Ninety percent of the incidents took place in a private residence (Table 1b). Specifically, one in three was initiated in a living room, one in three in a bedroom and one in six in a kitchen. However, in only about a third of the living room and bedroom incidents were the draperies (curtains) the first fabric item ignited compared to two-thirds of the incidents initiated in kitchens (Table 1c). While the involvement of curtains and draperies is heavily weighted towards the bedroom and living room, with fewer incidents in the kitchen, the number of draperies (curtains) which were the first fabric ignited was fairly evenly distributed between bedroom, kitchen and living room - 9 in the kitchen, 8 in the bedroom and 7 in the living room.

3.2 Occurrence of Incidents by Month and Time of Day

Table 2a gives a list of the 77 curtain and drapery incidents by the month of the year in which they occurred. The higher number of incidents during the latter part of the year is believed to reflect FDA's accelerated program to collect fabric fire cases near the end of 1970.

The time of day (Table 2b) of the 77 incidents is well spread out but appears to follow the density patterns of normal daily activity. Kitchen incidents are limited to the 6 am to 6 pm time periods when kitchens are more likely to be used. On the other hand, bedroom and living room incidents are liable to happen throughout the day - in daylight hours due, for example, to children playing with matches, at night due to smoldering cigarettes in upholstery and bedding, and at random times

due to faulty heaters, electrical short circuits, etc.

3.3 Personal Characteristics of Victims

The most highly represented age groups on these fires were the 27-45 and 66+ ranges (Table 3a). Of the 77 drapery (curtain) incidents, 64 directly involved a person or persons. Three cases involved two persons each and one case involved three persons, yielding a total of 69 involved persons in all. Three-fourths of the 35 incidents occurring in homes were in dwellings valued at less than $20,000 while over half of those involved who lived in rented units paid under $101 per month rent (Table 3b). Total annual household income was $4,000 or less in 25 percent of the incidents for which income figures are available and under $8,000 in nearly 60 percent of the incidents. For 33 incidents, no income was reported (Table 3c). Since income and living costs vary markedly in different regions of the United States, no real conclusions can be drawn from these figures.

3.4 Circumstances Prior to Incident

As can be seen from Tables 4a and 4b, most persons involved were not under the influence of intoxicants nor were they physically handicapped or disabled at the time of ignition. Table 5 shows the specific activities of individuals involved in the drapery (curtain) fires at the time of ignition. Note that two-thirds of those involved were alone when ignition occurred (Table 6).

3.5 Ignition Sources and Sequence

In 28 incidents, the drapery or curtain was the first fabric ignited. Ignition was due primarily to kitchen ranges, matches and cigarettes. Tables 7a and 7b list ignition sources and the order of drapery (curtain)

involvement in these fires.

3.6 Curtain/Drapery Fabrics Involved

Forty-three fabric samples of draperies and curtains from 38 incidents were received and analyzed at NBS. They were tested for fiber content, construction and weight. For 12 other curtains and draperies for which no samples were available, the involved person's and/or investigator's opinion of the fiber content or the content as reported on a label was sent with the report. Cotton was the most common fiber with acetate/rayon, glass fiber and cotton/rayon also well represented. Table 8a itemizes the fiber contents while table 8b gives the weight distribution of the drapery (curtain) samples tested.

3.7 Personal Injury and Property Loss

Curtain and drapery fires resulted in personal injuries to 47 of the 69 persons directly involved in the incidents. Over 75 percent of injured received burns and almost 40 percent suffered from inhalation of smoke or gas (Tables 9a, 9b). Fifteen fatalities occurred, ten due to inhalation. An additional 15 people had to be hospitalized. While nearly one in three of the injured victims died, in only two fatal incidents did the curtains or draperies ignite first and play an unquestionable role in the deaths. In these two cases, kitchen curtains burned rapidly and generated a heavy smoke which overcame a total of four victims before the fires could be controlled. In the other eleven fatalities, the draperies or curtains contributed to the flame spread but were not the first fabric ignited. Bedding or upholstered furniture ignited first,

producing suffocating smoke often before the curtains or draperies were involved. The treatment, causes of death and length of hospitalization of the 47 injured victims are detailed in Table 10a, 10b and 10c.

Reported property loss in 29 cases ranged from $10 to $31,000 and totaled $138,835. This averaged out to $4,787 per incident.

T A B L E S

Note in the following tables, percentage totals may not equal 100 percent due to round-off error.

