NBS TECHNICAL NOTE 858

U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

A Program for Survey of Fire Loads and Live Loads in Office Buildings

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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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Charles Culver and Jill Kushner

Center for Building Technology
Institute for Applied Technology
National Bureau of Standards
Department of Commerce
Washington, D.C. 20234

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ABSTRACT

The development of a survey program for determining the fire loads and live loads in office buildings is described. Considerations involved in planning the program which is directed toward establishing the factors affecting the loads in buildings are presented. The type of data to be collected and a data collection technique which utilizes visually observed information on the characteristics of building content items to determine weight are discussed. Procedures employed to select buildings to be included in a nation-wide office building load survey being conducted by the National Bureau of Standards and a sampling plan for selecting rooms to be surveyed in these buildings are also discussed.

Key Words: Buildings; fire loads; occupancy live loads; load surveys; structural engineering; survey techniques.

Note: This report, to the Building Research Advisory Board, National Research Council, National Academy of Sciences - National Academy of Engineering, was prepared by the Office of Federal Building Technology, Center for Building Technology, Institute for Applied Technology, National Bureau of Standards, Washington, DC, under Subcontract No. BRAB 27-73-53 between the National Academy of Sciences and the National Bureau of Standards. It is being distributed to the professional community to keep it advised of and to elicit its comments on the methodology being used in conjunction with the survey of office buildings in Phase I of the overall program. The results obtained from this survey will be presented at a later date and a final report on the total program will be submitted to the National Academy of Sciences.

SI Conversion Units

In recognition of the position of the USA as a signatory to the General Conference of Weights and Measures, which gave official status to the metric SI system of units in 1960, the authors assist readers interested in making use of the coherent system of SI units by giving conversion factors applicable to U.S. units used in this paper.

Length

1 in = 0.0254* meter
1 ft = 0.3048* meter

Area

1 in^2 = 6.4516* x 10^{-4} $meter^2$
1 ft^2 = 0.09290 $meter^2$

Force

1 lb (lbf) = 4.448 newton

Pressure, Stress

1 psi = 6895 $newton/meter^2$

Thermal

1 Btu = 1.054 x 10^3 joule

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* Exactly

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APPENDICES

1. INTRODUCTION

This report is being released by NBS at this time to elicit comments from the scientific and technical community. The final report will be transmitted to the National Academy of Sciences along with other reports to be developed by NBS as part of the Fire Loads and Live Loads in Office Buildings Program. The program of which this work is a part is being sponsored by the Public Buildings Service, General Services Administration, under contract between GSA and the Academy.

1.1 Background

The design of safe economical structures requires consideration of both loading and resistance (1)*. Loads can be defined as those elements of the environment which cause stresses in the structure. They may be classified as dead load such as load attributed to the weight of the structure, externally caused loads such as earthquake and wind loads, and live loads resulting from the intended use of the structure which include items moved into the structure by the occupant. Fire load or the weight of the combustible contents may generally be considered part of the latter load category. Portions of the dead load, however, such as interior finish materials for floors, walls etc. are also considered as part of the fire load. Resistance or strength refers to the ability of the structure to resist the loading and perform its intended function.

Although considerable information exists relative to characterizing structural resistance including the behavior of building components subjected to fire, and loads resulting from winds, earthquakes and wave forces, only limited data exist for fire loads and live loads resulting from the intended use of the structure. Also, most existing load survey data deals primarily with fire load which is only one aspect of the overall fire problem. Information on the nature of combustible contents (wood, metal, etc.), how they are distributed within rooms, the manner in which the type of occupancy affects these loads and the distribution of loads throughout the building are all important components in the systems approach to fire safety in buildings (51).

Most building codes treat the design problem in a deterministic fashion, i.e. loads and structural resistance are specified as single valued quantities with no indication of variability, although the probabilistic nature of both the loading and resistance are implicitly recognized in the design process. The current trend in the United States and

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* Figures in brackets refer to references listed in Chapter 5.

abroad in the development of improved design codes involves explicit consideration of the variability of load and resistance (1, 2, 3, 4, 5, 6, 7). One such effort involves incorporation of probability concepts for load factor design of steel buildings (8, 9).

Consideration of the variable nature of loads and resistance requires sufficient information for their statistical characterization. Proposed first order probabilistic approaches for structural design (5) and fire resistant design (6) utilize mean values and coefficients of variation. A summary of load surveys conducted during the period from 1891-1971 has been presented by Heaney (10). Based on a review of these surveys, Heaney concluded "...not one investigator has presented data in a form suitable for most useful statistical analysis to be readily applied." The need still exists, therefore, for more load survey information (20). This is particularly true in view of the significant magnitude of the fire problem in the United States. Although fire load is only part of the fire problem, information on fire loads and the type of combustible contents in buildings is important in developing approaches to reduce the fire hazard. The report of the National Commission on Fire Prevention and Control for example, recommended that "the fuel (fire) load study sponsored by the General Services Administration and conducted by the National Bureau of Standards be expanded to update the technical study of occupancy fire loads" (21). Data on the frequency distribution of occupancy live loads and fire loads is also required for application of probabilistic approaches to design.

The National Bureau of Standards (NBS), and the General Services Administration (GSA) have long recognized the need to measure live loads and fire loads in structures. Surveys of fire loads in residences, offices, schools, medical buildings and a few mercantile buildings were conducted by NBS during the period from 1928 to 1940 (11). An enlarged survey was made of the combustible contents of mercantile and manufacturing buildings in 1947 (12). Similarly, studies of occupancy live loads in buildings were conducted by the Public Buildings Administration (GSA) (13). More recently, NBS has conducted live load and fire load surveys in office buildings and postal facilities (14, 15, 16, 17, 18, 19).

In 1973 NBS undertook a project to determine fire loads and live loads in office buildings and educational facilities. The project was an outgrowth of the load survey program initiated at NBS in 1967. The purpose of this report is to describe the procedures and techniques adopted to carry out the work for office buildings.

1.2 Project Objectives

The objectives of the project are:

> . . . to collect fire load and live load data, to create an extensive computerized data bank, and, utilizing that data, to develop, refine and apply probabilistic models for predicting current and future loading conditions for ensuring life safety and property protection in office buildings and educational facilities.

The project involves determining the factors which affect the loads and establishing mathematical models expressing the relationship between these factors and loads.

In developing the procedures for collecting and analyzing load data, the objective was to establish methods which would be applicable to a wide class of buildings of differing occupancy type. Efficient, reliable and economic data collection was also of concern. The material presented in this report is concerned with loads in office buildings. Parallel studies, for example, are currently underway at NBS to determine fire loads and live loads in residential structures and mobile homes.

The results obtained from this work may be used to update existing design load provisions in standards and codes. In addition, the information should be useful in research studies concerned with the structural performance of buildings under live loads and the performance under fire conditions.

1.3 Organization of Report

The general considerations involved in planning the overall survey program and specific details of the procedures adopted to carry out the survey are included in this report.

Chapter 2 discusses the planning of the survey program including the scope of activities.

Chapter 3 describes the survey techniques adopted for this project including the type of data to be collected, data collected techniques and the data processing procedures.

Appendix A deals with the problem of the accuracy with which the position of the loads in a structure need to be measured and the criteria adopted for this survey.

Appendix B includes the field survey forms and instructions for collecting the data.

2. CONSIDERATIONS INVOLVED IN PLANNING SURVEY

2.1 General

As indicated, the objective of this project was to collect fire and live load data and determine the extent to which various factors may affect these loads in office buildings. This dictated the type of data collection required. The scope of the project and the type of data to be collected based on this objective are discussed in the following sections.

2.2 Project Scope

The scope of the project evolved from planning activities initiated at NBS several years ago. A comprehensive survey program for office buildings was developed by Cornell (22) and summarized in a paper by Greene (23). Although certain modifications were introduced following initiation of the project, the work by Cornell formed the basis for this project.

The type of loading considered was limited to fire loads and live loads resulting from the intended use of the building. This included furniture, equipment, and other items brought in for the service of the occupants after construction of the building. The weight of the occupants is not included as part of the live load. Walls and full height partitions, including removable partitions, affixed to the floor and ceiling system, doors and windows were not considered for the case of live load or fire loads. Combustible finish materials, including paneling, paint and wallpaper for walls and full height partitions, ceiling and flooring finish materials and trim such as wooden molding on walls, doors, and windows were included only for fire loads. Loads due to partial height partitions used to subdivide larger areas into work stations were included for both fire and live loads.

The areas within buildings for which loads were considered were restricted to offices and related work areas. Corridors, lavatories, mechanical equipment facilities, elevators, etc., were not included. Similarly, basements (i.e., the portion of the building completely below grade) were also not included. Although loads for these areas are important, it was not feasible to include these in the scope of this project.

Load magnitudes in this survey were determined for a single point in time, i.e., the loads present at the time of the survey. For office buildings, as with any structure, loads vary with time. A schematic representation of this time variation is shown in Fig. 1. The total load can be considered to be composed of a sustained load component and transient loads. Note that both the sustained and transient loads vary with time. Small changes in the sustained load occur as a result of daily or short term fluctuation. Considerably larger and longer duration changes occur as a result of changes in the type of occupancy in portions of the building or the entire building, remodeling, etc. Transient loads occur at discrete points in time during the life of the structure and are usually short duration type loads. For design purposes both types of loading and their combinations are important.

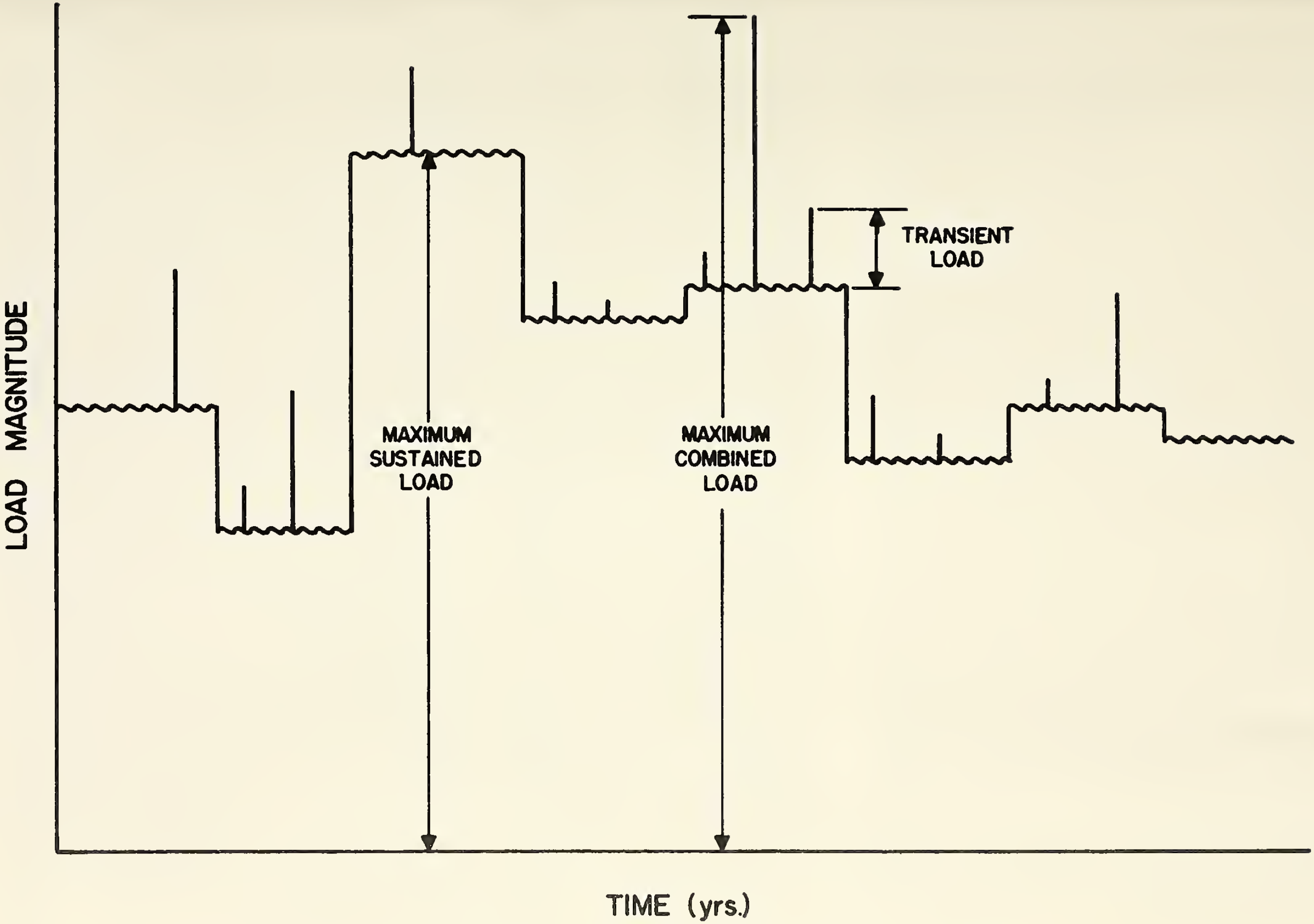


Fig. 1 Loading Time History

Several alternatives exist for determining the loading time history. The first and obvious procedure involves conducting several surveys over a period of time to measure the load changes. Special considerations would be involved in planning such surveys to insure obtaining data on short duration transient loads. The second, less accurate procedure, involves incorporation of judgment of the time variation effects in a survey conducted at one point in time. Interviews of occupants to determine their estimates of previous loads including large, short duration loads in an attempt to reconstruct the load time history is used in this approach. As noted by Cornell (22), the difficulty with this procedure is the potential sensitivity of the results to personal judgment and the combination of quantitative or directly measured survey load data and qualitative data based on judgment. Time variations may also be dealt with analytically. Assuming the variation of loads with time is a stationary process, load changes with time may be determined using results obtained from a survey conducted at one point in time. Karman (24) has used this procedure for determining the maximum sustained loading in Fig. 1 and Pier (26) generalized the concept for transient extraordinary loads. The load models proposed by Cornell for this project (22) involve similar assumptions.

In view of the above considerations, it was decided not to include occupant interviews, i.e., subjective judgment to reconstruct the loading time history. Since a permanent record of the data collected in the project will be maintained, the buildings surveyed could be monitored over time in subsequent follow-up surveys. The data collection forms and instructions for conducting the survey discussed in the next chapter and the computer software developed for data analysis will substantially reduce the effort involved in any such subsequent surveys.

Loads will be determined for only some of the rooms in the surveyed buildings in accordance with a sampling plan. Most previous load surveys have involved weighing and total sampling of all the floor area within the buildings surveyed. In view of the expense involved in such thorough data collection, these previous surveys were restricted to a limited number of buildings. Since the objective of this survey is to determine the factors affecting the loads in office buildings and it was assumed that some of these factors are related to building characteristics, (e.g., building height, geographic location, etc.), it was necessary to include a large number of buildings in the survey. To reduce the field effort involved it was, therefore, decided to survey only a selected sample of rooms within any one building. General information, however, will be obtained for all areas in the building. This permits extrapolating the results obtained from the surveyed rooms to other areas of similar use. Thus in analyzing the survey data it will be possible to study the loads in the entire building as well as the basic data from the surveyed rooms. Procedures adopted for selecting rooms to survey are discussed in Chapter 3. The survey data and the mathematical models discussed by Cornell (22) can then be used to calculate loads in the unsurveyed rooms. Following this, studies of the total loading in the building can be conducted.

The considerations involved in selecting the type of data to be collected included: (1) obtaining the information of interest to fire protection engineers in connection with fire severity and the magnitude and distribution of live loads for structural engineering purposes, and (2) obtaining information on the factors assumed to affect loads in office buildings. It is important to note that this second consideration involved considerable judgment in selecting the factors of interest (22). The survey program was structured, therefore, into two phases with the first phase, Phase I, designed to identify the important factors in the list of all factors initially judged to be potentially significant in this regard. The second phase, Phase II, concentrated on these important factors. Twenty-five buildings were included in the Phase I survey and 75 buildings in Phase II. Prior to initiating the survey of the 25 buildings, the survey techniques were pretested in a survey of the 12 story NBS Administration building shown in Fig. 2.

A summary and analysis of the data obtained from this pretest will be included in a subsequent report.

2.3 Data Requirements

The survey data may be grouped into the following three general categories

1. Building characteristic data
2. Building occupancy data
3. Room data

Building characteristic data - Data collected on the buildings surveyed included:

1. Building location - state
2. Age of building - years
3. Height of building - number of stories above ground level
4. Type of vertical load resisting system - column or bearing wall
5. Floor plan layout - classification of all areas in the building according to functional use and location of these areas (geometric coordinates)

Building occupancy data - These data included:

1. Occupancy type - classification by building tenant (government, private or both)
2. Firm data - location (floor and room) and classification and age (occupancy duration) of the individual firms occupying the building.

Room data - For the survey rooms these data included:

1. Room use - type of functions performed in room (file room, clerical office, etc.)
2. Room size - length, width and height
3. Dimensions and locations of doors and windows
4. Type of content items - furniture, equipment, etc.
5. Properties of content items - material type, dimensions, identifying characteristics, exposure, compaction
6. Normal number of occupants

Fig. 2 NBS Administration Building--used to pretest survey techniques

Data on room use and room size were also obtained for the unsurveyed rooms and other areas including corridors, stairs, and elevators.

The specific data collected and the use of the data are discussed in Chapter 3.

3. SURVEY METHODOLOGY

3.1 General

The survey data, the data collection procedure and data processing are described in this chapter. Prior to discussing these, a new survey technique developed in this project for rapidly and inexpensively collecting the data will be described.

3.2 Development of Inventory Survey Technique

Previous load surveys were primarily concerned with live loads although some information was obtained on fire loads. For live loads the weight of content items was of primary concern and direct weighing was employed using specially designed apparatus. With fire loads, however, other characteristics relative to combustibility such as material type, surface area, volume, exposure, etc., are important. Ideally, load surveys should also obtain data which will permit estimation of potential rates of heat release and smoke generation. For large surveys, costs and time involved in direct weighing are considerable. In addition, the weighing operations is disruptive of the normal business operations conducted in rooms surveyed.

Recognizing the above, it was decided to develop an inventory survey technique employing the collection of visual data, i.e., observable physical characteristics of the various content items, from which weight information could be obtained. Previous surveys have used this concept to a limited extent. Blackall (44, 45) for example recorded the types of items in offices and obtained the load by assigning weight values to the various types of items. Mitchell (27) and Bryson and Gross (15) used manufacturers' lists and a catalog of photographs to identify and code items to obtain weight for some items. The technique utilizing the collection of visual data has several advantages. First, the data collected is useful both for determining fire loads and the parameters of interest relative to fire severity and also for determining live loads. Second, the data collection operation provides a minimum disruption of business activity. Third, it should be more rapid, i.e., less field time is involved and special equipment is not required. Finally, a minimal amount of training of the survey crews would be required. Such a technique should also facilitate the collection of data over the long period of time required to establish the time variation of loads since it may be possible to have the building occupants periodically complete the data forms themselves.

The concept of developing an inventorying survey technique involved the assumption that a relationship existed between the visual characteristics of items and their weight. This relationship can be viewed as a transfer function or formula for weight expressed in terms of physical characteristics. Such relationships exist for mass produced items made in accordance with certain types of standards. Manufacturers of office furniture and equipment were contacted, therefore, to determine if industry-wide standards existed. It was determined that although no explicit standards currently exist, they are being developed. However, some implicit standardization does exist. Recognizing this, it was decided to use available information from manufacturers' catalogs to develop the required transfer functions. In addition, because a wide variety of types of items may be found in offices, it was decided to develop transfer functions only for commonly occurring items. These include: paper, books, desks, tables, seating, shelving cabinets, telephones, typewriters and calculators. For less common items it was decided to resort to estimating the weight during conduct of the survey.

To develop the transfer functions, manufacturers were contacted to identify those characteristics which significantly influence the weight of the items noted above. Data obtained from catalogs was also used. A building block approach was used in establishing the transfer functions by assuming that the weight of an item was obtained by adding the weights of the various components. For desks, for example, the total weight would consist of the basic weight of the frame and top plus the weight of the individual drawers. An alternate approach in which an attempt was made to establish functional relationships between weight and a single parameter such as surface area did not appear advisable since the catalog data indicated somewhat distinct weight groupings for particular classes of items. After identifying these characteristics or the form of the transfer functions, weight information was collected to obtain quantitative values. In some cases manufacturers' catalogs were used. Where this was not sufficient, additional data obtained by direct weighing of items was supplied by the manufacturers.

To insure that the data were representative, weight data were obtained from both large and small manufacturers. Manufacturers applying both private companies and government facilities were included. In each case, specific data were obtained from a sufficient number of manufacturers to insure that at least 50% of the total sales volume for the particular item was represented. Based on conversations with manufacturers, these data were determined to be representative of most of the office furniture market. Although the data was obtained for currently produced items and styles, industry representatives indicated that it was valid for older items. For example, although furniture styles have changed over the years, the basic weights have been constant for at least 30 years.

It was not anticipated that unique numerical values would be obtained for the terms in the transfer functions, but rather a range of values for each term. For example, it is obvious that the weight of all wood tables of a particular size group are not the same. Identification of the significant distinguishing characteristics between items of a particular class and grouping in sufficiently small classifications will, however, minimize the range over which the weights vary.

The range of numerical values for the various distinguishing characteristics of office furniture and equipment is given in Tables 1 through 7. The number of observations or the number of items of furniture with weights in this range encountered in the catalogs is also given. Note that the characteristics used for the items in the tables consist of physical characteristics such as material type, type of drawers, etc., and dimensions. The dimensional characteristics have been expressed in terms of surface area size groups. Minimization of the weight range was used as the basis for selecting these groups. Other groupings could have been used and in some cases the data in

TABLE 1 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR DESKS

Material Type	Desk Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Group (lb)		Number of Observations	80% of Sales Volume Weight Range (lb)	
				Min.	Max.	Min.	Max.		Min.	Max.
Wood	Single Pedestal	7-9.5	C	-	-	72	134	18	-	-
			D	99	134				107	107
			E	72	72				-	-
			F	-	-				-	-
		9.6-12	C	172	172	77	172	17	172	172
			D	-	-				-	-
			E	77	108				-	-
			F	-	-				-	-
		12.1-14.5	C	180	298	112	298	208	180	298
			D	125	190				125	190
			E	112	132				122	132
			F	186	190				186	190
		$\geq$14.6	C	317	317	125	317	97	317	317
			D	143	190				143	190
			E	125	152				152	152
			F	194	194				194	194
Wood	Double Pedestal	7-9.5	C	-	-	114	114	3	-	-
			D	-	-				-	-
			E	114	114				-	-
			F	-	-				-	-
		9.6-12	C	-	-	123	226	29	-	-
			D	211	226				211	226
			E	123	145				123	123
			F	-	-				-	-

TABLE 1 SUMMARY OF DATA USED TO DEVELOP TRANSFER FUNCTION FOR DESKS (Continued)

Material Type	Desk Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Group (lb)		Number of Observations	80% of Sales Volume Weight Range (lb)	
				Min.	Max.	Min.	Max.		Min.	Max.
Wood	Double Pedestal (Continued)	12.1-14.5	C	238	238	131	324	216	238	238
			D	131	270				141	270
			E	148	324				148	156
			F	222	225				222	225
		≥14.6	C	250	297	153	389	476	250	297
			D	153	264				161	242
			E	185	389				185	220
			F	226	249				226	249
Wood	Legs	7-9.5	C	-	-	111	111	5	-	-
			D	111	111				-	-
			E	-	-				-	-
			F	-	-				-	-
		9.6-12	C	-	-	-	-	-	-	-
			D	-	-				-	-
			E	-	-				-	-
			F	-	-				-	-
		12.1-14.5	C	-	-	129	234	41	-	-
			D	129	226				-	-
			E	224	234				-	-
			F	-	-				-	-
		≥14.6	C	-	-	169	279	87	-	-
			D	169	279				227	236
			E	252	272				-	-
			F	-	-				-	-

TABLE 1 SUMMARY OF DATA USED TO DEVELOP TRANSFER FUNCTION FOR DESKS (Continued)

Material Type	Desk Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Group (lb)		Number of Observations	80% of Sales Volume Weight Range (lb)	
				Min.	Max.	Min.	Max.		Min.	Max.
Metal	Single Pedestal	7-9.5	A	81	128	81	153	135	109	128
			B	123	153				123	153
		9.6-12	A	117	178	117	178	66	137	137
			B	129	153				153	153
		12.1-14.5	A	104	175	104	181	366	131	173
			B	138	181				138	181
		≥14.6	A	142	208	142	208	98	154	171
			B	163	187				163	187
Metal	Double Pedestal	7-9.5	A	-	-	-	-	-	-	-
			B	-	-				-	-
		9.6-12	A	121	178	121	178	59	142	142
			B	153	167				153	167
		12.1-14.5	A	114	194	114	195	204	155	194
			B	162	195				162	195
		≥14.6	A	157	215	157	227	207	171	208
			B	165	227				165	227
Metal	Legs	7-9.5	A	-	-	-	-	-	-	-
			B	-	-				-	-
		9.6-12	A	-	-	-	-	-	-	-
			B	-	-				-	-
		12.1-14.5	A	147	183	147	183	200	147	182
			B	-	-				-	-
		≥14.6	A	204	211	204	211	60	204	210
			B	-	-				-	-

TABLE 2 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR TABLES

Material Type	Table Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
				Min.	Max.	Min.	Max.	
Wood	Pedestal	4-9	C	80	80	42	123	34
			D	53	123			
			E	42	42			
			F	45	60			
		9.1-11.9	C	90	90	50	158	15
			D	123	158			
			E	50	50			
			F	75	75			
		12-12.5	C	90	90	75	158	10
			D	114	158			
			E	-	-			
			F	75	75			
		12.6-15.9	C	95	95	57	202	9
			D	176	202			
			E	57	57			
			F	90	90			
		16-18	C	95	95	95	202	3
			D	202	202			
			E	-	-			
			F	-	-			
		18.1-26.9	C	-	-	105	246	5
			D	216	246			
			E	-	-			
			F	105	105			
		27-44.9	C	-	-	251	312	6
			D	251	312			
			E	-	-			
			F	-	-			
		≥45	C	-	-	361	361	2
			D	361	361			
			E	-	-			
			F	-	-			

TABLE 2 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR TABLES (Continued)

Material Type	Table Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
				Min.	Max.	Min.	Max.	
Wood	Legs	4-9	C	25	80	25	97	69
			D	31	40			
			E	38	97			
			F	37	48			
		9.1-11.9	C	82	90	40	90	8
			D	40	79			
			E	58	62			
			F	-	-			
		12-12.5	C	90	130	51	130	36
			D	70	106			
			E	62	79			
			F	51	51			
		12.6-15.9	C	112	150	79	150	37
			D	79	119			
			E	97	114			
			F	79	92			
		16-18	C	95	150	88	150	45
			D	88	145			
			E	110	123			
			F	100	105			
		18.1-26.9	C	130	180	97	233	48
			D	150	233			
			E	124	132			
			F	97	126			
		27-44.9	C	195	210	128	374	41
			D	185	374			
			E	215	215			
			F	128	174			
		≥ 45	C	-	-	282	537	6
			D	282	537			
			E	-	-			
			F	-	-			

TABLE 2 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTIONS FOR TABLES (Continued)

Material Type	Table Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
				Min.	Max.	Min.	Max.	
Metal	Pedestal	4-9	A B	33 -	48 -	33	48	24
		9.1-11.9	A B	58 -	69 -	58	69	12
		12-12.5	A B	73 -	73 -	73	73	6
		12.6-15.9	A B	74 -	74 -	74	74	6
Metal	Legs	4-9	A B	40 48	65 50	40	65	48
		9.1-11.9	A B	67 56	82 78	56	82	54
		12-12.5	A B	79 71	91 82	71	91	54
		12.6-15.9	A B	92 84	109 87	84	109	60
		16-18	A B	117 107	125 119	107	125	42
		18.1-26.9	A B	128 110	168 110	110	168	66
		27-44.9	A B	213 -	265 -	213	265	30
		≥45	A B	445 -	445 -	445	445	6

TABLE 2 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR TABLES (Continued)

Material Type	Table Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
				Min.	Max.	Min.	Max.	
Plastic	Legs	4-9	D	64	88	64	88	14
		12-12.5	D	97	97	97	97	4
		16-18	D	128	128	128	128	4

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Wood	File	20-35.9	2-2.9	E	--	--	60	80	9
				G	60	80			
			3-3.9	E	--	--	97	97	2
				G	97	97			
			4-4.9	E	101	112	101	112	4
				G	--	--			
			≥ 5	E	--	--	110	158	4
				G	110	158			
		45-55.9	3-3.9	E	--	--	230	230	1
				G	230	230			
		≥ 56	2-2.9	E	--	--	120	120	2
				G	120	120			
Wood	All Purpose	19-27.9	3-3.9	C	--	--	78	88	8
				D	--	--			
				E	78	88			
				F	--	--			
				G	--	--			
			4-6.9	C	--	--	114	114	3
				D	--	--			
				E	114	114			
				F	--	--			
				G	--	--			
			7-9.9	C	--	--	150	156	42
				D	--	--			
				E	--	--			
				F	150	156			
				G	--	--			

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Wood	All Purpose	28-34.9	4-6.9	C	117	149	65	163	50
				D	65	158			
				E	133	163			
				F	--	--			
				G	77	139			
			7-9.9	C	132	208	96	244	62
				D	96	220			
				E	151	244			
				F	--	--			
				G	--	--			
			10-11.9	C	--	--	130	260	22
				D	172	172			
				E	182	260			
				F	--	--			
				G	130	140			
			≥ 12	C	--	--	229	317	6
				D	229	229			
				E	315	317			
				F	--	--			
				G	--	--			
		50-69.9	2-2.9	C	--	--	84	106	6
				D	--	--			
				E	84	106			
				F	--	--			
				G	--	--			
		≥ 70	4-6.9	C	332	332	332	332	1
				D	--	--			
				E	--	--			
				F	--	--			
				G	--	--			
			7-9.9	C	371	371	371	371	1
				D	--	--			
				E	--	--			
				F	--	--			
				G	--	--			

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Wood	Card	< 20	2-2.9	F	--	--	40	80	4
				G	40	80			
			3	F	--	--	50	105	3
				G	50	105			
		≥ 45	3	F	272	272	272	610	3
				G	500	610			

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	File	12-19.9	3-3.9	A B G	60 -- --	60 -- --	60	60	1
			4-4.9	A B G	73 -- --	73 -- --	73	73	1
			≥ 5	A B G	85 -- --	85 -- --	85	85	1
		20-35.9	2-2.9	A B G	-- -- 38	-- -- 59	38	59	10
			3-3.9	A B G	70 100 66	104 122 131	66	131	25
			4-4.9	A B G	116 -- --	116 -- --	116	116	1
			≥ 5	A B G	129 -- --	129 -- --	129	129	1

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	File	36-44.9	2-2.9	A	111	111	88	154	14
				B	154	154			
				G	88	88			
			3-3.9	A	121	151	99	168	20
				B	142	168			
				G	99	99			
			4-4.9	A	167	167	167	167	1
				B	--	--			
				G	--	--			
			≥ 5	A	185	185	185	185	1
				B	--	--			
				G	--	--			
		45-55.9	2-2.9	A	--	--	115	188	14
				B	174	188			
				G	115	115			
			3-3.9	A	152	203	152	210	25
				B	174	210			
				G	--	--			

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	File	45-55.9 (continued)	4-4.9	A	233	233	233	233	1
				B	--	--			
				G	--	--			
			≥ 5	A	257	257	257	257	1
				B	--	--			
				G	--	--			
		≥ 56	2-2.9	A	--	--	142	223	12
				B	200	223			
				G	142	142			
			3-3.9	A	174	258	153	258	20
				B	210	246			
				G	153	153			
			4-4.9	A	283	283	283	283	1
				B	--	--			
				G	--	--			
			≥ 5	A	315	315	315	315	1
				B	--	--			
				G	--	--			

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	All Purpose	19-27.9	2-2.9	A B C	27 -- --	30 -- --	27	30	4
			4-6.9	A B C	36 -- --	50 -- --	36	50	4
			7-9.9	A B C	-- 148 --	-- 174 --	148	174	3
		28-34.9	2-2.9	A B C	42 -- --	45 -- --	42	45	6
			3-3.9	A B C	55 -- --	68 -- --	55	68	5
			4-6.9	A B C	60 77 --	113 136 --	60	136	15
			7-9.9	A B C	95 140 --	175 289 --	95	289	26
			10-11.9	A B C	154 -- --	211 -- --	154	211	8
			$\geq$ 12	A B C	262 -- --	262 -- --	262	262	1

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	All Purpose	35-49.9	2-2.9	A	--	--	52	53	2
				B	52	53			
				C	--	--			
			3-3.9	A	--	--	81	82	2
				B	81	82			
				C	--	--			
			4-6.9	A	71	71	71	109	4
				B	87	109			
				C	--	--			
		50-69.9	2-2.9	A	--	--	66	81	4
				B	66	81			
				C	--	--			
			3-3.9	A	--	--	95	122	4
				B	95	122			
				C	--	--			
			4-6.9	A	75	131	75	153	15
				B	117	153			
				C	--	--			
		≥ 70	2-2.9	A	--	--	71	78	12
				B	--	--			
				C	71	78			
			3-3.9	A	--	--	86	86	4
				B	--	--			
				C	86	86			
			4-6.9	A	120	159	120	210	18
				B	170	210			
				C	136	189			

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	Card	< 20	2-2.9	B G	13 5	24 18	5	24	30
			≥ 3	B G	-- 21	-- 26	21	26	6
		36-44.9	2-2.9	B G	210 108	224 108	108	224	4
			≥ 3	B G	212 104	212 247	104	247	5
		≥ 45	2-2.9	B G	260 129	284 149	129	284	6
			≥ 3	B G	270 280	284 345	270	345	6
Metal	File Safe	20-35.9	3-3.9	F G	270 300	360 320	270	360	5
			≥ 4	F G	275 320	365 360	275	365	5
		36-44.9	3-3.9	F G	370 450	470 450	370	470	3
			≥ 4	F G	415 440	505 440	415	505	3
		≥ 45	3-3.9	F G	470 510	625 585	470	625	5
			≥ 4	F G	545 560	660 660	545	660	5

TABLE 3 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR CABINETS (Continued)

Material Type	Cabinet Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	Blue Print	12-19.9	3-3.9	A	--	--	120	259	20
				B	--	--			
				G	120	259			
			4-6.9	A	--	--	160	308	25
				B	--	--			
				G	160	308			
			7-9.9	A	--	--	200	200	3
				B	--	--			
				G	200	200			
			10-11.9	A	--	--	285	285	3
				B	--	--			
				·G	285	285			
			$\geq$ 12	A	--	--	357	357	3
				B	--	--			
				G	357	357			
		36	3-3.9	A	--	--	113	136	6
				B	--	--			
				G	113	136			
			4-6.9	A	--	--	190	190	3
				B	--	--			
				G	190	190			
			$\geq$ 12	A	--	--	856	856	1
				B	--	--			
				G	856	856			

TABLE 4 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SHELVING

Material Type	Shelving Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Groups (lb)		Number of Observations
				Min.	Max.	Min.	Max.	
Wood	Free Shelving	2-2.9	C	--	--	9	9	8
			D	--	--			
			E	9	9			
			F	--	--			
		3-3.9	C	--	--	9	13	14
			D	--	--			
			E	9	9			
			F	10	13			
		4-5.9	C	--	--	17	21	8
			D	--	--			
			E	--	--			
			F	17	21			
		6-7.9	C	--	--	--	--	--
			D	--	--			
			E	--	--			
			F	--	--			
		≥8	C	--	--	--	--	--
			D	--	--			
			E	--	--			
			F	--	--			

TABLE 4 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SHELVING (Continued)

Material Type	Shelving Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Groups (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Wood	Bookcase	29-36.9	2-2.9	C	--	--	60	60	3
				D	60	60			
				E	--	--			
				G	--	--			
			3-3.9	C	62	62	41	62	20
				D	--	--			
				E	--	--			
				G	41	60			
			4-4.9	C	79	87	40	87	23
				D	40	40			
				E	--	--			
				G	--	--			
			≥5	C	--	--	92	92	4
				D	92	92			
				E	--	--			
				G	--	--			
		37-49.9	2-2.9	C	46	46	46	53	32
				D	--	--			
				E	--	--			
				G	53	53			
			3-3.9	C	67	67	61	89	30
				D	61	61			
				E	--	--			
				G	62	89			
			4-4.9	C	--	--	59	90	6
				D	59	90			
				E	--	--			
				G	--	--			
			≥5	C	--	--	114	114	2
				D	--	--			
				E	--	--			
				G	114	114			

TABLE 4 SUMMARY OF DATA UTILIZED TO DEVELOP
TRANSFER FUNCTION FOR SHELVING (Continued)

Material Type	Shelving Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Groups (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Wood	Bookcase	50-65.9	2-2.9	C	65	65	65	79	23
				D	--	--			
				E	67	79			
				G	--	--			
			3-3.9	C	--	--	63	110	15
				D	--	--			
				E	63	102			
				G	77	110			
			4-4.9	C	--	--	--	--	--
				D	--	--			
				E	--	--			
				G	--	--			
			≥5	C	--	--	--	--	--
				D	--	--			
				E	--	--			
				G	--	--			
		≥66	2-2.9	C	--	--	--	--	--
				D	--	--			
				E	--	--			
				G	--	--			
			3-3.9	C	123	123	123	123	20
				D	--	--			
				E	--	--			
				G	--	--			
			4-4.9	C	--	--	--	--	--
				D	--	--			
				E	--	--			
				G	--	--			
			≥5	C	--	--	--	--	--
				D	--	--			
				E	--	--			
				G	--	--			

TABLE 4 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SHELVING (Continued)

Material Type	Shelving Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Groups (lb)		Number of Observations
				Min.	Max.	Min.	Max	
Wood	Extra Shelves for Book-cases	2-2.9	C	6	6	6	6	58
			D	--	--			
			E	--	--			
			G	--	--			
		3-3.9	C	7	7	7	7	85
			D	--	--			
			E	--	--			
			G	--	--			
		4-4.9	C	8	8	8	8	29
			D	--	--			
			E	--	--			
			G	--	--			
		≥ 5	C	--	--	9	9	6
			D	9	9			
			E	--	--			
			G	--	--			
Metal	Free Shelving	2-2.9	A	--	--	9	10	4
			B	--	--			
			F	9	10			
		3-3.9	A	--	--	9	13	8
			B	9	10			
			F	11	13			
		4-5.9	A	--	--	11	21	16
			B	11	14			
			F	17	21			
		6-7.9	A	--	--	16	19	4
			B	16	19			
			F	--	--			
		≥ 8	A	--	--	20	22	4
			B	20	22			
			F	--	--			

TABLE 4 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SHELVING (Continued)

Material Type	Shelving Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Groups (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	Bookcase	29-36.9	2-2.9	A	33	33	33	33	9
				B	--	--			
				F	--	--			
			3-3.9	A	46	46	46	54	13
				B	47	54			
				F	--	--			
			4-4.9	A	--	--	58	58	3
				B	58	58			
				F	--	--			
			≥ 5	A	--	--	82	82	4
				B	--	--			
				F	82	82			
		37-49.9	2-2.9	A	--	--	38	38	3
				B	38	38			
				F	--	--			
			3-3.9	A	61	94	56	94	15
				B	56	63			
				F	--	--			
			4-4.9	A	--	--	54	68	7
				B	68	68			
				F	54	68			
			≥ 5	A	--	--	64	112	4
				B	--	--			
				F	64	112			

TABLE 4 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SHELVING (Continued)

Material Type	Shelving Type	Height (in)	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Groups (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	Bookcase	50-65.9	2-2.9	A B F	-- -- --	-- -- --	--	--	--
			3-3.9	A B F	78 69 --	124 80 --	69	124	18
			4-4.9	A B F	-- 82 --	-- 85 --	82	85	6
			≥ 5	A B F	-- -- --	-- -- --	--	--	--
		≥ 66	2-2.9	A B F	-- 60 --	-- 84 --	60	84	12
			3-3.9	A B F	-- -- --	-- -- --	--	--	--
			4-4.9	A B F	-- -- --	-- -- --	--	--	--
			≥ 5	A B F	-- 106 --	-- 158 --	106	158	12

TABLE 4 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SHELVING (Continued)

Material Type	Shelving Type	Surface Area (ft^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum for Surface Area Groups (lb)		Number of Observations
				Min.	Max.	Min.	Max.	
Metal	Extra Shelves for Book-cases	2-2.9	A B F	3 6 --	3 6 --	3	6	24
		3-3.9	A B F	4 6 --	6 7 --	4	7	24
		4-4.9	A B F	-- 8 --	-- 8 --	8	8	12
		≥5	A B F	-- 9 --	-- 9 --	9	9	12

TABLE 5 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SEATING

Material Type	Seating Type	Arm Characteristics	Size Characteristics (in)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Wood	Pedestal	With Arms	Height ≤38.5	C D E F	58 35 52 30	71 82 72 35	30	82	194
			Height >38.5	C D E F	78 66 72 -	93 88 102 -	66	102	285
		Without Arms	N.A.	C D E F	43 29 37 -	74 49 38 -	29	74	138
	Uphol-stered	N.A.	N.A.	C D E F	93 111 68 64	95 128 123 76	64	128	78
	Sofa	N.A.	48-71	C D E F	- 202 133 124	- 255 198 192	124	255	64
		N.A.	72-90	C D E F	92 277 186 176	142 282 281 176	92	282	96
		N.A.	≥ 91	C D E F	- 339 - 224	- 352 - 280	224	352	16

TABLE 5 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SEATING (Continued)

Material Type	Seating Type	Arm Characteristics	Size Characteristics (in)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Wood	Legs	With Arms	N. A.	C	43	63	22	63	126
				D	22	60			
				E	33	58			
				F	24	24			
		Without Arms	N. A.	C	43	43	21	43	93
				D	21	30			
				E	33	33			
				F	-	-			
	Bench	N. A.	N. A.	C	-	-	22	43	76
				D	32	43			
				E	-	-			
				F	22	22			

TABLE 5 SUMMARY OF DATA UTILIZED TO DEVELOP
TRANSFER FUNCTION FOR SEATING (Continued)

Material Type	Seating Type	Arm Characteristics	Size Characteristics (in)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	Sofa	N. A.	48-71	A B F	- - -	- - -	-	-	-
		N. A.	72-90	A B F	104 203 -	132 203 -	104	203	12
		N. A.	≥ 91	A B F	146 - -	215 - -	146	215	6
	Bench	N. A.	N. A.	A B F	31 - -	129 - -	31	129	12
	Drafting Stool	N. A.	N. A.	A B G	33 34 28	43 37 35	33	43	17
	Classroom Chair	N. A.	N. A.	A B F	- 23 -	- 23 -	23	23	4

TABLE 5 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SEATING (Continued)

Material Type	Seating Type	Arm Characteristics	Size Characteristics (in)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Metal	Pedestal	With Arms	Height ≤ 38.5	A	44	68	20	68	87
				B	31	59			
				F	20	29			
			Height > 38.5	A	75	95	59	95	46
				B	59	68			
				F	-	-			
		Without Arms	N. A.	A	31	48	18	48	107
				B	26	36			
				F	18	29			
	Legs	With Arms	N. A.	A	30	45	16	45	51
				B	16	34			
				F	16	24			
		Without Arms	N. A.	A	19	34	9	34	50
				B	9	22			
				F	-	-			
	Upholstered	N. A.	N. A.	A	90	119	90	119	8
				B	94	94			
				F	-	-			

TABLE 5 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR SEATING (Continued)

Material Type	Seating Type	Arm Characteristics	Size Characteristics (in)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Plastic	Pedestal	With Arms	Height < 38.5	A	37	56	15	56	75
				B	42	44			
				F	15	29			
			Height ≥ 38.5	A	-	-	-	-	-
				B	-	-			
				F	-	-			
		Without Arms	N. A.	A	35	41	11	41	43
				B	32	36			
				F	11	19			
	Legs	With Arms	N. A.	A	33	33	10	33	51
				B	-	-			
				F	10	19			
		Without Arms	N. A.	A	29	29	8	29	22
				B	-	-			
				F	8	12			
	Classroom Chair	N. A.	N. A.	A	-	-	18	21	40
				B	-	-			
				F	18	21			

TABLE 6 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR PAPER AND BOOKS

Item Type	Material Type	Size Group (in)	Manufacturer	Weight Range (lb/in)	
				Min.	Max.
Paper	Paper	8.5 X11	H	1.7	2.6
		8.5 X15	H	2.3	3.2
		11 X15	H	3.7	4.9
		15 X20 >	H	4.7	6.8
Books	Paper	< 7 X7.25	I	1.0	1.6
		> 7X7.25 -10X6.5 <	I	1.7	2.4
		10 X6.5 >	I	1.9	2.9

Note: Data obtained from manufacturers and random weighing of piles of paper and books

TABLE 7 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS

Equipment Type	Material Type	Misc. Characteristics	Size Group (in^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Calculator	Metal or Plastic	Illuminated Read-Out	10-65.9	N	--	--	0.5	2.5	53
				O	1.1	2.2			
				P	0.5	2.4			
				Q	1.8	2.5			
				R	--	--			
			66-105.9	N	3.3	3.3	3.3	6.6	61
				O	3.8	6.6			
				P	4.8	6.0			
				Q	3.1	3.1			
				R	--	--			
			106-136.9	N	6.1	6.5	6.1	8.8	72
				O	8.6	8.6			
				P	8.1	8.1			
				Q	8.8	8.8			
				R	7.7	8.8			
			137-170.9	N	--	--	8.6	11.0	31
				O	8.8	8.8			
				P	8.6	8.6			
				Q	--	--			
				R	8.5	11.0			
			>171	N	--	--	18.0	18.0	5
				O	--	--			
				P	--	--			
				Q	--	--			
				R	18.0	18.0			

TABLE 7 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Equipment Type	Material Type	Misc. Characteristics	Size Group (in^2)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Calculator	Metal or Plastic	Illuminated Read-Out With Tape	106-136.9	N	-	-	10.3	10.3	12
				O	-	-			
				P	10.3	10.3			
				Q	-	-			
				R	-	-			
			137-170.9	N	-	-	13.0	13.0	6
				O	-	-			
				P	-	-			
				Q	13.0	13.0			
				R	-	-			
			>171	N	-	-	26.4	26.4	12
				O	-	-			
				P	26.4	26.4			
				Q	-	-			
				R	-	-			
Calculator	Metal or Plastic	Dial Read-Out	137-170.9	N	-	-	29.0	29.5	20
				O	29.5	29.5			
				P	-	-			
				Q	-	-			
				R	29.0	29.0			
			>171	N	-	-	43.0	43.5	6
				O	-	-			
				P	-	-			
				Q	43.0	43.0			
				R	43.5	43.5			

TABLE 7 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Equipment Type	Material Type	Misc. Charact-eristics	Size Group (in)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)		Number of Observations
					Min.	Max.	Min.	Max.	
Calculator	Metal or Plastic	Tape Only	90-119.9	N	17.0	17.0	9.9	17.0	26
				O	-	-			
				P	-	-			
				Q	9.9	9.9			
				R	13.0	13.0			
			120-154.9	N	22.0	25.0	12.6	25.0	162
				O	-	-			
				P	12.6	12.6			
				Q	11.4	11.4			
				R	20.0	26.8			
			155-199.9	N	16.5	16.5	16.5	38.5	85
				O	24.0	26.5			
				P	-	-			
				Q	-	-			
				R	29.3	38.5			
			>200	N	-	-	35.5	43.0	11
				O	-	-			
				P	-	-			
				Q	38.0	38.0			
				R	35.5	43.0			