TABLE 1. PLACE OF OCCURRENCE OF DRAPERY/CURTAIN INCIDENTS

a. State

State	Drapery/Curtain Cases	Total Cases in FFACTS
California	16	175
Ohio	8	55
Illinois	7	79
Colorado	7	280
Arizona	5	21
Missouri	5	45
Wisconsin	4	17
Michigan	4	113
Washington	3	43
New York	3	67
Texas	3	34
Washington, D. C.	2	16
Oregon	2	9
Pennsylvania	1	44
Florida	1	17
Oklahoma	1	19
Indiana	1	26
Utah	1	2
Maryland	1	17
Massachusetts	1	205
Iowa	1	141
Others	-	142
TOTAL	77	1567

TABLE 1 (cont.)

b. General Location

Location	Incidents	Percent
Home	70	90.9
Dormitory	3	3.9
Hospital/Convalescent Home	2	2.6
Office	1	1.3
Camper	1	1.3
TOTAL	77	100.0

c. Specific Location of Ignition

Location	Incidents	Percent
Bedroom	27	36.0
Living Room	26	34.7
Kitchen	14	18.7
Den/Playroom	3	4.0
Lounge	1	1.3
Study	1	1.3
Dining Room	1	1.3
Porch	1	1.3
Camper	1	1.3
Subtotal	75	99.9
Unknown	2	
TOTAL	77	

TABLE 2. TIME OF OCCURRENCE OF DRAPERY/CURTAIN INCIDENTS

a. Month of Year

Month	Incidents	Percent
January	7	9.6
February	4	5.5
March	3	4.1
April	4	5.5
May	2	2.7
June	1	1.4
July	0	-
August	3	4.1
September	18	24.7
October	12	16.4
November	10	13.7
December	9	12.3
Subtotal	73	100.0
Unknown	4	
TOTAL	77	

b. Time of Day

Time	Incidents	Percent
12:01 am to 6:00 am	11	15.5
6:01 am to 12:00 noon	19	26.8
12:01 pm to 6:00 pm	24	33.8
6:01 pm to 12:00 midnight	17	23.9
Subtotal	71	100.0
Unknown	6	
TOTAL	77	

TABLE 3. PERSONAL CHARACTERISTICS OF VICTIMS

a. Age and Sex

Age[1]	Male	Female	Unknown	Total	Percent
0-5	4	3	0	7	10.6
6-11	2	0	0	2	3.0
11-15	0	1	0	1	1.5
16-20	0	2	0	2	3.0
21-26	4	2	0	6	9.1
27-35	3	7	0	10	15.2
36-45	6	9	0	15	22.7
46-55	4	4	0	8	12.1
56-65	0	2	0	2	3.0
66+	2	11	0	13	19.7
Subtotal	25	41	0	66	99.9
Unknown	1	1	1	3	
TOTAL	26	42	1	69	

[1]Each of the above age groups represents approximately 10 percent of the 1970 U.S. population.

TABLE 3 (cont.)

b. Home Value/Monthly Rent[1]

Home Value	Incidents	Percent
$ 10,000 or less	6	17.1
10,001 - 20,000	20	57.1
20,001 - 30,000	3	8.6
Over 30,000	6	17.1
TOTAL	35	99.9

Monthly Rent	Incidents	Percent
Under $101	15	53.6
101-200	10	35.7
Over 200	3	10.7
TOTAL	28	100.0

[1] In 14 incidents, these data are not known.

c. Total Annual Income of Household

Income	Incidents	Percent
$ 4,000 or less	11	25.0
4,001 - 8,000	15	34.1
8,001 - 12,000	7	15.9
12,001 - 16,000	6	13.6
16,001 - 20,000	4	9.1
Over 20,000	1	2.3
Subtotal	44	100.0
Unknown	33	
TOTAL	77	

TABLE 4. PHYSICAL AND MENTAL CONDITION OF VICTIM AT TIME OF IGNITION

a. Use of Intoxicants Prior to Ignition

Intoxicant	Persons Directly Involved	Percent
Alcohol	4	7.8
Drugs	0	0.0
None	47	92.2
Subtotal	51	100.0
Unknown	18	
TOTAL	69	

b. Physical or Mental Disabilities of Victims at Time of Ignition

Disability	Persons Directly Involved	Percent
Partial lack of mobility	3	5.9
Bed confined	2	3.9
Alcoholic	1	2.0
Epilepsy	1	2.0
None	44	86.3
Subtotal	51	100.1
Unknown	18	
TOTAL	69	

TABLE 5. ACTIVITY OF VICTIM AT TIME OF IGNITION

Activity	Persons Directly Involved	Percent
Sleeping	11	18.6
Careless smoking	11	18.6
Cooking	8	13.6
Playing with matches or lighter	7	11.9
Rescuing other victims or extinguishing fire	6	10.2
Careless use of matches	3	5.1
Other	13	22.0
Subtotal	59	100.0
Unknown	10	
TOTAL	69	

TABLE 6. PRESENCE OF OTHER PEOPLE DURING VICTIM'S INVOLVEMENT

Solitude of victim	Persons Directly Involved	Percent
Alone at ignition only	17	28.8
Alone during entire incident	22	37.3
Not alone	20	33.9
Subtotal	59	100.0
Unknown	10	
TOTAL	69	

TABLE 7. SOURCES AND SEQUENCE OF IGNITION

a. Ignition Sources

Ignition Source[1]	Incidents	Percent
Range[2]	7	30.4
Match	5	21.7
Cigarette/Cigar[3]	4	17.4
Electrical Wiring	3	13.0
Candle	2	8.7
Electrical Appliance	2	8.7
Subtotal	23	99.9
Unknown	5	
TOTAL	28	

[1]For incidents in which curtains or draperies were the first fabric item involved.