TABLE 7 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Equipment Type	Material Type	Misc. Character- istics	Size Group (in)	Manufacturer	Catalog Weight Range (lb)	Catalog Minimum and Maximum (lb)	
						Min.	Max.
Telephone	Plastic	0 button	NA	J	3.6	NA	
		6 button	NA	J	3.9		
		10 button	NA	J	6.3		
		12 button	NA	J	8.0		
		18 button	NA	J	11.8		
		20 button	NA	J	12.4		
		30 button	NA	J	13.0		
Typewriter	Metal	Manual	11 - 14 carriage	K	-	31	31
				L	31		
				M	31		
			15 - 16 carriage	K	-	33	34
				L	33		
				M	34		
			17 - 20 carriage	K	-	37	37
				L	37		
				M	-		
			21 - 24 carriage	K	-	44	44
				L	-		
				M	44		
			25 - 30 carriage	K	-	--	--
				L	-		
				M	-		

TABLE 7 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Equipment Type	Material Type	Misc. Characteristics	Size Group (in)	Manufacturer	Catalog Weight Range (lb)		Catalog Minimum and Maximum (lb)	
					Min.	Max.	Min.	Max.
Typewriter	Metal	Electric	11 -14 carriage	K	36	48	36	51
				L	48	48		
				M	51	51		
			15 -16 carriage	K	38	67	38	67
				L	50	50		
				M	53	53		
			17 -20 carriage	K	52	52	52	52
				L	-	-		
				M	-	-		
			21 -24 carriage	K	55	55	54	59
				L	55	55		
				M	54	59		
			25 -30 carriage	K	61	61	59	63
				L	59	59		
				M	63	63		

TABLE 7 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Equipment Type	Material Type	Height (in)	Manufacturer	Catalog Weight Range (lb/ft)		Catalog Minimum and Maximum for Surface Area Groups (lb/ft)		Number of Observations
				Min.	Max.	Min.	Max.	
Partitions	Steel	<48	B	14	14	14	14	1
		48-59.9	B	15	24	15	24	15
		60-71.9	B	16	34	16	34	15
		≥72	B	26	43	26	43	13
	Fabric	<48	B	--	--	--	--	--
			F	--	--			
			G	--	--			
		48-59.9	B	19	26	9	26	12
			F	--	--			
			G	9	11.2			
		60-71.9	B	24	31	9.8	31	20
			F	9.8	16.5			
			G	10.8	14.2			
		≥72	B	29	35	11.8	35	17
			F	11.8	25			
			G	13.3	15.8			

TABLE 7 SUMMARY OF DATA UTILIZED TO DEVELOP TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Equipment Type	Material Type	Height (in)	Manufacturer	Catalog Weight Range (lb/ft)		Catalog Minimum and Maximum for Surface Area Groups (lb/ft)		Number of Observations
				Min.	Max.	Min.	Max.	
Partitions	Plastic	<48	B	14	14	14	14	1
			F	--	--			
		48-59.9	B	15	24	12.5	24	31
			F	12.5	24			
		60-71.9	B	16	34	13	34	40
			F	13	34			
		≥ 72	B	26	43	15	45	38
			F	15	45			

Tables 1 through 7 indicate that it might be possible to combine several size groups. Prior to combining these groups, it would be advisable to study the effect this would have on the weight range and also the effect of the number of observations on the means and standard deviations. Similar groups were used for both metal and wood furniture and also for the different items within a given type of furniture,e.g.,single pedestal desks, double pedestal desks, and desks with legs. Because of this, in some cases no data are given since items in this category are not manufactured, e.g., in Table 1, metal double pedestal desks in the 7-9.5 ft^2 size group encountered for wood double pedestal desks. In establishing the size groups, the surface areas were computed using the actual dimensions given in the catalogs and then rounded off giving the values listed in the tables. In most cases the catalog maximum and minimum values for the weights for several manufacturers are listed. For desks, it was also possible to establish a weight range representative of 80% of the sales volume for these items. For some items such as telephones, for which one manufacturer supplies the majority of the market, only one manufacturer is listed. In other cases such as typewriters, data were obtained directly from the manufacturer and consequently the number of observations is not given. Similarly, where a manufacturer is listed and no data are given, no items in this group were encountered in their catalog. Where only one weight value is given as opposed to a weight range, the manufacturer indicated that there was only minor differences in the weight for these items.

The catalog minimum and maximum values in the tables were established from the weight ranges for the several manufacturers. Note that the weight range for a particular item varies with the manufacturer and is usually smaller than the range including several manufacturers. In addition, the amount of this variation is different for the various items and the types of material.

As indicated, the number of observations in Tables 1 through 7 refer to the number of items encountered in furniture catalogs. Although they do not necessarily represent the frequency of occurrence of the weights within a group in actual offices, it was assumed that they were approximately representative of this frequency distribution. The 80% sales volume data for desks in Table 1 provided one indication that the items encountered in offices would, in general, cover the range of weights. Attempts to obtain the actual frequency distribution through detailed information from manufacturers on sales volumes for the various weight items in a group were unsuccessful.

Using the data in Tables 1 through 7, estimates of the mean and standard deviation (28) were computed for each group as:

$$\overline{X} = \frac{1}{n} \sum_{i=1}^{n} X_i \tag{3.1}$$

$$S = \sqrt{\frac{\sum_{i=1}^{n} (X_i - \overline{X})^2}{n-1}} \tag{3.2}$$

where X_i = weights obtained from manufacturers catalogs.

The number of observations given in the tables were used for n in these computations.

The transfer functions and these numerical values of the parameters selected for conversion of the inventory field survey data are given in Tables 8 through 14. Note that for paper and books a compaction factor defined in Appendix B has been employed to convert the volume measurements from the field survey to weight. For those cases where the weight range was zero, the standard deviation was computed using the average coefficient of variation determined for the other items in the same group. For telephones, however, this was not done since the weight variation was determined to be extremely small.

For those groups where no data was found in the manufacturers catalogs, the symbol NA (not applicable) has been used in Tables 8 through 14. It was concluded, based on attempts to determine values for these groups, that they are not commonly manufactured as office furniture. If such items are encountered in the field survey, it is planned to obtain their weights by interpolating values from similar items in the tables. If encountered frequently, weights for these items will be obtained from manufacturers.

In converting the inventory data to weight, both the mean and standard deviation were used. This permitted determination of the total fire load and live load and the uncertainty of these loads for the rooms surveyed.

It is interesting to note that the values in Tables 8 through 14 compare reasonably well with office furniture weights used by commercial moving companies for estimating purposes. In some cases, the mean value is close to the moving companies' estimates, in other cases the mean plus one standard deviation is close to the moving companies' estimate. The categories used by moving companies are, however, not as detailed as the groups contained in the tables, consequently, only limited comparisons were possible.

The question of the accuracy with which these transfer functions predict the weight of items is discussed in Section 3.6.

In originally planning the survey (22), it was proposed that sample weighing be done in some of the offices surveyed to obtain numerical values similar to those in Tables 8 through 14. Selection of the offices to be weighed, however, would require special care to insure obtaining an unbiased sample. For example, the catalog data for weights of desks is shown in histogram form in Figs. 3, 4. Similar data for empty weights obtained by Bryson and Gross from a weight survey (15) is shown in Figs. 5, 6.

Referring to Figs. 3 through 6, it is obvious that the variability or range of weights encountered by Bryson and Gross is considerably smaller than that for the catalog data. This results from the fact that the Bryson and Gross data represent only one building in which a majority of the items were procured from only one or two sources. A similar situation would probably occur for other government buildings

TABLE 8 TRANSFER FUNCTION FOR DESKS

$$W_d = B_{ijk} + N_b D_{bi} + N_f D_{fi} + \begin{cases}[D_{ci} + (N_p-1)\ D_{pi}] & \text{when } N_p > 1 \\ [0] & \text{when } N_p = 0\end{cases}$$

W_d = total weight of a desk
B = basic desk weight
N_p = number of personal drawers
D_p = weight of one personal drawer
N_b = number of box drawers
D_b = weight of one box drawer
N_f = number of file drawers
D_f = weight of one file drawer
D_c = weight of one center drawer
i = material type - metal, wood, plastic
j = desk type - single pedestal, double pedestal, legs
k = size group - top surface area

Material type	Desk type	Size group (ft^2)	Basic Desk weight-B (lb)	Weight of Personal drawer D_p (lb)	Weight of Box drawer D_b (lb)	Weight of File drawer D_f (lb)	Weight of Center drawer D_c (lb)
Metal	Single Pedestal	7-9.5	112,15	8,0 .3	12,0 .5	21,5.2	14,2.1
		9.6-12	136,21	8,0 .3	12,0 .5	21,5.2	14,2.1
		12.1-14.5	147,16	8,0 .3	12,0 .5	21,5.2	14,2.1
		>14.6	167,30	8,0 .3	12,0 .5	21,5.2	14,2.1
	Double Pedestal	7-9.5	NA	NA	NA	NA	NA
		9.6-12	141,27	8,0 .3	12,0 .5	21,5.2	14,2.1
		12.1-14.5	164,22	8,0 .3	12,0 .5	21,5.2	14,2.1
		>14.6	188,19	8,0 .3	12,0 .5	21,5.2	14,2.1
	Legs	7-9.5	NA	NA	NA	NA	NA
		9.6-12	NA	NA	NA	NA	NA
		12.1-14.5	158,37	8,0 .3	12,0 .5	21,5.2	14,2.1
		>14.6	207,2.6	8,0 .3	12,0 .5	21,5.2	14,2.1

Values listed are sample mean and standard deviation- $\overline{X}$, s

TABLE 8 TRANSFER FUNCTION FOR DESKS (Continued)

Material type	Desk type	Size group (ft^2)	Basic Desk weight-B (lb)	Weight of Personal drawer D_p (lb)	Weight of Box drawer D_b (lb)	Weight of File drawer D_f (lb)	Weight of Center drawer D_c (lb)
Wood	Single Pedestal	7-9.5	104,20	5,1.8	8,1.3	12,2.9	8,0.3
		9.6-12	128,44	5,1.8	8,1.3	12,2.9	8,0.3
		12.1-14.5	204,51	5,1.8	8,1.3	12,2.9	8,0.3
		>14.6	180,49	5,1.8	8,1.3	12,2.9	8,0.3
	Double Pedestal	7-9.5	114,33	5,1.8	8,1.3	12,2.9	8,0.3
		9.6-12	164,76	5,1.8	8,1.3	12,2.9	8,0.3
		12.1-14.5	201,40	5,1.8	8,1.3	12,2.9	8,0.3
		>14.6	241,47	5,1.8	8,1.3	12,2.9	8,0.3
	Legs	7-9.5	111,20	5,1.8	8,1.3	12,2.9	8,0.3
		9.6-12	NA	5,1.8	8,1.3	12,2.9	8,0.3
		12.1-14.5	175,37	5,1.8	8,1.3	12,2.9	8,0.3
		>14.6	222,33	5,1.8	8,1.3	12,2.9	8,0.3
Plastic	Single Pedestal	7-9.5 9.6-12 12.1-14.5 >14.6	N.A	N A	N A	N A	N A
	Double Pedestal	7-9.5 9.6-12 12.1-14.5 >14.6	N A	N A	N A	N A	N A
	Legs	7-9.5 9.6-12 12.1-14.5 >14.6	N A	N A	N A	N A	N A

Values listed are sample mean and standard deviation--$\overline{X}$, s

TABLE 9 TRANSFER FUNCTION FOR TABLES

$$W_t = T_{ijk} + N_c D_{ci}$$

W_t = total weight of a table

T = basic table weight

N_c = 1 with a center drawer or 0 without a center drawer

D_c = weight of a center drawer

i = material type - metal, wood, plastic

j = table type - legs, pedestal

k = size group - top surface area

Material Type	Table Type	Size Group (ft ^{2})	Basic Table Weight (lb)	Weight of a Center Drawer-D_{ci} (lb)
Metal	Pedestal	4-9	39,6.1	14,2.1
		9.1-11.9	64,5.7	
		12-12.5	73,11	
		12.6-15.9	74,11	
		16-18	NA	
		18.1-26.9	NA	
		27-44.9	NA	
		≥45	NA	
	Legs	4-9	50,9.8	14,2.1
		9.1-11.9	71,9.9	
		12-12.5	80,11.8	
		12.6-15.9	98,8.2	
		16-18	114,17.3	
		18.1-26.9	149,26	
		27-44.9	238,22.8	
		≥45	445,62	

Values listed are sample mean and standard deviation- $\overline{X}$, s

TABLE 9 TRANSFER FUNCTION FOR TABLES (Continued)

Material Type	Table Type	Size Group (ft^2)	Basic Table Weight-T (lb)	Weight of a Center Drawer-D_c (lb)
Wood	Pedestal	4-9	70,22.6	8,0.3
		9.1-11.9	82,34.3	
		12-12.5	90,27	
		12.6-15.9	98,54.5	
		16-18	131,61.8	
		18.1-26.9	178,67.4	
		27-44.9	280,27.4	
		≥ 45	361,130	
	Legs	4-9	42,12	8,0.3
		9.1-11.9	70,17.6	
		12-12.5	83,21	
		12.6-15.9	102,20.5	
		16-18	118,18.8	
		18.1-26.9	163,30.8	
		27-44.9	254,85.2	
		≥ 45	428,50.1	
Plastic	Pedestal	4-9	NA	NA
		9.1-11.9	NA	
		12-12.5	NA	
		12.6-15.9	NA	
		16-18	NA	
		18.1-26.9	NA	
		27-44.9	NA	
		≥ 45	NA	
	Legs	4-9	73,8.5	NA
		9.1-11.9	NA	
		12-12.5	97,12	
		12.6-15.9	NA	
		16-18	97,12	
		18.1-26.9	NA	
		27-44.9	NA	
		≥ 45	NA	

Values listed are sample mean and standard deviation $\bar{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS-ALL-PURPOSE

$$W_{apc} = C_{ikh} + N_s S^W{}_{il} + N_p D_{pi} + N_B D_{Bi} + N_f D_{fi}$$

W_{apc} = total weight of an all-purpose cabinet
C = basic all-purpose cabinet weight
N_s = number of shelves
S^W = weight of a shelf
N_p = number of personal drawers
D_p = weight of a personal drawer
N_B = number of box drawers
D_B = weight of a box drawer
N_f = number of file drawers
D_f = weight of a file drawer
i = material type -- metal, wood, plastic
k = size groups - top surface area
h = height groups
l = shelf size groups - top surface area

TABLE 10 TRANSFER FUNCTION FOR CABINETS- ALL-PURPOSE (Continued)

Material Type	Height Group (in)	Size Group (ft^2)	Basic All-Purpose Cabinet Weight-C (lb)	Weight of a Shelf (lb)	Weight of a Personal Drawer (lb)	Weight of a Box Drawer (lb)	Weight of a File Drawer (lb)
Wood	19-27.9	2-2.9	NA	6,0.7	4,0.5	6,0.7	10,3.3
		3-3.9	83,5.1	7,0.8			
		4-6.9	114,5	8,1.0			
		7-9.9	153,2.5	9,1.1			
		10-11.9	NA	NA			
		≥ 12	NA	NA			
	28-34.9	2-2.9	NA	NA	4,0.5	6,0.7	10,3.3
		3-3.9	NA	NA			
		4-6.9	132,23	8,1.0			
		7-9.9	174,34	9,1.1			
		10-11.9	206,33	9,1.1			
		≥ 12	287,45	9,1.1			
	35-49.9	2-2.9	NA	NA	NA	NA	NA
		3-3.9	NA				
		4-6.9	NA				
		7-9.9	NA				
		10-11.9	NA				
		≥ 12	NA				
	50-69.9	2-2.9	96,9.9	6,0.7	4,0.5	6,0.7	10,3.3
		3-3.9	NA	NA			
		4-6.9	NA				
		7-9.9	NA				
		10-11.9	NA				
		≥ 12	NA				
	≥70	2-2.9	NA	NA	4,0.5	6,0.7	10,3.3
		3-3.9	NA	NA			
		4-6.9	332,33	8,1.0			
		7-9.9	371,37	9,1.1			
		10-11.9	NA	NA			
		≥ 12	NA	NA			

Values listed are sample mean and standard deviation $\overline{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS- ALL-PURPOSE (Continued)

Material Type	Height Group (in)	Size Group (ft^2)	Basic All-Purpose Cabinet Weight-C (lb)	Weight of a Shelf (lb)	Weight of a Personal Drawer (lb)	Weight of a Box Drawer (lb)	Weight of a File Drawer (lb)
Metal	19-27.9	2-2.9	27,3.3	5,1.5	7,0.6	9,0.6	20,0.6
		3-3.9	NA	NA			
		4-6.9	41,6.6	8,1.0			
		7-9.9	161,13	9,1.1			
		10-11.9	NA	NA			
		≥12	NA	NA			
	28-34.9	2-2.9	43,1.6	5,1.5	7,0.6	9,0.6	20,0.6
		3-3.9	63,5	6,1.1			
		4-6.9	100,27.9	8,1.0			
		7-9.9	166,56.6	9,1.1			
		10-11.9	181,23.4	9,1.1			
		≥12	262,44.5	9,1.1			
	35-49.9	2-2.9	59,7.8	5,1.5	7,0.6	9,0.6	20,0.6
		3-3.9	89,10.6	6,1.1			
		4-6.9	96,20.6	8,1.0			
		7-9.9	NA	NA			
		10-11.9	NA	NA			
		>12	NA	NA			
	50-69.9	2-2.9	85,13.7	5,1.5	7,0.6	9,0.6	20,0.6
		3-3.9	118,18.9	6,1.1			
		4-6.9	119,26.8	8,1.0			
		7-9.9	NA	NA			
		10-11.9	NA	NA			
		≥12	NA	NA			
	≥ 70	2-2.9	76,3.5	5,1.5	7,0	9,0.6	20,0.6
		3-3.9	86,8.6	6,1.1			
		4-6.9	163,27.5	8,1.0			
		7-9.9	NA	NA			
		10-11.9	NA	NA			
		≥12	NA	NA			

Values listed are sample mean and standard deviation $\overline{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS- ALL-PURPOSE (Continued)

Material Type	Height Group (in)	Size Group (ft^2)	Basic All-Purpose Cabinet Weight-C (lb)	Weight of a Shelf (lb)	Weight of a Personal Drawer (lb)	Weight of a Box Drawer (lb)	Weight of a File Drawer (lb)
Plastic	19-27.9	2-2.9	NA	NA	NA	NA	NA
		3-3.9	NA				
		4-6.9	NA				
		7-9.9	NA				
		10-11.9	NA				
		≥ 12	NA				
	28-34.9	2-2.9	NA	NA	NA	NA	NA
		3-3.9	NA				
		4-6.9	NA				
		7-9.9	NA				
		10-11.9	NA				
		≥ 12	NA				
	35-49.9	2-2.9	NA	NA	NA	NA	NA
		3-3.9	NA				
		4-6.9	NA				
		7-9.9	NA				
		10-11.9	NA				
		≥ 12	NA				
	50-69.9	2-2.9	NA	NA	NA	NA	NA
		3-3.9	NA				
		4-6.9	NA				
		7-9.9	NA				
		10-11.9	NA				
		≥ 12	NA				
	≥ 70	2-2.9	NA	NA	NA	NA	NA
		3-3.9	NA				
		4-6.9	NA				
		7-9.9	NA				
		10-11.9	NA				
		≥ 12	NA				

Values listed are sample mean and standard deviation $\overline{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS--EXCLUDING ALL-PURPOSE

$$W_c = C_{ijkh}$$

W_c = total weight of a cabinet
C = basic cabinet weight
i = material type - metal, wood, plastic
j = cabinet type - file, card, blueprint, safe
k = size groups - top surface area
h = height groups

Material type	Cabinet type	Height Group (in)	Size Group (ft^2)	Basic Cabinet Weight-C (lb)
Metal	File	12-19.9	2-2.9	NA
			3-3.9	60,12
			4-4.9	73,14.6
			$\geq$ 5	85,17
		20-35.9	2-2.9	49,11.1
			3-3.9	88,17.7
			4-4.9	85,17.9
			$\geq$ 5	129,27.1
		36-44.9	2-2.9	120,28
			3-3.9	140,19
			4-4.9	167,30.1
			$\geq$ 5	185,33.3
		45-55.9	2-2.9	171,24.5
			3-3.9	178,41.8
			4-4.9	233,41.9
			$\geq$ 5	257,46.3
		$\geq$ 56	2-2.9	188,35.6
			3-3.9	209,33.9
			4-4.9	283,50.9
			$\geq$ 5	315,53.6
	Card	< 20	2-2.9	14.5,6.2
			$\geq$ 3	24,1.9
		20-35.9	2-2.9	NA
			$\geq$ 3	NA
		36-44.9	2-2.9	163,63.2
			$\geq$ 3	197,54.4
		$\geq$ 45	2-2.9	230,71.5
			$\geq$ 3	223,64.5

Values listed are sample mean and standard deviation-$\bar{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS--EXCLUDING ALL-PURPOSE (Continued)

Material type	Cabinet type	Height Group (in)	Size Group (ft^2)	Basic Cabinet Weight-C (lb)
Metal (Continued)	Blueprint	12-19.9	2-2.9	NA
			3-3.9	190,71.3
			4-6.9	227,60
			7-9.9	200,64
			10-11.9	285,91.2
			≥ 12	357,114.2
		20-35.9	2-2.9	NA
			3-3.9	NA
			4-6.9	NA
			7-9.9	NA
			10-11.9	NA
			≥ 12	NA
		≥ 36	2-2.9	NA
			3-3.9	125,12.6
			4-6.9	190,19
			7-9.9	NA
			10-11.9	NA
			≥ 12	856,85.6
	Safe	12-19.9	2-2.9	NA
			3-3.9	NA
			≥ 4	NA
		20-35.9	2-2.9	NA
			3-3.9	313,32.7
			≥ 4	332,36.6
		36-44.9	2-2.9	NA
			3-3.9	430,52.9
			≥ 4	453,46.5
		≥ 45	2-2.9	NA
			3-3.9	554,62.6
			≥ 4	613,55.9

Values listed are sample mean and standard deviation--$\bar{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS--EXCLUDING ALL-PURPOSE (Continued)

Material type	Cabinet type	Height Group (in)	Size Group (ft^2)	Basic Cabinet Weight-C (lb)
Wood	File	12-19.9	2-2.9	NA
			3-3.9	NA
			4-4.9	NA
			≥ 5	NA
		20-35.9	2-2.9	70,8.7
			3-3.9	97,17.5
			4-4.9	108,4.9
			≥ 5	134,27.7
		36-44.9	2-2.9	NA
			3-3.9	NA
			4-4.9	NA
			≥ 5	NA
		45-55.9	2-2.9	NA
			3-3.9	230,41.4
			4-4.9	NA
			≥ 5	NA
		≥ 56	2-2.9	120,21.6
			3-3.9	NA
			4-4.9	NA
			≥ 5	NA
	Card	< 20	2-2.9	56,18
			≥ 3	78,27.5
		20-35.9	2-2.9	NA
			≥ 3	NA
		36-44.9	2-2.9	NA
			≥ 3	NA
		≥ 45	2-2.9	NA
			≥ 3	461,172

Values listed are sample mean and standard deviation--$\bar{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS--EXCLUDING ALL-PURPOSE (Continued)

Material type	Cabinet type	Height Group (in)	Size Group (ft^2)	Basic Cabinet Weight-C (lb)
Wood (Continued)	Blueprint	12-19.9	2-2.9	NA
			3-3.9	NA
			4-6.9	NA
			7-9.9	NA
			10-11.9	NA
			≥ 12	NA
		20-35.9	2-2.9	NA
			3-3.9	NA
			4-6.9	NA
			7-9.9	NA
			10-11.9	NA
			≥ 12	NA
		≥ 36	2-2.9	NA
			3-3.9	NA
			4-6.9	NA
			7-9.9	NA
			10-11.9	NA
			≥ 12	NA
	Safe	12-19.9	2-2.9	NA
			3-3.9	NA
			≥ 4	NA
		20-35.9	2-2.9	NA
			3-3.9	NA
			≥ 4	NA
		36-44.9	2-2.9	NA
			3-3.9	NA
			≥ 4	NA
		≥ 45	2-2.9	NA
			3-3.9	NA
			≥ 4	NA

Values listed are sample mean and standard deviation-- $\overline{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS--EXCLUDING ALL-PURPOSE (Continued)

Material type	Cabinet type	Height Group (in)	Size Group (ft^2)	Basic Cabinet Weight-C (lb)
Plastic	File	12-19.9	2-2.9	NA
			3-3.9	NA
			4-4.9	NA
			≥ 5	NA
		20-35.9	2-2.9	NA
			3-3.9	NA
			4-4.9	NA
			≥ 5	NA
		36-44.9	2-2.9	NA
			3-3.9	NA
			4-4.9	NA
			≥ 5	NA
		45-55.9	2-2.9	NA
			3-3.9	NA
			4-4.9	NA
			≥ 5	NA
		≥ 56	2-2.9	NA
			3-3.9	NA
			4-4.9	NA
			≥ 5	NA
	Card	12-19.9	2-2.9	NA
			> 3	NA
		20-35.9	2-2.9	NA
			≥ 3	NA
		36-44.9	2-2.9	NA
			≥ 3	NA
		≥ 45	2-2.9	NA
			≥ 3	NA

Values listed are sample mean and standard deviation--$\bar{X}$, s

TABLE 10 TRANSFER FUNCTION FOR CABINETS--EXCLUDING ALL-PURPOSE (Continued)

Material type	Cabinet type	Height Group (in)	Size Group (ft^2)	Basic Cabinet Weight-C (lb)
Plastic (Continued)	Blueprint	12-19.9	2-2.9	NA
			3-3.9	NA
			4-6.9	NA
			7-9.9	NA
			10-11.9	NA
			≥ 12	NA
		20-35.9	2-2.9	NA
			3-3.9	NA
			4-6.9	NA
			7-9.9	NA
			10-11.9	NA
			≥ 12	NA
		≥ 36	2-2.9	NA
			3-3.9	NA
			4-6.9	NA
			7-9.9	NA
			10-11.9	NA
			≥ 12	NA
	Safe	12-19.9	2-2.9	NA
			3-3.9	NA
			≥ 4	NA
		20-35.9	2-2.9	NA
			3-3.9	NA
			≥ 4	NA
		36-44.9	2-2.9	NA
			3-3.9	NA
			≥ 4	NA
		≥ 45	2-2.9	NA
			3-3.9	NA
			≥ 4	NA

Values listed are sample mean and standard deviation--$\bar{X}$, s

TABLE 11 TRANSFER FUNCTION FOR SHELVING--FREE SHELVING

$$W_{Fs} = N_s\, S^f_{il}$$

W_{Fs} = total weight of free shelving

N_s = number of shelves

S^f = weight of one free shelf

i = material type - metal, wood, plastic

l = size groups - top surface area

Material type	Size group (ft^2)	Basic Shelf weight-S^f (lb)
Metal	2-2.9	10,0.6
	3-3.9	11,1.6
	4-5.9	15,3.6
	6-7.9	18,1.7
	$\geq$ 8	21,1.2
Wood	2-2.9	9,1.2
	3-3.9	10,1.6
	4-5.9	19,2
	6-7.9	NA
	$\geq$ 8	NA
Plastic	2-2.9	NA
	3-3.9	NA
	4-5.9	NA
	6-7.9	NA
	$\geq$ 8	NA

Values listed are sample mean and standard deviation-$\bar{X}$, s

TABLE 11 TRANSFER FUNCTION FOR SHELVING-BOOKCASE (Continued)

$$W_b + S_{ikh} + N_s S^b{}_{ik}$$

W_b = total weight of a bookcase

S = basic bookcase weight

N_s = number of shelves

S^b = weight of one bookcase shelf

i = material type - metal, wood, plastic

k = size group - top surface area

h = height groups

Material type	Height group (in)	Size group (ft^2)	Basic Bookcase Weight-S (lb)	Weight of a Bookcase Shelf (lb)
Metal	28-36.9	2-2.9	33,2.3	5,1.5
		3-3.9	50,3.7	6,1.1
		4-4.9	58,4.1	8,1.0
		≥5	82,5.7	9,1.1
	37-49.9	2-2.9	38,2.7	5,1.5
		3-3.9	67,14	6,1.1
		4-4.9	62,7.5	8,1.0
		≥5	87,26.6	9,1.1
	50-65.9	2-2.9	NA	5,1.5
		3-3.9	89,22.3	6,1.1
		4-4.9	84,1.6	8,1.0
		≥5	NA	9,1.1
	≥66	2-2.9	72,11.1	5,1.5
		3-3.9	NA	6,1.1
		4-4.9	NA	8,1.0
		≥5	151,19.3	9,1.1

Values listed are sample mean and standard deviation - $\overline{X}$, s

TABLE 11 TRANSFER FUNCTION FOR SHELVING-BOOKCASE (Continued)

Material type	Height group (in)	Size group (ft^2)	Basic Bookcase Weight-S (lb)	Weight of a Bookcase Shelf (lb)
Wood	28-36.9	2-2.9	60,10.8	6,0.7
		3-3.9	55,8.4	7,0.8
		4-4.9	77,15.3	8,1.0
		≥ 5	92,16.6	9,1.1
	37-49.9	2-2.9	46,1.7	6,0.7
		3-3.9	69,9.4	7,0.8
		4-4.9	77,14.3	8,1.0
		≥ 5	114,27.4	9,1.1
	50-65.9	2-2.9	71,5.5	6,0.7
		3-3.9	88,17.5	7,0.8
		4-4.9	NA	8,1.0
		≥ 5	NA	9,1.1
	≥66	2-2.9	NA	6,0.7
		3-3.9	123,24.6	7,0.8
		4-4.9	NA	8,1.0
		≥ 5	NA	9,1.1
Plastic	28-36.9	2-2.9	NA	NA
		3-3.9	NA	
		4-4.9	NA	
		≥5	NA	
	37-49.9	2-2.9	NA	NA
		3-3.9	NA	
		4-4.9	NA	
		≥5	NA	
	50-65.9	2-2.9	NA	NA
		3-3.9	NA	
		4-4.9	NA	
		≥5	NA	
	≥66	2-2.9	NA	NA
		3-3.9	NA	
		4-4.9	NA	
		≥5	NA	

Values listed are sample mean and standard deviation-$\bar{X}$,s

TABLE 12 TRANSFER FUNCTION FOR SEATING

$W_s = C_{ij}$

W_s = total Weight of a seating item

C = basic seating weight

i = material type - metal, wood, plastic

j = seating type

1 = legs with arms
2 = legs without arms
3 = pedestal with arms and height $\leq$ 38.5
4 = pedestal with arms and height $>$ 38.5
5 = pedestal without arms
6 = upholstered
7 = sofa 48" - 71" long
8 = sofa 72" - 90" long
9 = sofa $\geq$ 91"
10 = bench
11 = drafting stool
12 = classroom chair

Material Type	Seating Type	Basic Seating Unit Weight - C (lb)
Metal	1	25,9
	2	20,8.6
	3	33,17.9
	4	81,9.1
	5	24,12.4
	6	99,12.6
	7	NA
	8	141,38.9
	9	175,32.2
	10	77,38.5
	11	34,8.4
	12	23,5.5
Wood	1	44,10.9
	2	34,5.3
	3	54,13
	4	78,10.8
	5	40,14.6
	6	90,27.5
	7	173,33.2
	8	205,49.6
	9	299,52.6
	10	29,7.6
	11	NA
	12	NA

Values listed are sample mean and standard deviation--$\bar{X}$, s

TABLE 12 TRANSFER FUNCTION FOR SEATING (Continued)

Material Type	Seating Type	Basic Seating Unit Weight - C (lb)
Plastic	1	16,4
	2	13,5.4
	3	24,15.1
	4	NA
	5	21,11.5
	6	NA
	7	NA
	8	NA
	9	NA
	10	NA
	11	NA
	12	20,1.5

Values listed are sample mean and standard deviation--$\overline{X}$, s

TABLE 13 TRANSFER FUNCTION FOR PAPER AND BOOKS

Paper

$$W_p = P_k hc$$

W_p = total weight of paper

P = basic paper weight per inch

k = size groups

h = height of pile

c = % of compaction

Size groups (in)	Basic Paper Weight-P (lb/in)
8.5 x 11	2.1, 0.2
8.5 x 15	2.8, 0.3
11 x 15	4.2, 0.4
15 x 20	5.3, 0.5

Values listed are sample mean and standard deviation- $\overline{X}$, s

Note: Data obtained from manufacturers and random weighing of piles of paper

TABLE 13 TRANSFER FUNCTION FOR PAPER AND BOOKS (Continued)

Books

$$W_{Bk} = B_k lc$$

W_{Bk} = total weight of a book

B = basic book weight per inch

k = size groups - height X width

l = length of row

c = % of compaction

Size groups (in)	Basic Book Weight-B (lb/in)
< 7 x 7.25	1.3, 0.2
> 7 x 7.25 - 10 x 6.5 <	2.0, 0.2
10 x 6.5 >	2.3, 0.3

Values listed are sample mean and standard deviation- $\overline{X}$, s

Note: Data obtained from manufacturers and random weighing of piles of books

TABLE 14 TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS

Telephones

$$W_{ph} = PH_b$$

W_{ph} = total weight of a telephone

PH = basic telephone weight

b = number of buttons

Number of Buttons	Basic Telephone Weight-PH (lb)
0	3.6,0
6	3.9,0
10	6.3,0
12	8,0
18	11.8,0
20	12.4,0
30	13,0

Values listed are sample mean and standard deviation $\overline{X}$, s

TABLE 14 TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Typewriter

$$W_{ty} = T_{jk}$$

W_{ty} = total weight of a typewriter
T = basic typewriter weight
j = typewriter type - electric, manual
k = size groups - carriage length

Typewriter type	size groups (in)	Basic Typewriter Weight-T (lb)
Manual	11-14	31,2.8
	15-16	33.5,3.0
	17-20	37,3.3
	21-24	44,4.0
	25-30	NA
Electric	11-14	47,5.6
	15-16	52,9.3
	17-20	52,4.7
	21-24	56,1.8
	25-30	61,1.8

Values listed are sample mean and standard deviation $\overline{X}$, s

TABLE 14 TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Calculators

$$W_{ca} = CA_{jk}$$

W_{ca} = total weight of a calculator

CA = basic calculator weight

j = calculator type

k = size groups

Calculator type	Size groups (in^2)	Basic Calculator weight-CA (lb)
Illuminated Read-out	10-65.9	1.6,0.7
	66-105.9	4.6,1.1
	106-136.9	7.1,1.0
	137-170.9	9.3,0.9
	171	18,4.1
Illuminated Read-out With Tape	10-65.9	NA
	66-105.9	NA
	106-136.9	10,1.8
	137-170.9	13,2.3
	171	26,4.7
Dial Read-out	10-65.9	NA
	66-105.9	NA
	106-136.9	NA
	137-170.9	29,0.3
	171	43,0.2
Tape Only	90-119.9	15,3.0
	120-154.9	23,2.7
	155-199.9	27,7.7
	200	39,3.8

Values listed are sample mean and standard deviation - $\overline{X}$, s

TABLE 14 TRANSFER FUNCTION FOR EQUIPMENT AND PARTITIONS (Continued)

Partitions

$W_{pa} = PA_{ih} l$

W_{pa} = total weight of partition

PA = partition weight per foot

i = material type -

h = height group

l = length of partition

Material type	Height group (in^2)	Partition weight-PA * (lb/ft)
Steel	< 48	14,2.1
	48-59.9	21,2.1
	60-71.9	26,4.6
	≥ 72	35,5.8
Fabric	< 48	NA
	48-59.9	17,6.3
	60-71.9	18,7.1
	≥ 72	22,8.1
Plastic	< 48	14,2.8
	48-59.9	19,3.3
	60-71.9	24,5.6
	≥ 72	33,7.6
Wood	< 48	NA
	48-59.9	NA
	60-71.9	NA
	≥ 72	NA

Values listed are sample mean and standard deviation- $\overline{X}$, s

*For fire load purposes, the partition weight obtained from the transfer functions were multiplied by the following values to determine fire load:

Steel--0.00, Fabric - 1.00, Plastic - 0.75, Wood - 1.00

and buildings with a single tenant such as corporate headquarters. The data in Tables 8 through 14 were therefore used since they provide a better indication of the variability of the weight of content items for the office building population of the United States.

The transfer functions in Tables 8 through 14 give the actual item weight. The total weight is needed from the standpoint of live loads. For fire loads, however, the combustibility must be taken into account. For example, although a metal desk may weigh 250 lbs. only the veneer on the top surface and the paint are combustible and the fire load may be as low as 10 lbs. For items composed of both combustible and non-combustible materials, the percentage of the actual weight which is combustible is required. For simplicity, the values in Tables 15 and 16 were arbitrarily selected to represent reasonable composite estimates of the combustible content and calorific value. It is customary in expressing fire load data for different types of materials to convert weights to an equivalent weight of wood or cellulose (11, 46). Conversion factors for this purpose are also given in Tables 15 and 16. These factors were obtained by dividing the calorific value for the material by the calorific value for cellulose (taken as 8000 Btu/lb). Note that for items composed of two materials such as a padded wooden chair, judgment based on NBS fire test experience, the combustible characteristics of the types of materials, and the estimated proportion of the total item weight each material comprised was used in selecting these values.

In dealing with enclosed combustibles such as papers in filing cabinets, a derating factor (i.e., an estimate of the quantity of the material which will burn in a fire) is used. Derating factors, similar to those used for combustibles in steel containers (11), used in this study are given in Table 17. The derating factors are a function of the ratio of enclosed combustible weight to the total combustible weight in the room. In computing the fire loads for enclosed combustible contents from the survey data, the derating factor was determined using the ratio noted then their weight was multiplied by the derating factors prior to computing their fire load.

Since the exposed combustible interior finish surfaces of the rooms, i.e., floors, walls, and ceiling, are considered part of the fire load, it was also necessary to develop transfer functions for these items. The amount of visual data which could be easily obtained in a field survey, however, was limited in this case. For example, the thickness of wall paneling or the number of coats of paint on a wall cannot usually be determined by simple visual inspection. Therefore, only the very general inventory information described in the next section was collected for the bounding surfaces. For this reason, the transfer functions for these items are single values. To establish these values, information on the weight and calorific value of different types of interior finish materials and coverings was collected. This information is summarized in Tables 18 and 19. Based on this information, representative values to be used to convert the survey data to fire loads for the bounding surfaces were selected. These values are given in Table 20.