[2]In two cases grease was an intermediary material.

[3]In one case paper was an intermediary material.

b. Ignition Sequence

Order of Involvement	Incidents	Percent
First	28	50.9
Second	8	14.5
Third or higher	16	29.1
Did not ignite	3	5.5
Subtotal	55	100.0
Order of Ignition Unknown	22	
TOTAL	77	

TABLE 8. IDENTIFICATION OF FABRICS IGNITED

a. Fabric Types

(Note: Parentheses in fabric names indicate separate fabric layers.)

Fiber Content	Draperies/Curtains	Percent
Cotton[1]	14	25.5
Acetate/Rayon	8	14.5
Glass Fiber[1]	7	12.7
Cotton/Rayon	6	10.9
Rayon[1]	3	5.5
Rayon/Polyester	2	3.6
(Polyethylene) (Polyethylene)	2	3.6
(Cotton/Rayon) (Polyester)	1	1.8
Nylon	1	1.8
Polyester[2]	1	1.8
Jute [Burlap]	1	1.8
Polyethylene	1	1.8
(Rayon) (Polyethylene)	1	1.8
(Rayon/Cotton) (Acrylic)	1	1.8
(Acetate/Rayon) (Cotton)	1	1.8
Cotton/Polyester	1	1.8
Rayon/Metallic	1	1.8
Polypropylene/Rayon/Modacrylic	1	1.8
(Unknown Plastic) (Polyurethane)[2]	1	1.8
Unknown Synthetic[2]	1	1.8
Subtotal	55	99.7
Unknown	27	
TOTAL	82	

[1]Five cotton, 2 glass fiber and 1 rayon fabric were not tested by NBS.

[2]Fiber content not determined by NBS.

TABLE 8. (cont.)

b. Drapery/Curtain Fabric Weight

Weight (oz/yd)	Samples	Percent
Under 2.0	5	11.9
2.1 - 4.0	8	19.0
4.1 - 6.0	12	28.6
6.1 - 8.0	12	28.6
8.1 - 10.0	3	7.1
Over 10.0	2	4.8
TOTAL	42	100.0

TABLE 9. INJURIES TO VICTIMS

a. Personal Injury

	Personal Injury		Burn		Inhalation	
	Persons Directly Involved	Percent	Victims	Percent	Victims	Percent
YES	47	68.1	36	76.6	18	38.3
NO	22	31.9	11	23.4	29	61.7
TOTAL	69	100.0	47	100.0	47	100.0

b. Percent of Body Burned

Percent of Body Burned	Total Area[1]		Full Thickness Area[2]	
	Burned Victims	Percent[3]	Burned Victims	Percent[3]
0%	-	-	18	58.1
1 - 5%	12	35.3	6	19.4
6 - 10%	8	23.5	2	6.5
11 - 20%	4	11.8	0	-
21 - 30%	3	8.8	1	3.2
31 - 40%	0	-	1	3.2
41 - 50%	0	-	1	3.2
51 - 60%	1	2.9	0	-
61 - 70%	2	5.9	0	-
71 - 80%	1	2.9	0	-
81 - 90%	1	2.9	0	-
91 - 100%	2	5.9	2	6.5
Subtotal	34	99.9	31	100.1
Unknown	2		5	
TOTAL	36		36	

1 Total area burned includes both partial thickness and full thickness, i.e. first, second and third degree burns.

2 A full thickness burn is equivalent to a third degree burn.

3 The percentage of burned victims who fall into a given percentile category, e.g. 58.1 percent of burned victims had no (0%) full thickness burns.

TABLE 10. STATUS OF VICTIMS AFTER FIRE

a. Disposition of Victims After Incident

Patient Disposition	Victims	Percent
First Aid Only	3	6.4
Treated and Released	13	27.7
Hospitalized	15	31.9
Dead on Arrival	14	29.8
Died in Hospital	1	2.1
No Treatment Necessary	1	2.1
TOTAL	47	100.0

b. Cause of Death

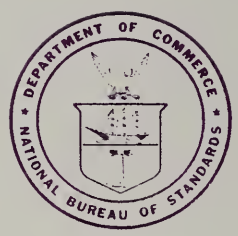
Cause	Fatalities	Percent
Inhalation	10	71.4
Burns	2	14.3
Inhalation and Burns	2	14.3
Subtotal	14	100.0
Unknown	1	
TOTAL	15	

TABLE 10 (cont.)

c. Hospitalization

Days Hospitalized[1]	Victims	Percent
1 - 5	3	25.0
6 - 10	1	8.3
11 - 20	3	25.0
21 - 40	3	25.0
Over 40	2	16.7
Subtotal	12	100.0
Unknown	4	
TOTAL	16	

[1]Note: Four of the victims were still hospitalized when the reports were compiled. For these only a minimum number of hospital days is known: one at least two days, one at least 11 days, one at least 15 days and one at least 56 days. In addition, one victim was hospitalized but died after 10 days.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