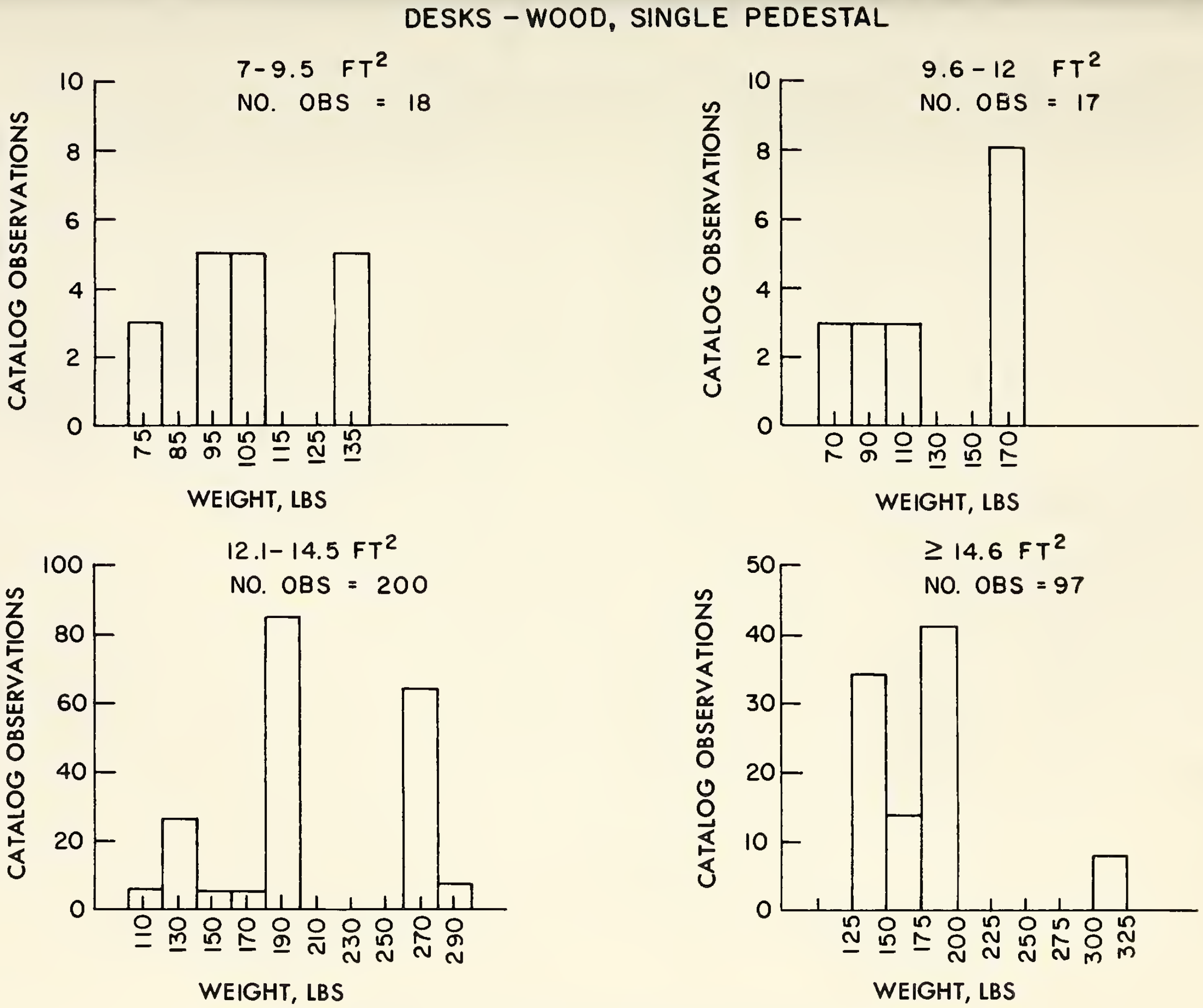


Fig. 3 Catalog Frequency Distribution for Wood Desks

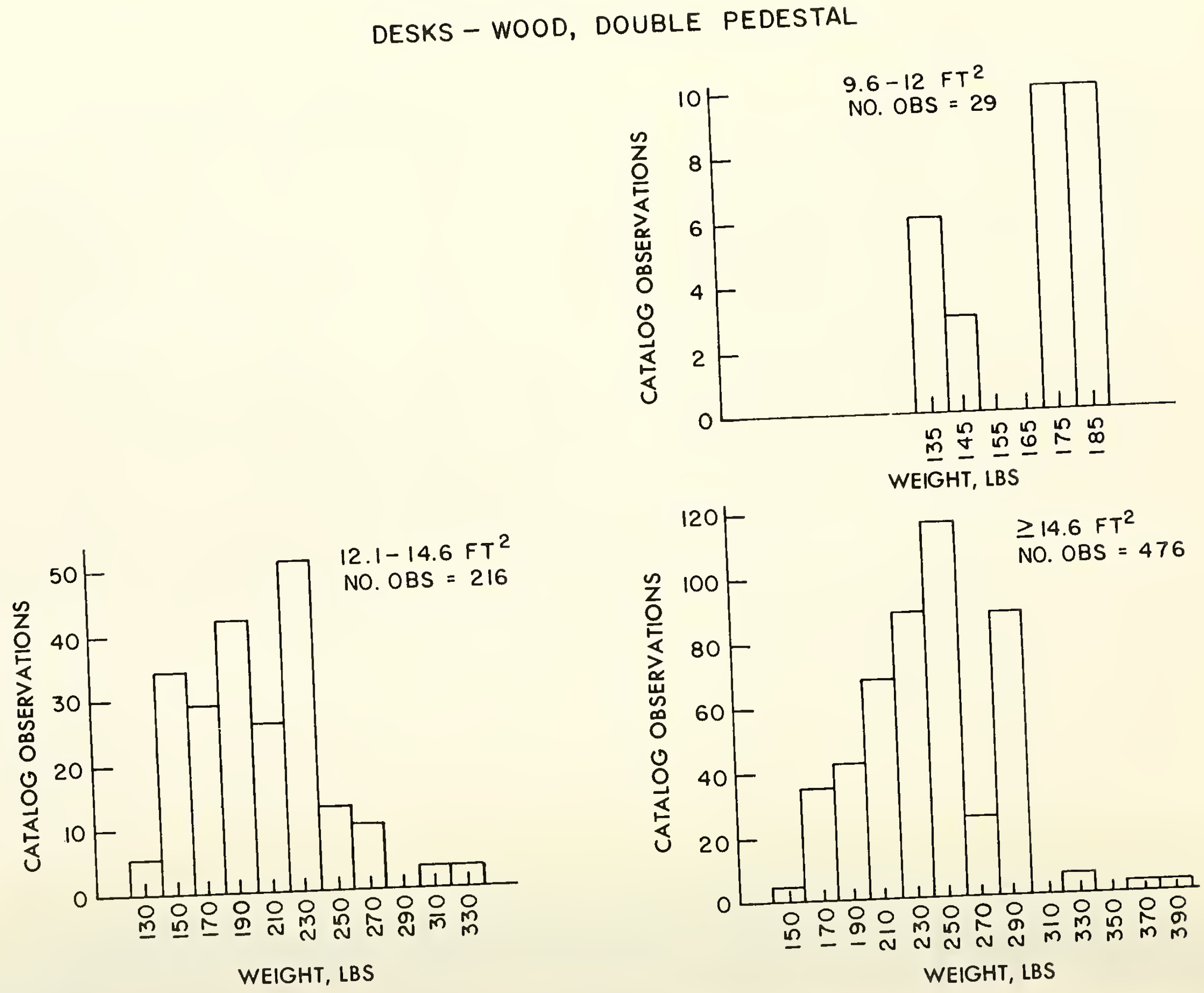


Fig. 3 Catalog Frequency Distribution for Wood Desks -Continued

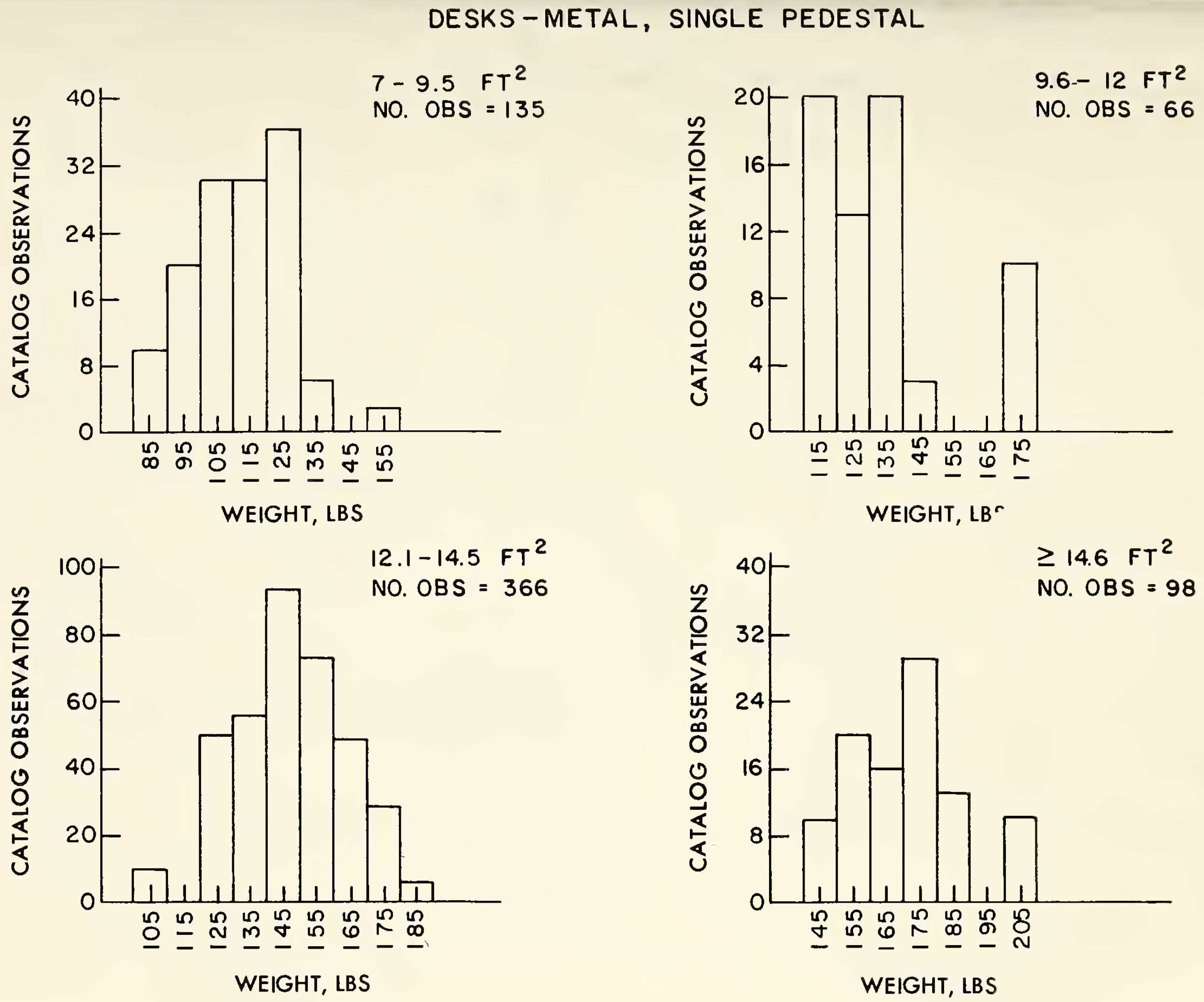
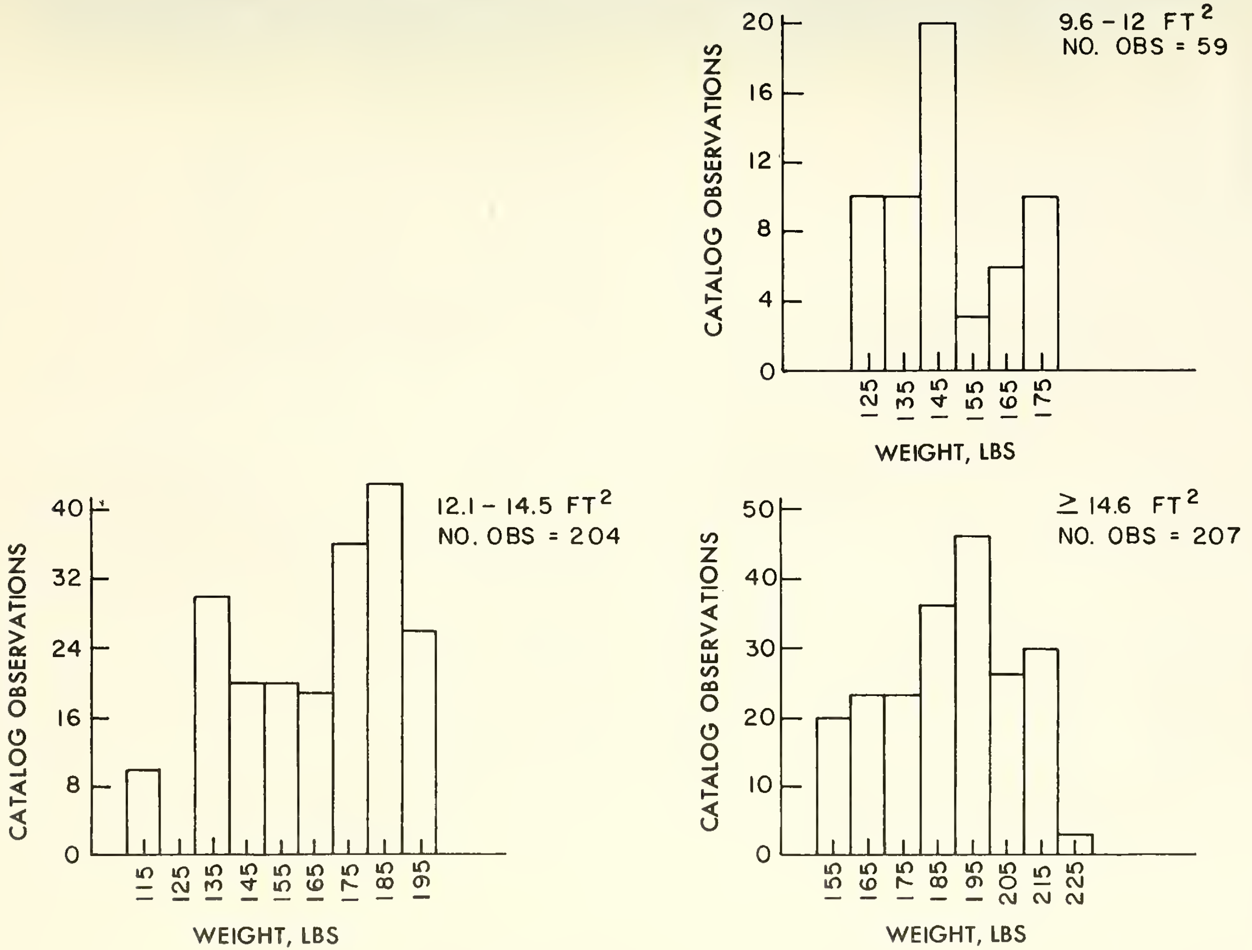


Fig. 4 Catalog Frequency Distribution for Metal Desks

Fig. 4 Catalog Frequency Distribution for Metal Desks -Continued

DESKS – METAL, DOUBLE PEDESTAL



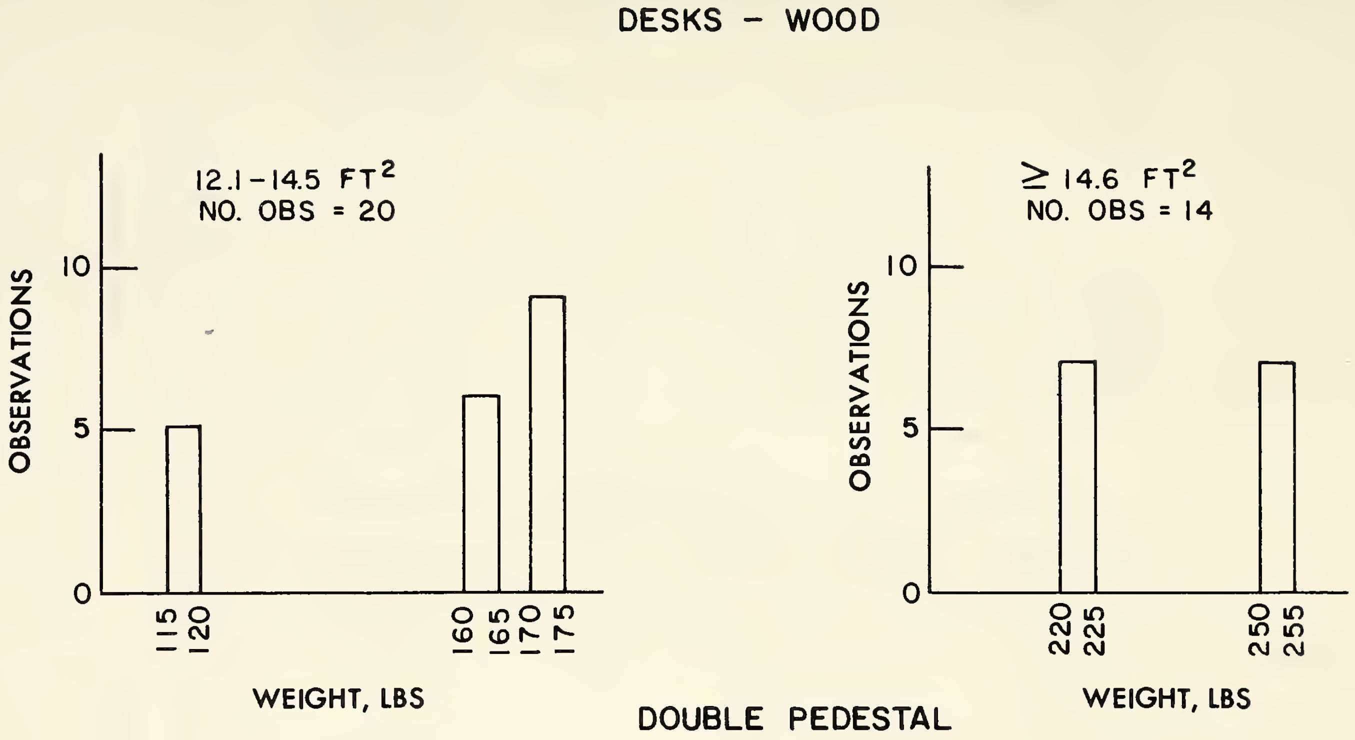


Fig. 5 Frequency Distribution for Wood Desks--Bryson and Gross Survey

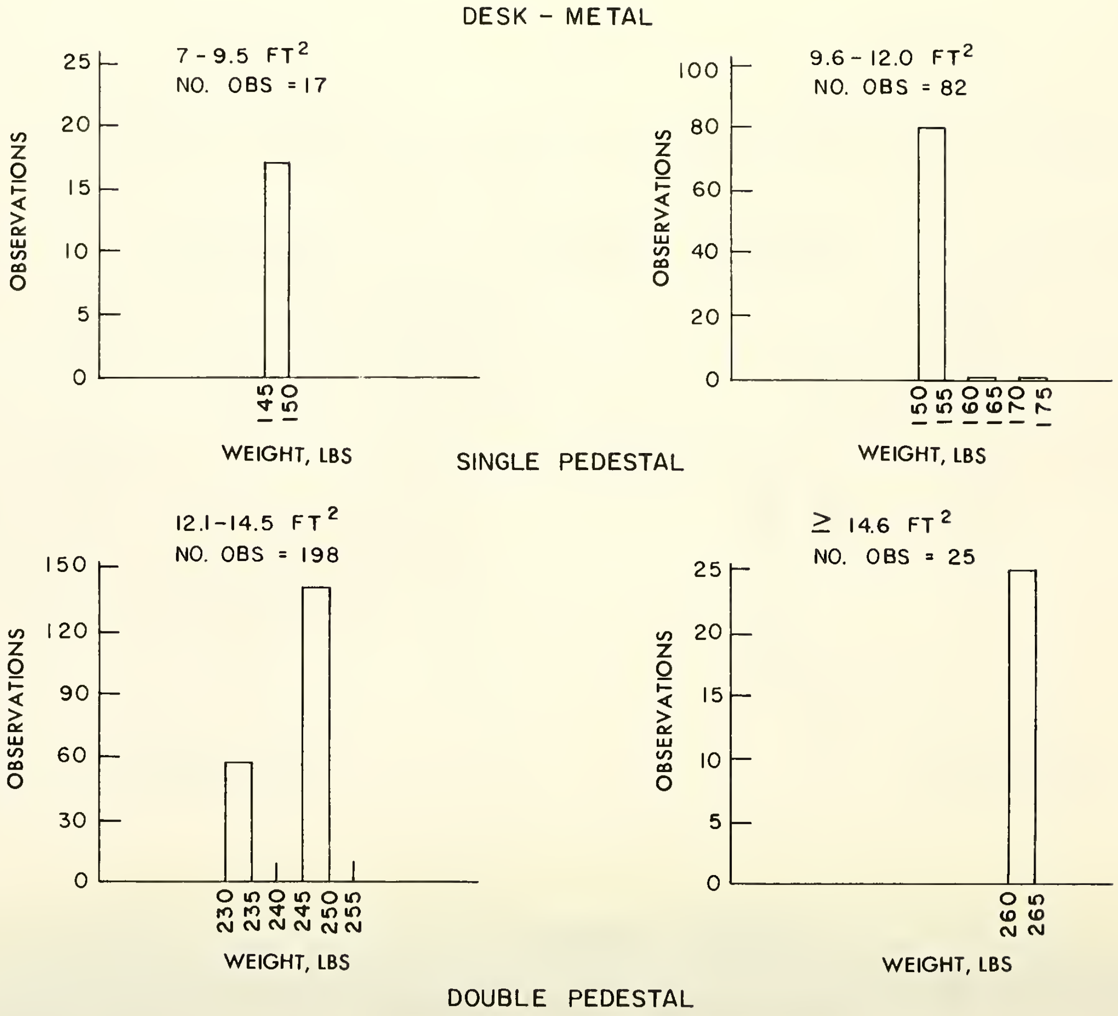


Fig. 6 Frequency Distribution for Metal Desks--Bryson and Gross Survey

TABLE 15 FIRE LOAD VALUES FOR FURNITURE

Item	Material type	% Total Item Weight assumed combustible	Calorific value (Btu/lb.)	Cellulose Conversion Factor (Calorific Value/8000)
Desk	Wood	100	8000	1.00
	Metal	0	0	0.00
	Plastic	100	6000	0.75
Table	Wood	100	8000	1.00
	Metal	0	0	0.00
	Plastic	100	6000	0.75
Cabinet	Wood	100	8000	1.00
	Metal	0	0	0.00
	Plastic	100	6000	0.75
Shelving	Wood	100	8000	1.00
	Metal	0	0	0.00
	Plastic	100	6000	0.75
Seating	Wood Frame	100	8000	1.00
	Metal Frame	0	0	0.00
	Plastic Frame	100	6000	0.75

$$\text{Fire load} = \left[\begin{array}{l}\text{Weight in lb from transfer}\\ \text{function}\end{array}\right] \times \left[\begin{array}{l}\text{fraction total item}\\ \text{weight assumed com-}\\ \text{bustible}\end{array}\right] \times \left[\begin{array}{l}\text{Cellulose}\\ \text{Conversion}\\ \text{Factor}\end{array}\right]$$

TABLE 18 SUMMARY OF WEIGHT DATA
FOR ROOM BOUNDING SURFACES (Continued)

Walls, Ceilings and Floors

Location	Material	Type	Thickness Range (in)	Weight Range (lb/ft^2)	Data Source
Ceiling and Wall Covering	Acoustical Tile	Mineral	0.5-0.75	0.85-1.5	Ref. 42
		Fiber Glass	0.6-3	0.2-0.85	
		Cellulose	0.5-0.75	0.8-1.1	
		Tectum Board	1-2	1.5-3.3	
		Mineral Pad	1-2	0.05-04	
Flooring	Wood	Parquet	0.313	1.3	American Parquet Association Little Rock, Ark.
		Oak	0.375-0.75	1.0-2.3	National Oak Flooring Manufacturers Assoc. Memphis, Tenn.
	Resilient	Vinyl Tile	0.125	1.2	Armstrong Cork Co. Lancaster, Pa
		Vinyl Asbestos Tile	0.125	1.2	Ref. 36

TABLE 17 DERATING FACTORS FOR DETERMINING COMBUSTIBLE CONTRIBUTION FOR ENCLOSED CONTENTS

Type of Container	Container Material	Derating Factor		
		Ratio of enclosed combustible weight to total combustibles in room weight		
		(<50%)	(50%-80%)	(<80%)
Desk, Table Cabinet	Wood	1.0	1.0	1.0
	Metal	0.40	0.20	0.10
	Plastic	1.0	1.0	1.0
Shelving	Wood	1.0	1.0	1.0
	Metal	0.75	0.75	0.75
	Plastic	1.0	1.0	1.0
Misc. Item	Non-Combustible	0.75	0.75	0.75

Fire Load (lb) for Enclosed Contents = [Total weight of combustible contents from transfer function or weight estimate] x [Derating Factor]

3.3 Survey Data

Three sets of data collection forms were developed to obtain the information on the building characteristics, the building occupants and the room contents. The forms and instructions for collecting the data are included in Appendix B. The procedure adopted for processing this information is discussed in Section 3.5.

The Building Characteristics Form contains information on the building location, age, height, vertical load resisting system and the type of occupants. The building name and address were recorded only for general identification purposes. The building number assigned to each building was used for reference purposes in processing the data.

Information on the type and age of the firms occupying the buildings was collected on the Occupancy Data portion of the Building Characteristics Form. The classification of firms was in accordance with standard classifications developed to promote uniformity and comparability in the presentation of statistical data (31). Firm names were used only for identification purposes.

Locations for the firms were recorded directly on the floor plans of the building. Each area in the building was classified in accordance with the area use categories given in the instructions for annotating the building plans contained in Appendix B.

The data collected on the room contents is included in the Fire Load and Live Load Survey Form in Appendix B. The forms include data for the bounding surfaces (floors, walls and ceiling) as well as the moveable contents. The data include information on most of the important parameters affecting fire growth and fire severity (32). Data on some factors such as density, specific heat, etc. were not collected due to the difficulty in obtaining this information in a field survey of this type. Data on the characteristics of the bounding surfaces and the door and window openings (Form 1) were included in view of their effect on fire severity (46). Forms 2 through 6 were designed to collect data on the moveable contents. The descriptive data on the characteristics of furniture and equipment are required to obtain the weights of the items using the transfer functions. This information is also useful for characterizing the type and combustibility properties of room contents. Although discussions with furniture manufacturers established the fact that plastic is not generally used as the main construction material for office furniture, plastic was included on the forms as a material type. This was done since in some cases furniture intended for other than office use is sometimes used and the amount of plastic furniture in offices is of interest with respect to the fire problem.

In recording the locations of the items within the room, only the proximity of the item with respect to the walls was determined. As noted on the form, the location of the item was recorded as being within 2 ft. of a wall or greater than 2 ft. from a wall. Although load locations have been recorded more precisely in previous surveys, the analysis included in Appendix A indicated that the procedure adopted in this project is satisfactory.

TABLE 18 SUMMARY OF WEIGHT DATA FOR ROOM BOUNDING SURFACES

Walls, Ceilings and Floors

Location	Material	Type	Thickness Range (in)	Weight Range (lb/ft^2)	Data Source
Ceiling and Wall Covering	Paints and Enamels	Varnish	0.001 to 0.003 per coat	0.004 0.016	National Paint and Coatings Association Washington, D. C.
		Lacquer			
		Solvent-thinned (oil)		0.005-0.021	
		Primer		0.009-0.037	
		Water-thinned (latex)		.006-.022	
	High Density Plastic	Glass Rein-forced Plastic	0.08-0.12	0.5-0.8	Refs. 40, 41
		Vinyl Wall Covering	0.011-0.013	0.05-0.15 0.04-0.05	Ref 43
	Paper	Wall	- - - -	0.03-0.06	Wall Coverings Council, Inc. New York, N.Y.
	Textile or Drapes	Nylon	0.1-0.44	0.04-0.14	Refs. 40, 41
		Polyester			
		Fiberglass			
		Acrylic			
		Vinyl			
		Cotton			
		Wool			

TABLE 18 SUMMARY OF WEIGHT DATA FOR ROOM BOUNDING SURFACES (Continued)

Walls, Ceilings and Floors

Location	Material	Type	Thickness Range (in)	Weight Range (lb/ft^2)	Data Source
Ceiling and Wall Covering	Wood	Hardwood Plywood	0.125- 0.375	0.4-1.2	Refs. 40, 41, 42
		Softwood Plywood	0.125- 0.375	0.4-1.2	
		Particle Board	0.375- 0.750	1.5-3.1	
		Hardboard	0.125- 0.375	0.5-1.5	
		Pine	0.625	1.0	
		Fir	0.625	1.6	
		Cedar	0.625	1.0	
		Cypress	0.625	1.6	
		Oak	0.625	2.2	
		Mahogany	0.625	1.7	
	Gypsum-Board	Paper Covered	0.25- 0.625	1.1-2.5	Ref. 41
		Vinyl Surfaced	0.25 0.625	1.1-2.5	

TABLE 16 FIRE LOAD VALUES FOR EQUIPMENT, PAPER, BOOKS, AND OTHER FREE AND ENCLOSED CONTENTS

Item	Material Type	% Total Item Weight Assumed Combustible	Calorific Value (BTU/lb.)	Cellulose Conversion Factor (Calorific Value/8000)
Paper, Books	Paper	100	8000	1.00
Typewriter	Metal or Plastic	25	12000	1.50
Calculator	Metal or Plastic	50	12000	1.50
Telephone	Plastic	50	14000	1.75
Misc. and Other Free and Enclosed Contents	Combustible	100	8000	1.00

$$\text{Fire Load} = \left[\begin{array}{l}\text{Weight in lb from Transfer}\\ \text{Function or Weight Estimate}\end{array}\right] \times \left[\begin{array}{l}\text{fraction total item}\\ \text{weight assumed com-}\\ \text{bustible}\end{array}\right] \times \left[\begin{array}{c}\text{Cellulose Conversion}\\ \text{Factor}\end{array}\right]$$

TABLE 18 SUMMARY OF WEIGHT DATA
FOR ROOM BOUNDING SURFACES (Continued)

Walls, Ceilings, and Floors

Location	Material	Type	Thickness Range (in)	Weight Range (lb/ft^2)	Data Source
Flooring	Resilient (cont.)	Asphalt	0.125	1.2	Armstrong Cork Co., Lancaster, Pa. Ref 36
		Linoleum	0.09	0.9	
		Vinyl Sheet	0.09	0.9	
		Rubber Tile	0125-0.25	1.2-2.4	
		Underlayment	0.03-0.125	--	
	Carpeting	Wool	0.16-0.28	0.5-0.6	The Wool Bureau, Inc. New York, N.Y.
		Nylon	0.16-0.28	0.4-0.5	
		Acrylic	0.16-0.28	0.4-0.5	
		Polyester	0.16.0.28	0.4-0.5	The Carpet Rug Institute Dalton, Ga.
	Carpet Cushion	Composite (Rubberized Hair)	--	0.2-0.4	The Carpet and Rug Institute Dalton, Ga.
		Rubber	--	1.3-0.7	The Wool Bureau, Inc. New York, N. Y.

TABLE 18 SUMMARY OF WEIGHT DATA FOR ROOM BOUNDING SURFACES (Continued)

Walls, Ceilings and Floors

Location	Material	Type	Thickness Range (in)	Weight Range (lb/ft^2)	Data Source
Trim	Wood	Baseboard 4" - 6"	0.625	0.67	National Oak Flooring Manufacturers Association Memphis, Tennessee
		Casing 2" - 4"		0.40	
		Molding 3/4" - 2"		0.18	
	H.D. Plastic (Base Cove)	2-1/2"	0.08	0.16	Armstrong Cork Company Lancaster, Pennsylvania
		4"		0.26	
		6"		0.38	

TABLE 19 SUMMARY OF FIRE LOAD DATA FOR ROOM BOUNDING SURFACES

Walls, Ceilings and Floors

Location	Material	Type	Heat Content Range (Btu/lb)	Data Source
Ceiling and Wall Covering	Paints and Enamels	Varnish	2000-5000	Refs. 34, 35
		Lacquer		
		Solvent-thinned (oil)		
		Water-thinned (latex)		
	High Density Plastic	Glass Reinforced Plastic	5000-8000	Ref. 35
		Vinyl Wall Covering	6000-10,000	Unpublished NBS Test Data
	Paper	Wall	8000	Ref. 37
	Textile or Drapes	Nylon	14,000	Ref. 39
		Polyester	12,000-13,000	Unpublished NBS Test Data
		Fiberglass	100-200	Unpublished NBS Test Data
		Acrylic	8000-9200	Unpublished NBS Test Data
		Vinyl	9000	Ref. 34
		Cotton	7000	Ref. 37
		Wool	9000	Ref. 37

TABLE 19 SUMMARY OF FIRE LOAD DATA FOR ROOM BOUNDING SURFACES (Continued)

Walls, Ceilings and Floors

Location	Material	Type	Heat Content Range (Btu/lb)	Data Source
Ceiling and Wall Covering	Wood	Hardwood Plywood	8000	Refs. 34, 36, 37
		Softwood Plywood		
		Particle Board		
		Hard Board		
		Pine		
		Fir		
		Cedar		
		Cypress		
		Oak		
		Mahogany		
	Gypsum Board	Paper Covered	400-800	Ref. 34
		Vinyl Surfaced	800-1000	Ref. 38

TABLE 19 SUMMARY OF FIRE LOAD DATA FOR ROOM BOUNDING SURFACES (Continued)

Walls, Ceilings and Floors

Location	Material	Type	Heat Content Range (Btu/lb)	Data Source
Ceiling and Wall Covering	Acoustical Tile	Mineral (Painted)	1000	Ref. 33
		Fiber Glass	1000-3000	Refs. 34, 35, 36
		Cellulose	8000	Ref. 37
		Tectum Board	2000	Ref. 34
Flooring	Wood	Plywood	8000	Ref. 37
		Oak (Parquet strip)	8000	Ref. 34
	Resilient	Vinyl Tile/Sheet	9000	Refs. 34, 36
		Vinyl Asbestos Tile	2000	Ref. 35

TABLE19 SUMMARY OF FIRE LOAD DATA FOR ROOM BOUNDING SURFACES (Continued)

Walls, Ceilings and Floors

Location	Material	Type	Heat Content Range (Btu/lb)	Data Source
Flooring	Resilient (Cont.)	Asphalt	3000	Ref. 36
		Linoleum	8000	Ref. 34
		Rubber Tile	14000	Unpublished NBS Test Data
		Underlayment	500	Ref. 35
	Carpeting	Wool	9000	Ref. 37
		Nylon	14000	Ref. 39
		Acrylic	8000-9000	Ref. 47
		Polyester	12000-13000	Ref. 37
	Carpet Cushion	Composite (Rubberized Hair)	8000	Unpublished NBS Test Data
		Rubber	14000	Unpublished NBS Test Data

TABLE 19 SUMMARY OF FIRE LOAD DATA
FOR ROOM BOUNDING SURFACES (Continued)

Walls, Ceilings, and Floors

Location	Material	Type	Heat Content Range (Btu/lb)	Data Source
Trim	Wood	Baseboard 4" - 6"	8000	Ref. 34
		Casing 2" - 4"		
		Molding 3/4" - 2"		
	H.D. Plastic (Base Cove)	2 1/2"	7000	Ref. 34
		4"		
		6"		

TABLE 20 FINAL FIRE LOAD VALUES USED FOR ROOM BOUNDING SURFACES

Location	Material	Calorific Value (BTU/lb)	Equivalent Fire Load (lb/ft^2)
Ceiling	Wood	8000	1.0
	Metal	0	0
	Plastic	6000	0.6
	Acous. Tile	2000	0.2
	Non-comb.	0	0
Floor	Wood	8000	2.0
	Non-comb.	0	0
	Res. Floor	4000	0.6
	Carpet	12000	1.0
Wall Material	Wood	8000	1.0
	Metal	0	0
	Plastic	6000	0.6
	Non-comb.	0	0
	Plaster	0	0
	Gypsum Board	1000	0.2
Wall Covering	Paper	8000	0.1
	Drapes	8000	0.1
	Vinyl	10000	0.1
	Paint	4000	0.1
Trim	Wood	8000	* 0.4
	Metal	0	* 0
	Plastic	6000	* 0.2
	Rubber	10000	* 0.2

* lbs/ft rather than lb/ft^2

The contribution of heat of paper, books and equipment is affected by their containment. Therefore, for these items, a distinction was made between free and enclosed contents. Papers, books and equipment located on top of furniture items and directly exposed to combustion are categorized as free contents. Enclosed contents are items located in drawers or other containers where complete burning may or may not occur. In addition, for paper and books, the percent compaction or the ratio of the volume of material to the smallest volume that would contain the material was recorded since this will also affect the burning behavior as noted in Section 3.2.

Form 7 was used for miscellaneous items not included on Forms 2 through 6. In this case the weight of the item was estimated by the surveyor, since transfer functions to obtain this weight were not developed.

Recognizing that the number of items in a room varies, the room survey forms were developed accordingly. As indicated in the instructions included in Appendix B, this flexibility was provided for by using the appropriate number of forms. Similarly, Forms A, B, and C were developed for use as supplemental sheets to handle situations where sufficient space was not available on Forms 2 through 6 for recording all the data.

The data collection forms were intended for use in the entire survey. In view of the two-phase nature of the survey and the possibility of adding additional data following completion of the 25 buildings in Phase I, space for recording such data was provided. The Special Item or "just in case" (JIC) category was included for this purpose. Although it was not possible to anticipate the exact type of additional data which might be required, weight and dimensions were selected as being the important characteristics. The decision to use this section of the form for additional items for which the weight and dimensions will be recorded, will be made following analysis of the results of the Phase I survey. Based on experience in pretesting the forms in the survey of the NBS Administration building, this portion of the form was also used for miscellaneous enclosed and free contents associated with furniture (see instructions in Appendix B). This was done to expedite the field survey operations.

3.4 Survey Procedure

3.4.1 General

As previously noted, the objective of the survey was to determine the factors which affect the fire loads and live loads in office buildings. Although previous surveys provided some guidance in this regard, it was still necessary to assume many of the factors and design the survey to investigate their effects.

Two groups of factors were used. The first relates to the overall characteristics of the building and the second relates to the characteristics of the areas or rooms within the building. For the building characteristics it was assumed that the following factors may affect the loading:

1. Geographic location of the building
2. Building height
3. Building age
4. Type of occupancy

The area or room characteristics include:

1. Type of firm or establishment occupying the area
2. Room use

Selection of the buildings and the rooms within the buildings to be surveyed was made to determine the effects of these characteristics. Recognizing the variety of characteristics involved and the necessary prior assumptions, the overall survey was stratified into two phases. The first phase consisting of 25 buildings was planned to identify the important characteristics. Planning of the second phase was deferred pending analysis of the Phase I results. It was anticipated that this two-phase approach would facilitate identification of the significant characteristics in the first survey. During the second phase the less significant characteristics would be eliminated and the survey would concentrate on the significant characteristics.

The selection process used for the first phase is described in the subsequent sections of this chapter. Planning for the second phase will commence following analysis of the Phase I data.

3.4.2 Building Selection

The advantages of selecting the buildings to be surveyed based on the characteristics assumed to affect the loads were pointed out by Cornell (22). The primary advantage involves utilizing the survey results to predict loads for any population of buildings with a given set of characteristics. Consider, for example, the current office building population, as consisting of several smaller populations subdivided on the basis of the building characteristics noted. Knowing the fraction of the total population contained in each of the smaller populations and obtaining mean loads for each subpopulations permits the determination of the mean value of the loads for the total population using a weighted sum. The mean values for these subpopulations may also be used for estimating values for future populations with a different distribution of subpopulations simply by changing the weighting factors. This is obviously the case of interest for the purpose of design codes which apply to future construction. Random sampling from the present building population with no consideration of the characteristics will only produce results applicable to the current but not necessarily to the future population.

Having adopted the concept of subpopulations based on building characteristics and a two-phase survey, it would be possible to determine the amount of sampling which should be done within each subpopulation to improve the reliability of the estimate of the mean for the total population, either current or future. To do this, however, the fraction of the total population contained within each subpopulation must be known since it is used to calculate the estimate of the mean for the total population from the sample means of the subpopulations.

The total population for this project is all office buildings in the United States. To obtain information on the building characteristics of this population, the following agencies were contacted: Bureau of the Census; the Defense Civil Preparedness Agency, which collects building data as part of their fallout shelter and All Effects Survey Program; and various private insurance companies. However, the limited data available did not include all the characteristics of interest and was not representative of the total office building population.

Data on these characteristics, however, were obtained for approximately 1000 Federal government office buildings from the General Services Administration (GSA) and approximately 1000 private office buildings from the Building Owners and Managers Association (BOMA) 224 South Michigan Avenue, Chicago, Illinois. The GSA data represented office buildings owned and controlled by the GSA. As indicated in Table 21, the data represented only a small fraction of the Federal buildings since many such buildings are controlled by other agencies. Similarly the BOMA data only contains information on buildings whose owners or managers belong to BOMA.

In view of the lack of complete data representative of the total United States office building population, it was decided that the GSA and BOMA data would be used to select buildings for the Phase I survey. This data was first reduced and plotted according to geographic location, building height and building age. These results are shown in Figs. 7 through 20. The groupings used to plot the data were arbitrarily selected. In plotting these figures the states and the District of Columbia were ordered as shown in Table 22 according to population figures determined from the 1970 Census. Figs. 7 and 14 indicate the age group breakdown by state, and Figs. 8 and 15, the height breakdown. The mean age of the buildings in each state is shown in Figs. 9 and 16 and the mean height in Figs. 10 and 18 and in each height group in Figs. 12 and 19. The mean height for each age group is shown in Figs. 13 and 20. The total number of buildings, N, is listed on each figure. Data were available for 929 government buildings and for approximately 1100 private buildings, some data were missing for some private buildings.

The following trends may be noted in these figures:

A. Government Buildings

1. The majority of the buildings are greater than 20 years old (Fig. 7).

2. The mean height is somewhat related to age (Fig. 13). For buildings 6-10 years old, the mean height is approximately 7 stories. For buildings less than 6 years or greater than 10 years old, the mean height is between 4 and 5 stories.

3. The mean height is somewhat related to geographic location (Fig. 10).

TABLE 21 SUMMARY OF EXISTING GOVERNMENT BUILDING SPACE*

	No. of Buildings			Area (Million sq. ft.)		
	Owned	Leased	Total	Owned	Leased	Total
Government-wide (except USPS)	400,545	49,197	449,742	2,417	180.7	2,597.7
GSA Controlled (all space)	2,309	7,686	9,995	149.0	72.0	221.0
GSA Controlled (office only)	1,570	7,291	8,861	98.6	65.1	163.7

* Summary of Buildings Management Costs (7/1/73 - 12/31/73, RCS - PB 15, General Services Administration, Public Buildings Service

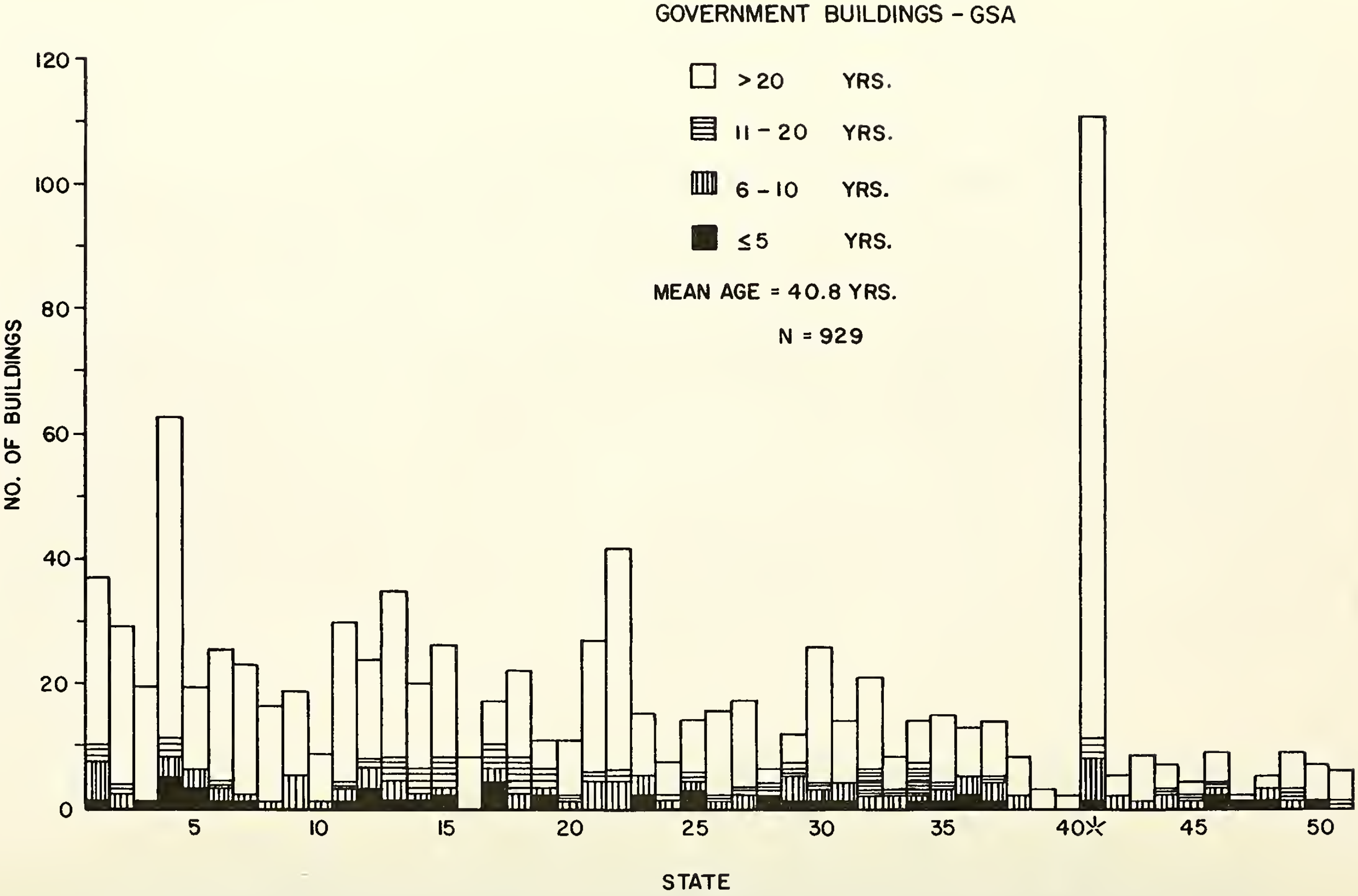


Fig. 7 Geographical Distribution of Government Office Buildings by Age

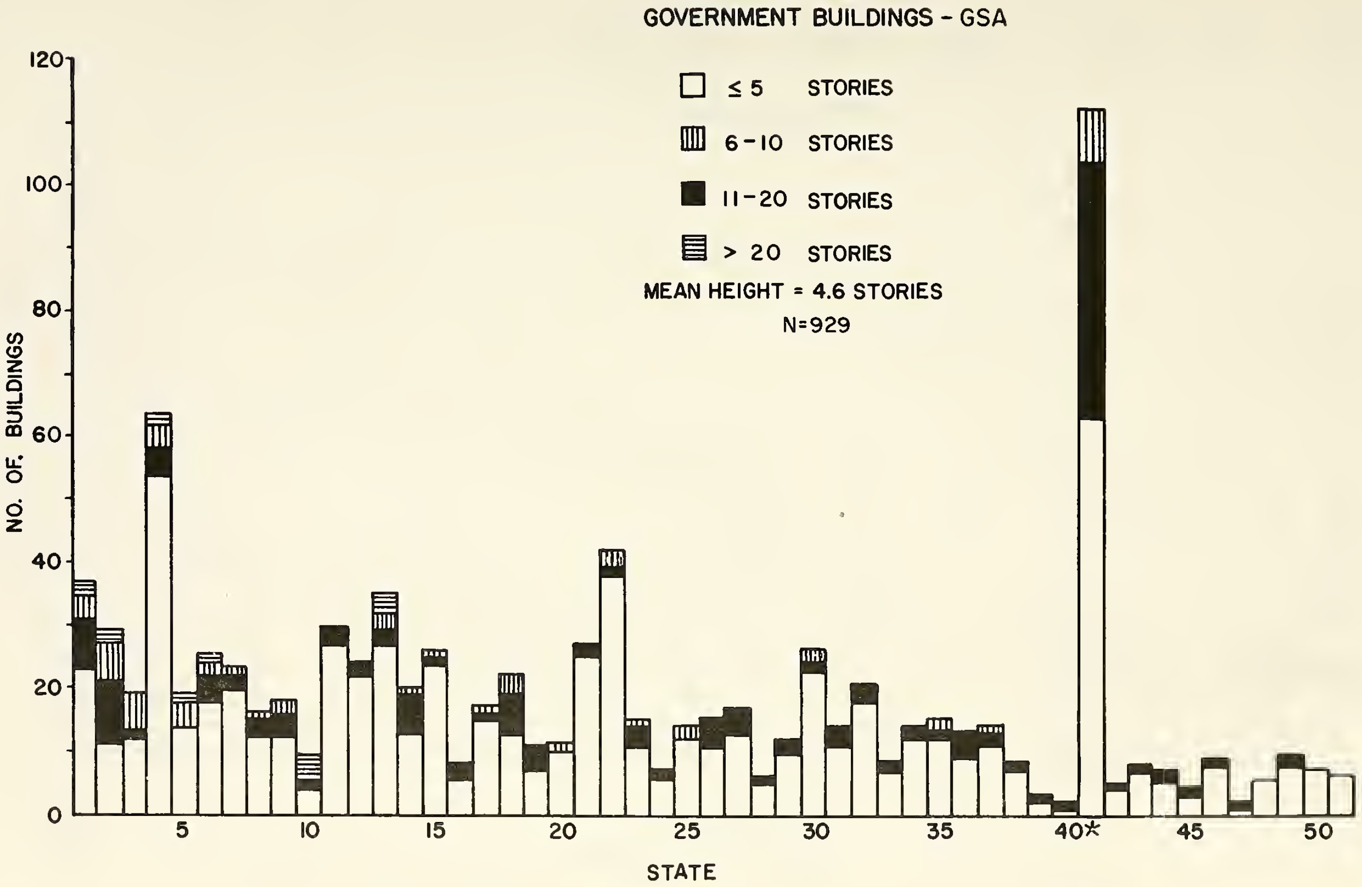


Fig. 8 Geographical Distribution of Government Office Buildings by Height

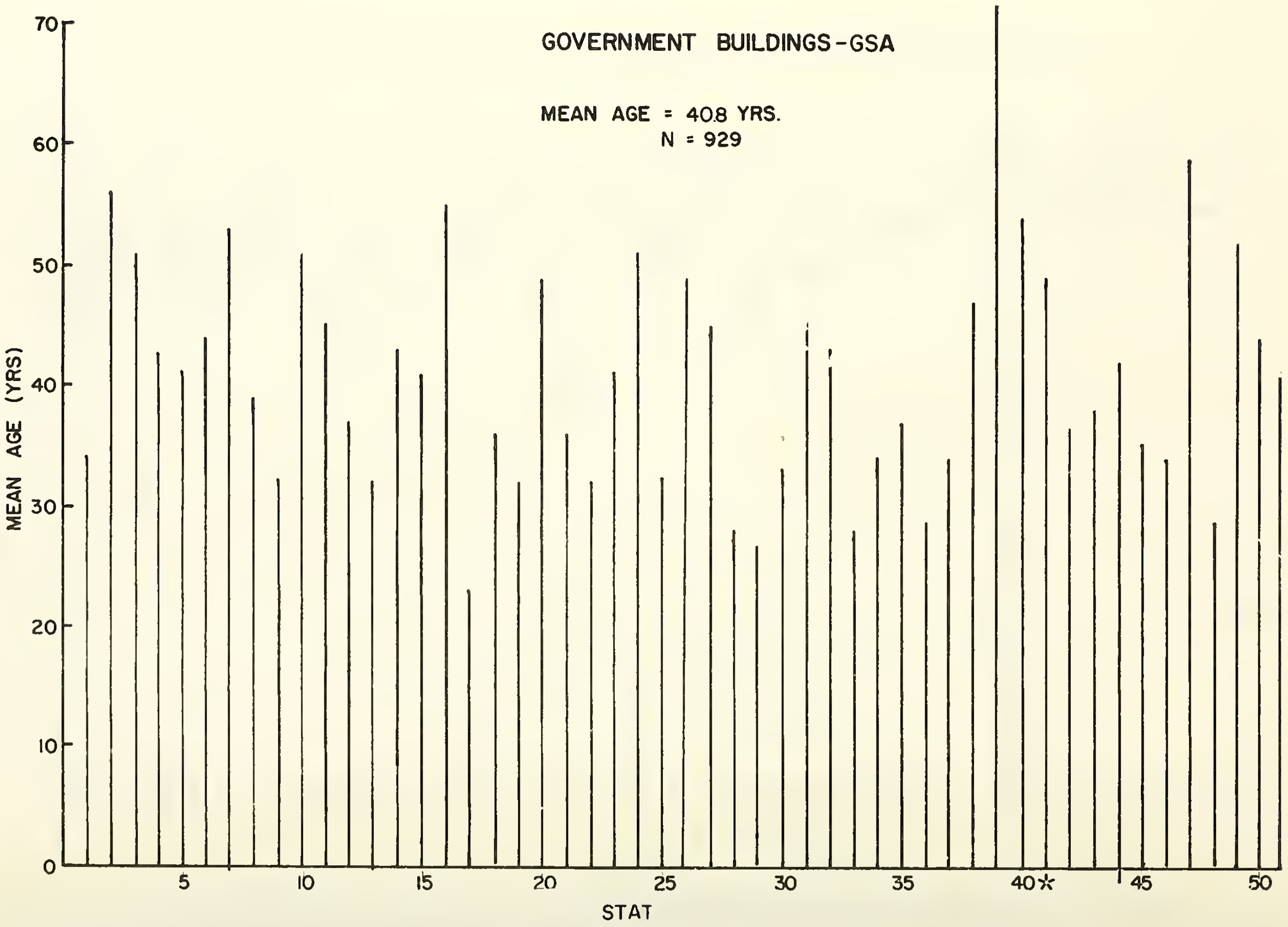


Fig. 9 Mean Age Distribution of Government Office Buildings

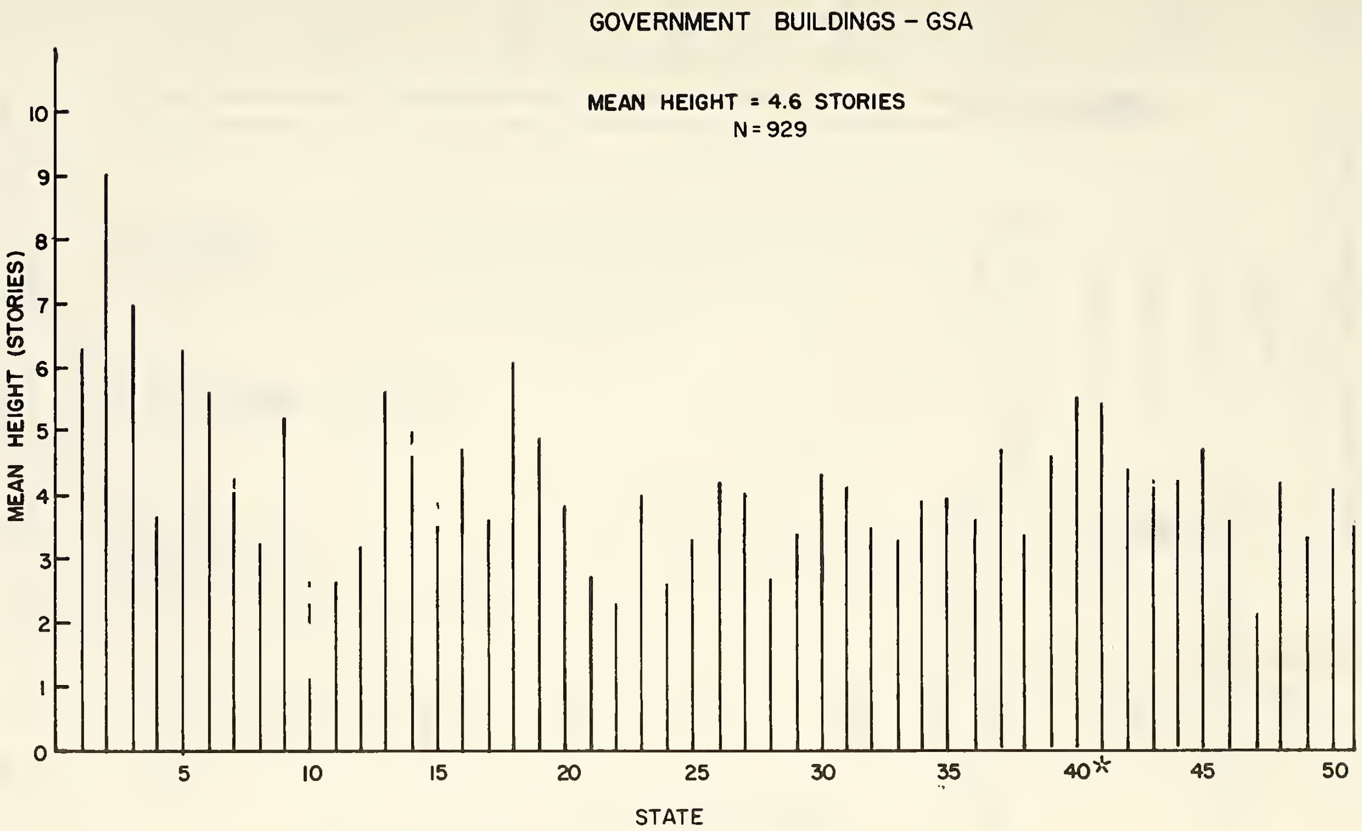


Fig. 10 Mean Height Distribution of Government Office Buildings

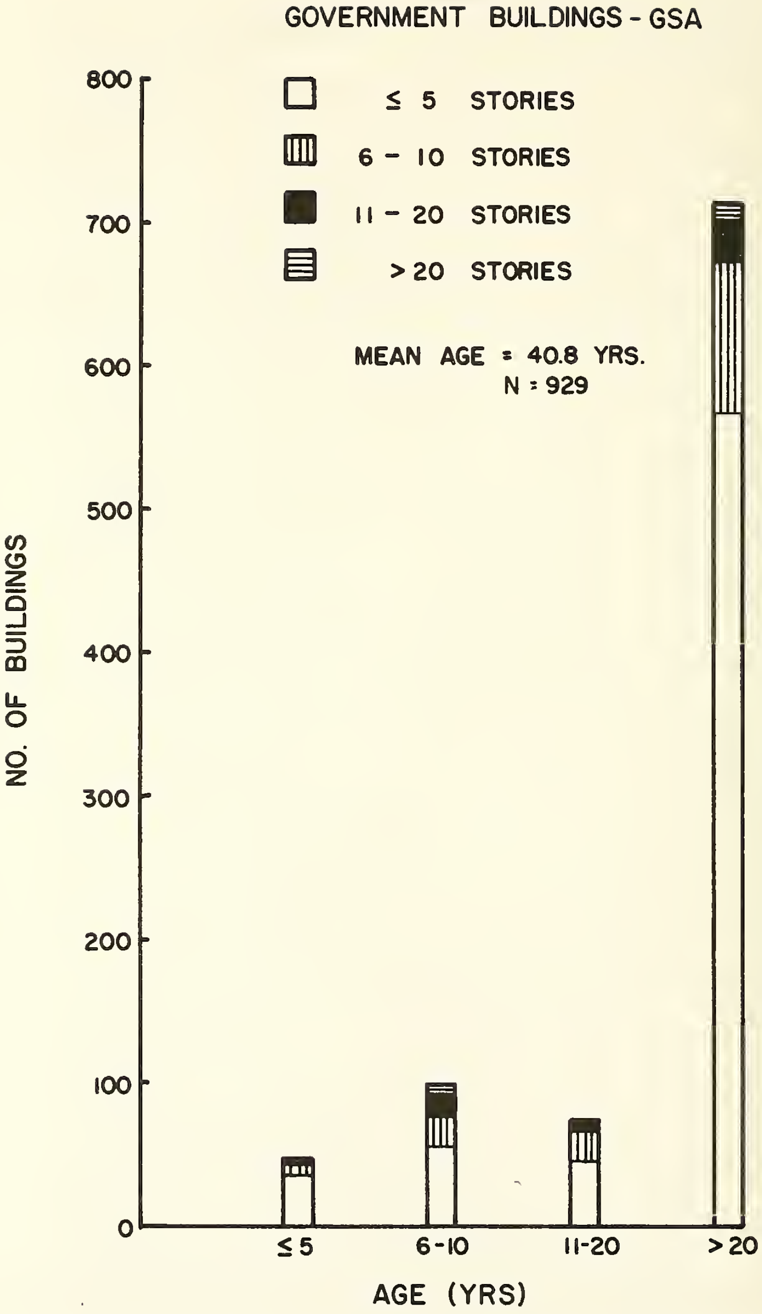


Fig. 11 Age Grouping of Government Office Buildings

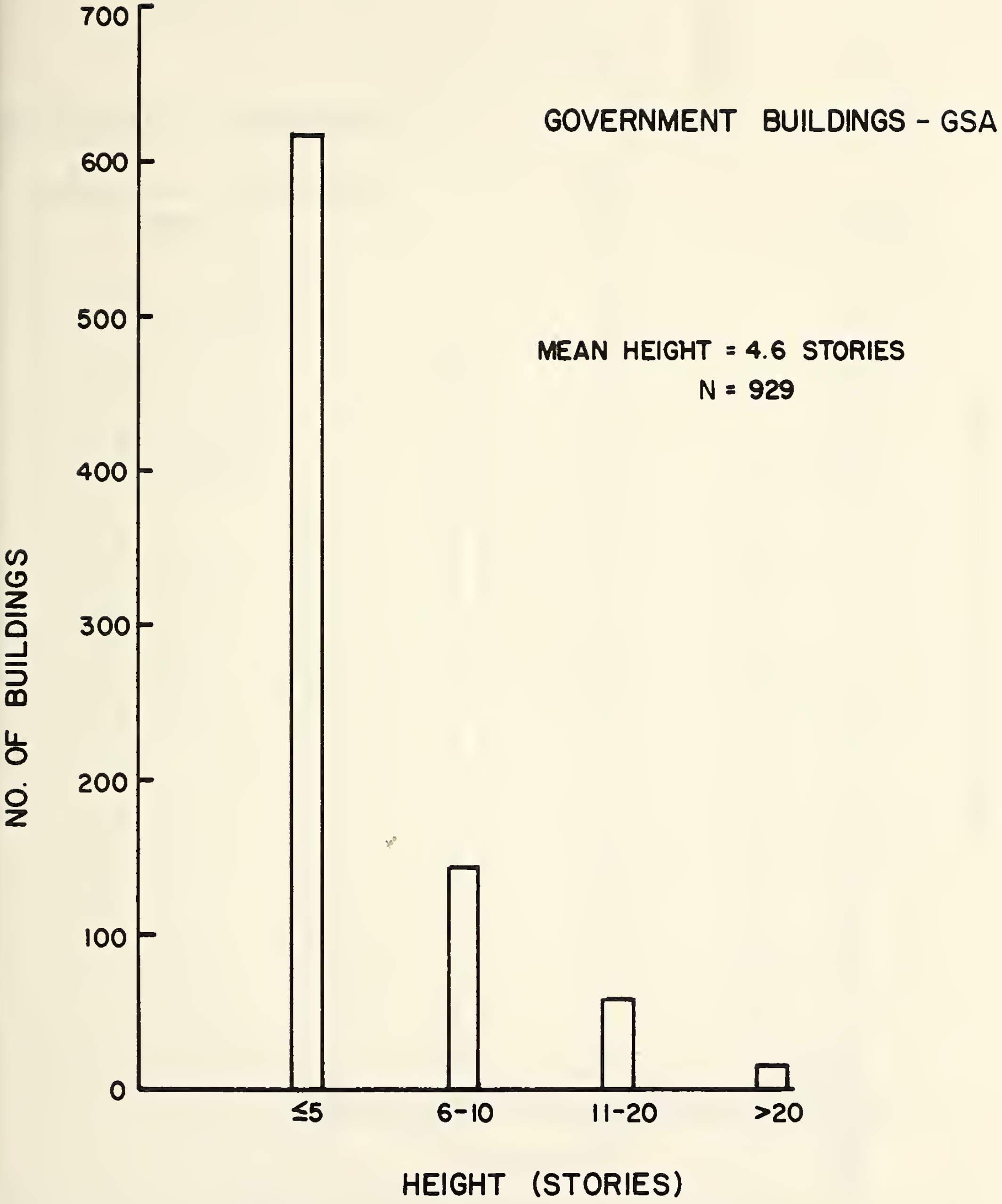


Fig. 12 Height Grouping of Government Office Buildings

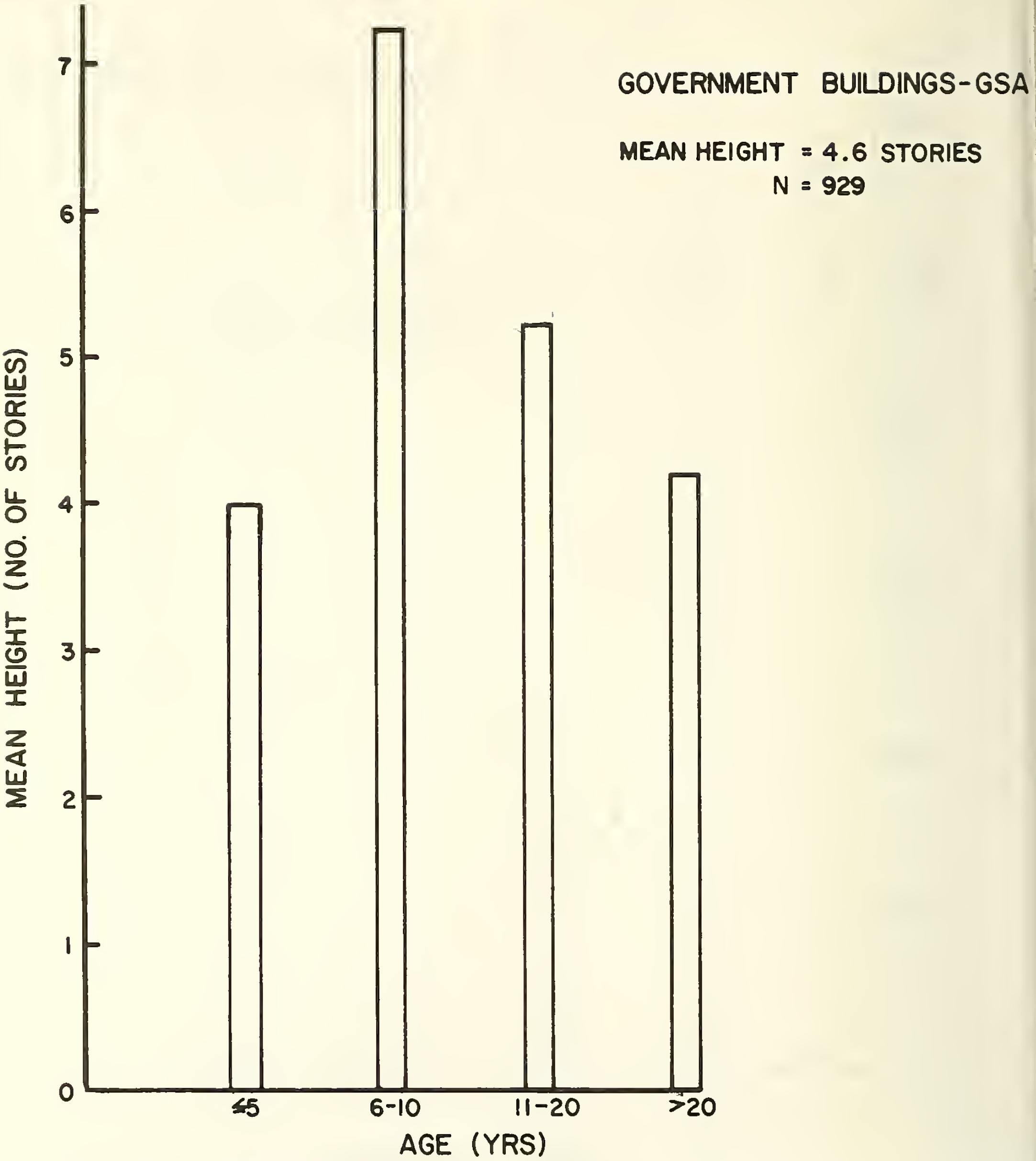


Fig. 13 Relationship Between Mean Height and Age for Government Office Buildings

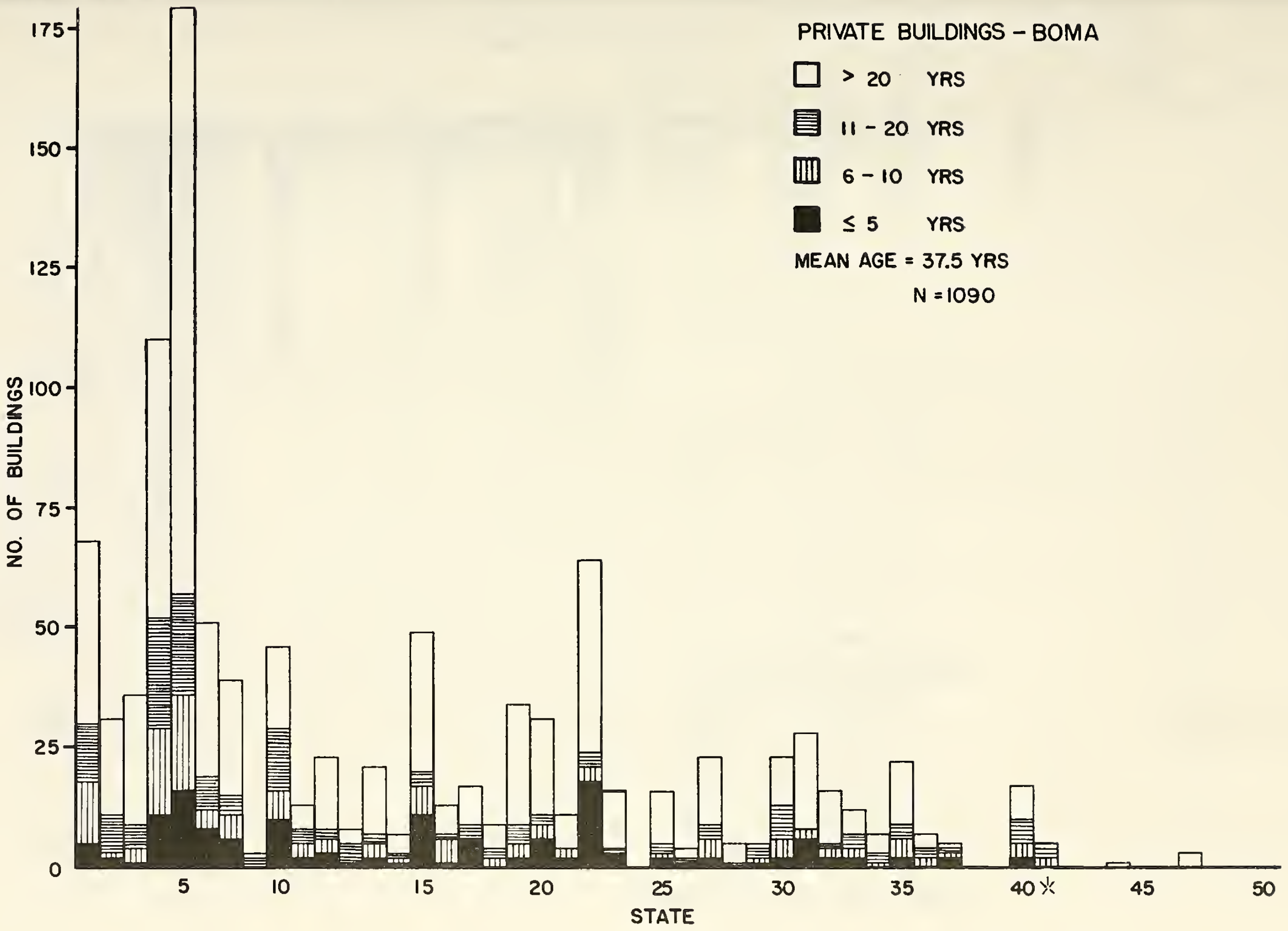


Fig. 14 Geographical Distribution of Private Office Buildings by Age

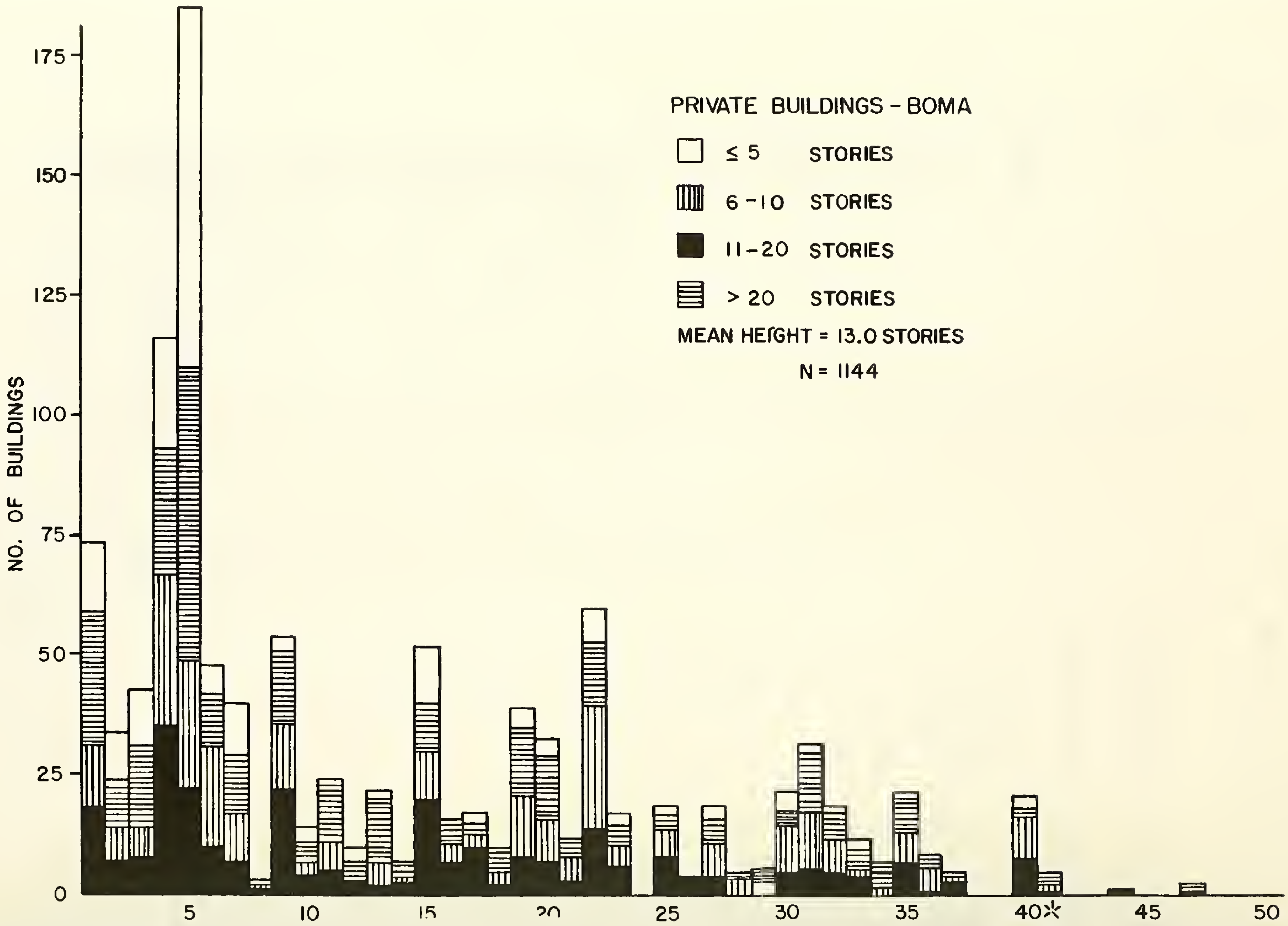


Fig. 15 Geographical Distribution of Private Office Buildings by Height

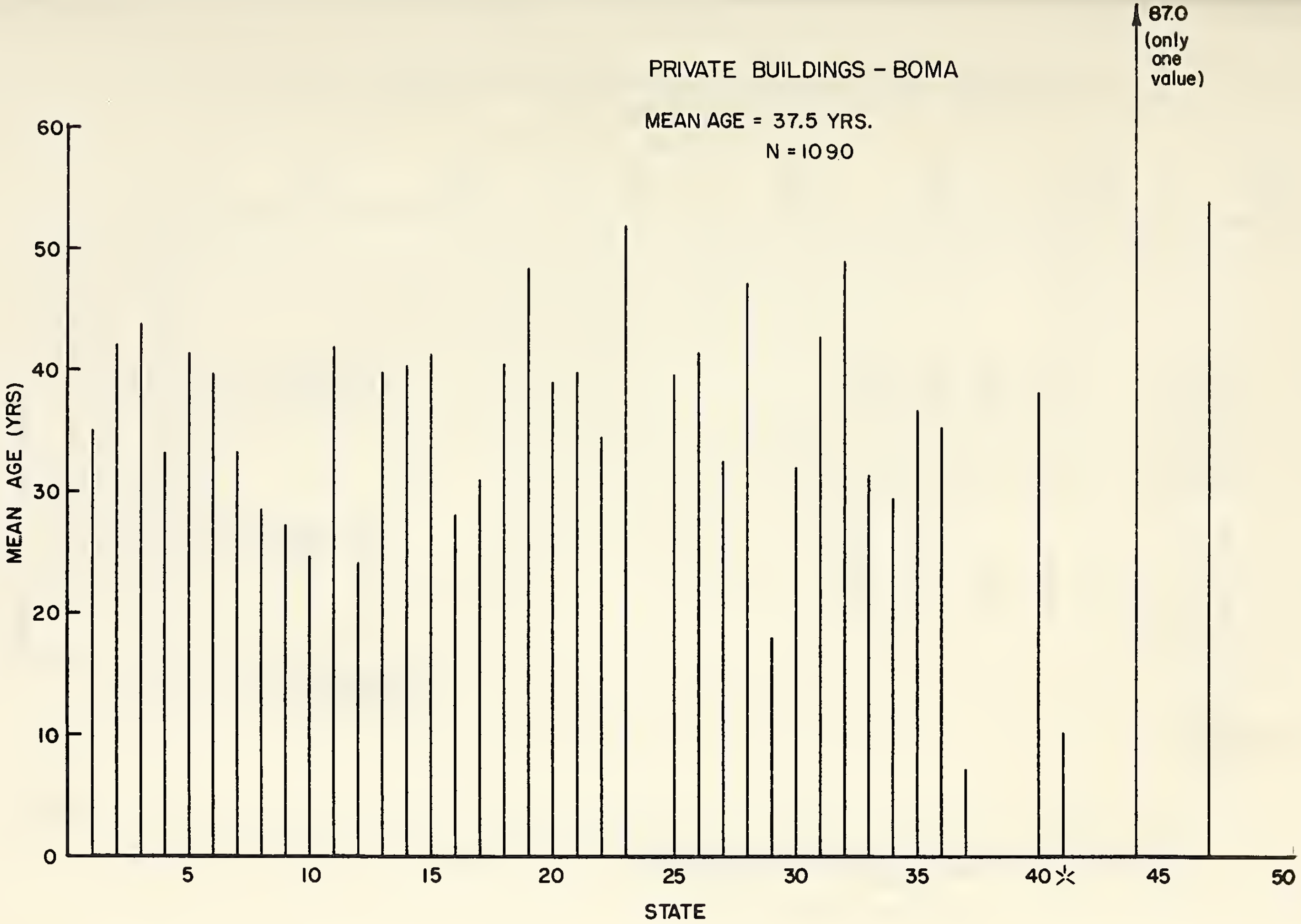


Fig. 16 Mean Age Distribution of Private Office Buildings

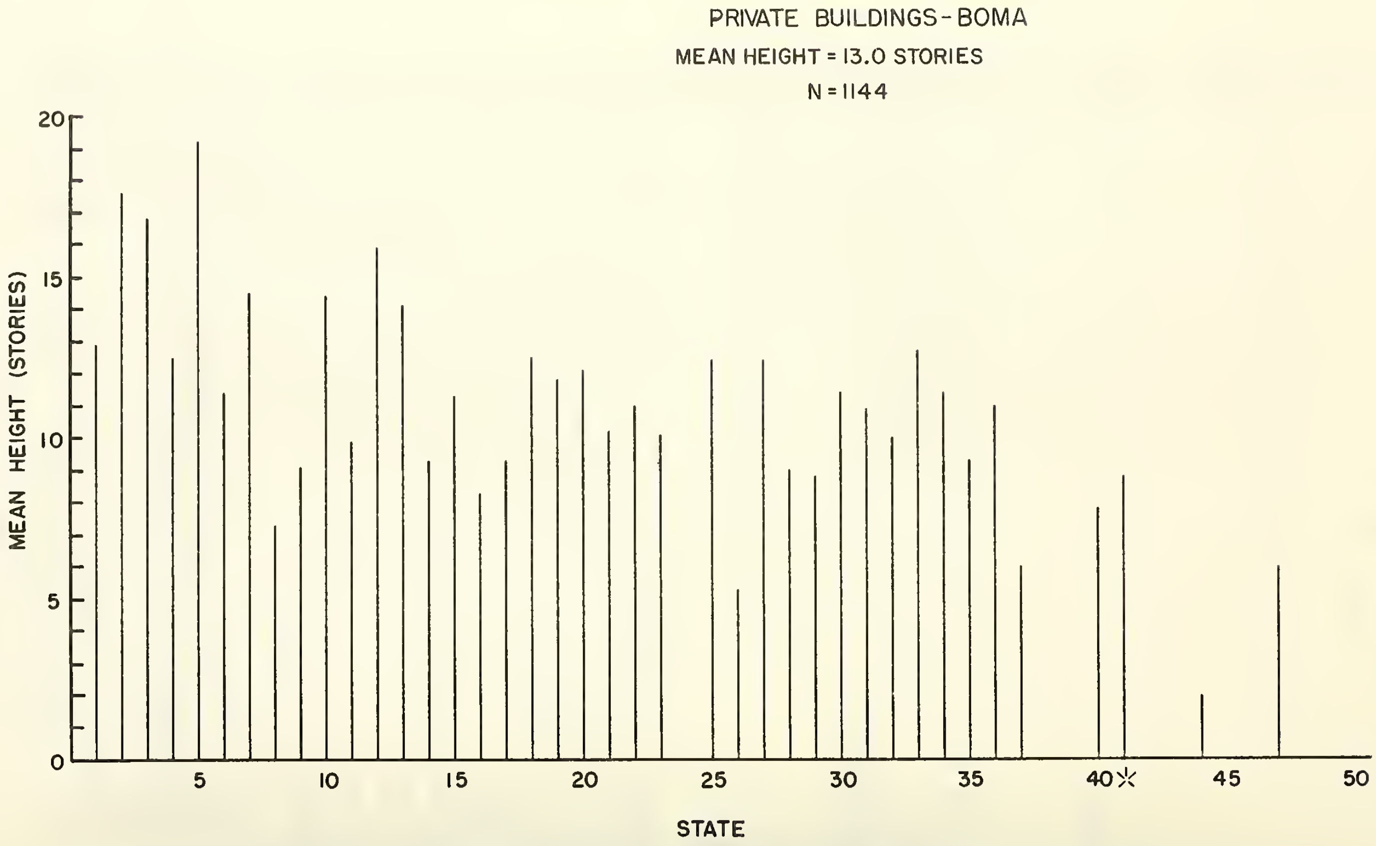


Fig. 17 Mean Height Distribution of Private Office Buildings

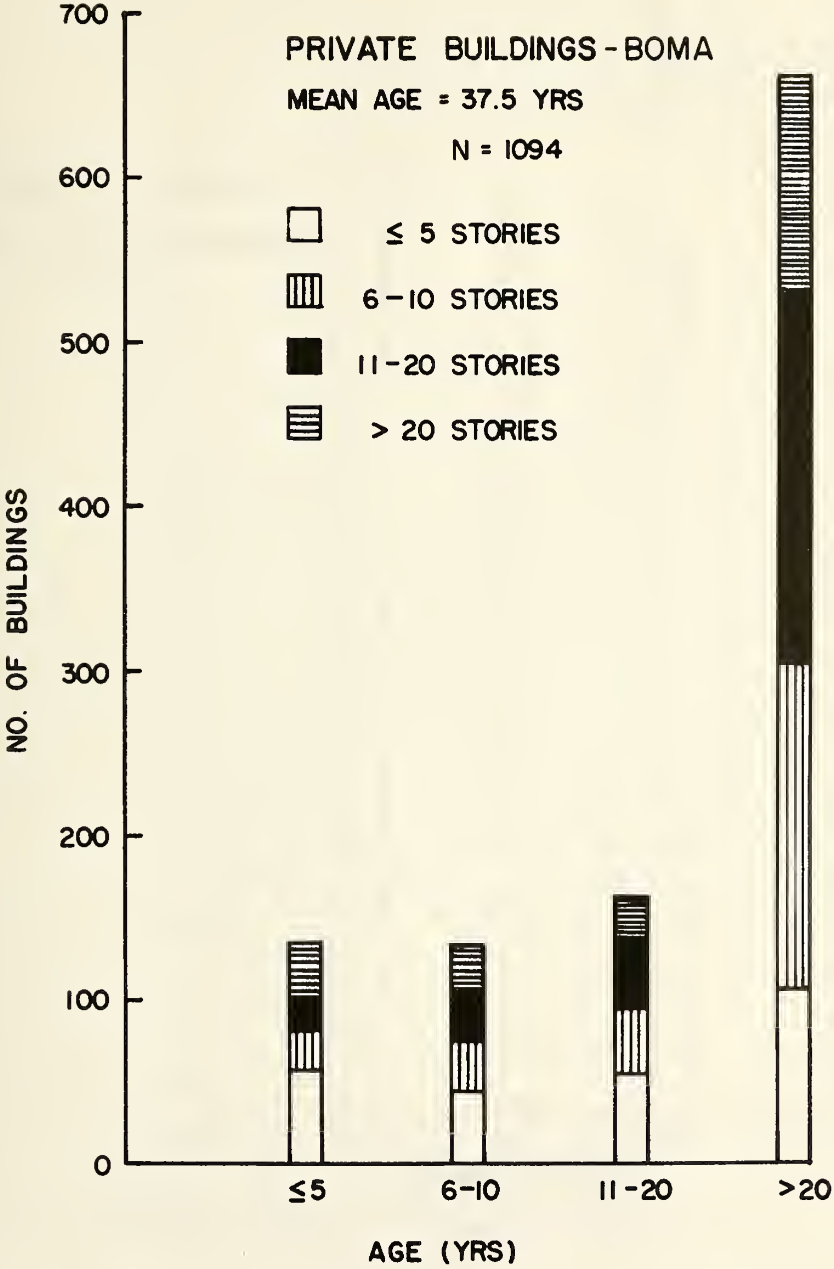


Fig. 18 Age Grouping of Private Office Buildings

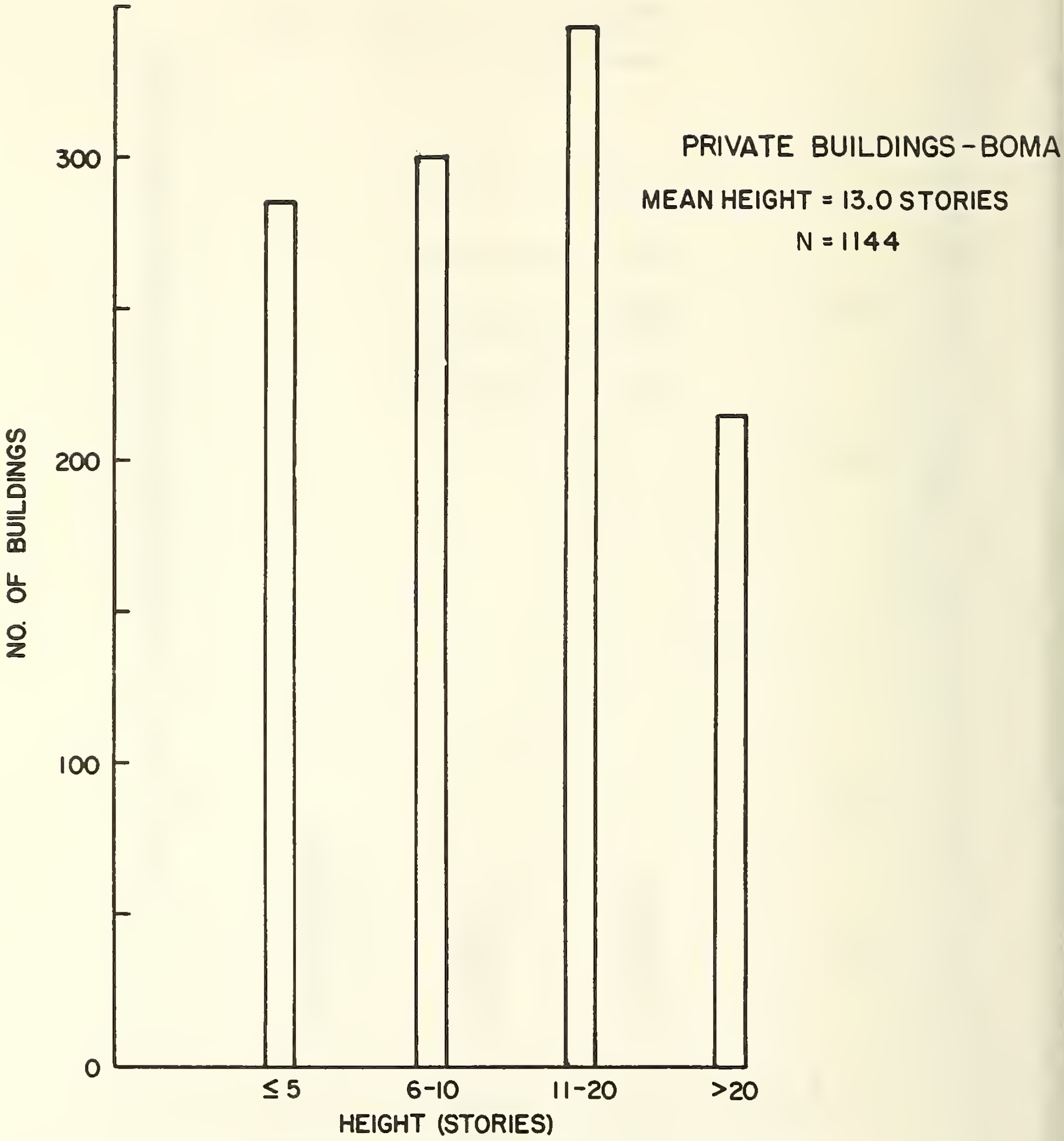


Fig. 19 Height Grouping of Private Office Buildings

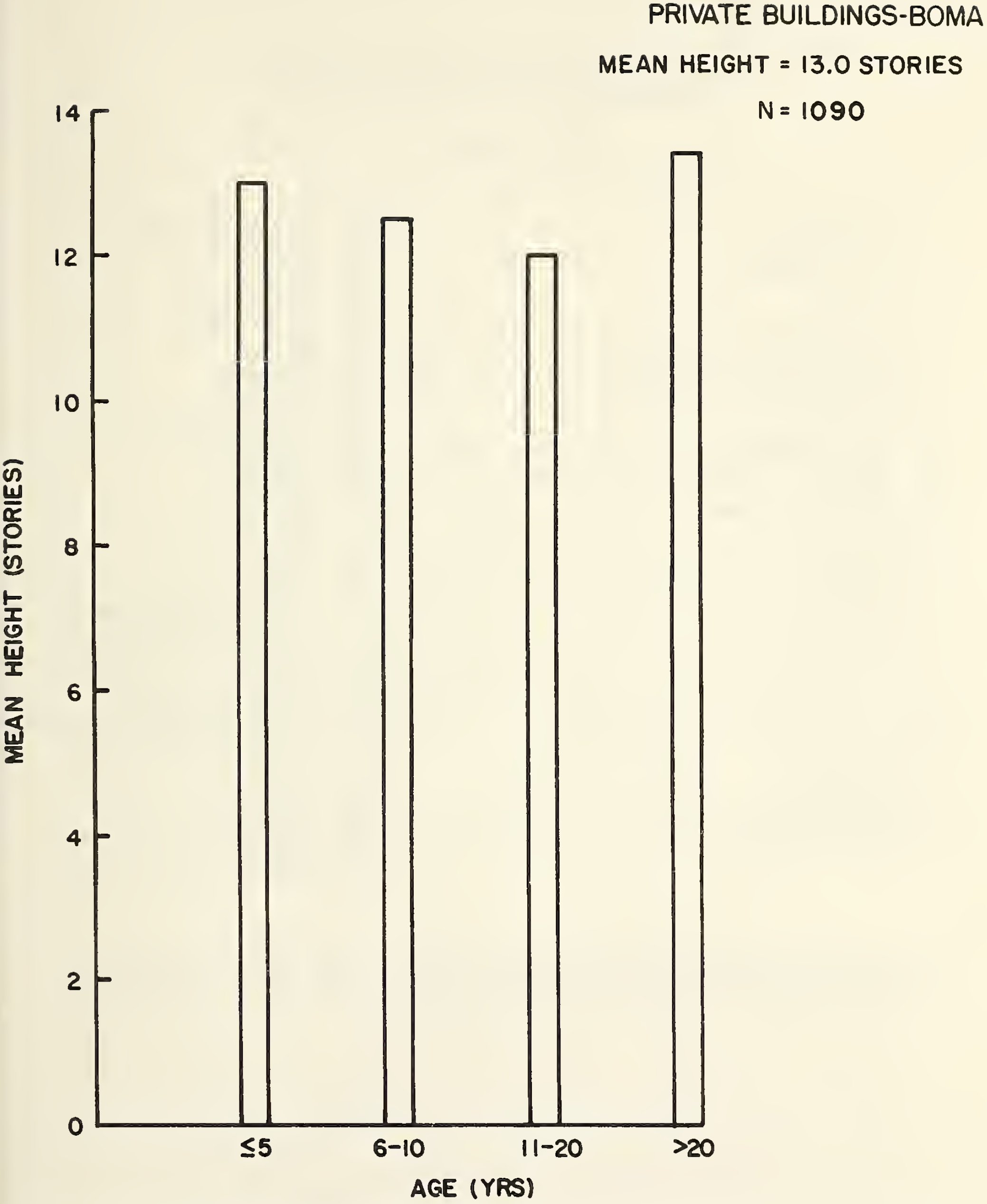


Fig. 20 Relationship Between Mean Height and Age for Private Office Buildings

TABLE 22 STATES RANKED BY POPULATION

(1970 Census*)

1. California
2. New York
3. Pennsylvania
4. Texas
5. Illinois
6. Ohio
7. Michigan
8. New Jersey
9. Florida
10. Massachusetts
11. Indiana
12. North Carolina
13. Missouri
14. Virginia
15. Georgia
16. Wisconsin
17. Tennessee
18. Maryland
19. Minnesota
20. Louisiana
21. Alabama
22. Washington
23. Kentucky
24. Connecticut
25. Iowa
26. South Carolina
27. Oklahoma
28. Kansas
29. Mississippi
30. Colorado
31. Oregon
32. Arkansas
33. Arizona
34. West Virginia
35. Nebraska
36. Utah
37. New Mexico
38. Maine
39. Rhode Island
40. Hawaii
41. District of Columbia
42. New Hampshire
43. Idaho
44. Montana
45. South Dakota
46. North Dakota
47. Delaware
48. Nevada
49. Vermont
50. Wyoming
51. Alaska

* Statistical Abstract of the United States, 1972, 93rd Edition, Bureau of the Census

4. Building age does vary somewhat with geographic location (Fig. 9). The building ages appear to be grouped between 30 and 50 years old.

5. Approximately, 14% of the buildings are in Washington, D. C. The location of the remaining buildings is somewhat related to population (Fig. 7).

B. Private Buildings

1. The majority of the buildings are greater than 20 years old (Fig. 14).

2. The mean height does not appear to be related to age (Fig. 20).

3. The mean height does not vary much with geographic location (Fig. 17). Building height is fairly equally distributed in the 1-20 story range with approximately 20% of the buildings being greater than 20 stories.

4. Building age does vary somewhat with geographic location (Fig. 16). The building ages appear to be grouped between 25 and 45 years old.

5. Most of the buildings are located in Illinois, Texas, California, Florida, Georgia and Washington (Fig. 14).

Since the data for the building characteristics did not indicate any well defined trends, the concept of factorial experiment design (28) was adopted to select the 25 buildings to be surveyed in Phase I. In such an experiment several factors are involved with each factor having several values or "levels". The experiment plan consists of taking an observation at each one of all possible combinations that can be formed for the different levels of the factors.

Recognizing that the use of 50 states or 50 levels for geographic location would lead to an extremely large number of combinations, the four geographic regions used by the Bureau of the Census and shown in Fig. 21 were adopted.

Using three factors (geographic location, height, age) each having four levels gives a 4^3 factorial experiment with 64 combinations for each of the two occupancy types, government and private or a total of 128 combinations. Selecting only one building for each combination of factors would thus require surveying 128 buildings. To reduce this number, consideration was given to fractional factorial designs (28). A one-fourth fraction of the complete factorial experiment would require 16 combinations of geographic location, height, and age for each occupancy type. When interactions among these factors are negligible (with respect to their relation to load attributes), then the effects of the three factors can all be estimated from the reduced design. Further reduction was achieved by deciding to concentrate on private buildings.

The decision was made to survey 20 private buildings and 5 government buildings in the Phase I survey. For the 16 combinations involved this permitted inclusion of more than one private building for some of the combinations and no government buildings for some of the combinations. Although the resulting design is not perfectly balanced, a one-fourth fraction of the 4^3 experiment is imbedded in it for the private buildings, using only the first age group listed in a cell of Table 23A.

The number of buildings to be surveyed for each of the combinations is shown in Table 23. The NBS Administration building used to pretest the data collection procedure is included in Table 23B as an additional government building. In the case of private buildings at least one building was included in each category. This provided coverage of the entire height range and would facilitate determining whether building height does affect fire and live loads in the rooms within a building.

Since the selection of 20 buildings permitted more than one building in some of the 16 categories, the remaining 4 buildings were included in the high-rise category as shown in Table 23A. Concentration, however, on high-rise buildings to the exclusion of low-rise buildings in the Phase I was not deemed advisable. Determination of the influence building height may have on the location of rooms within a building and the consequent live load reduction factors used in design was deferred to the Phase II portion of the survey. For government buildings, it was decided to concentrate on low-rise structures with more than one building selected in the northeastern portion of the country as shown in Table 23B. Stratification of the total survey into two phases permits the use of different selections for the Phase II portion depending upon the Phase I results.

Table 23A shows all combinations of geographic location and height, but also notice that the ages for the buildings in a given height group and a given regional group were selected to insure that all four age groups were included for each row or column in the matrix in Table 23A.

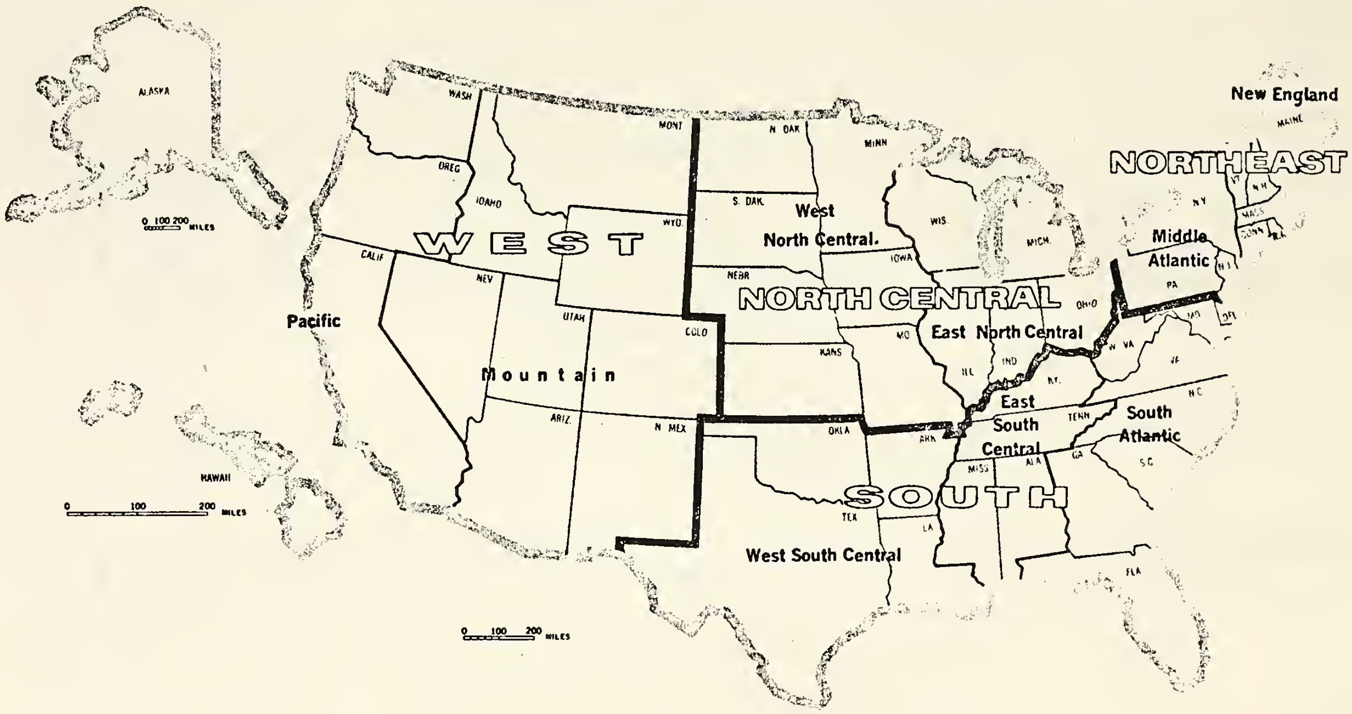
Having determined the characteristics for the buildings to be included in the Phase I survey, the actual buildings were then selected from the GSA and BOMA lists. The buildings from each list were grouped according to the location, height and age factors indicated in Table 23. The appropriate number of buildings for each category were then selected at random from these groups. The 25 buildings selected according to the above procedure and the NBS Administration building are shown in Table 24, and the locations indicated in Fig. 22. The actual buildings are only identified by a building number assigned for the purposes of the survey and not by building name. This building number will be used in future reports which include the survey results.

3.4.3 Room Selection

Two considerations influence the selection of the rooms to be surveyed within the buildings chosen. The first involves determining the effects which assumed factors such as room use and type of occupancy have on the magnitudes of the loads. The second involves the combined effect of loads in several areas within the building on the

MAP OF THE UNITED STATES, SHOWING CENSUS REGIONS AND DIVISIONS

[Alaska and Hawaii are drawn at different scales from conterminous United States and are not shown in their correct relative geographic positions]



Source: U.S. Bureau of the Census.

Fig. 21 Census Regions of The United States

TABLE 23 NUMBER OF BUILDINGS INCLUDED IN EACH CATEGORY IN PHASE I SURVEY

A. Private Buildings

Height (No. of Stories)	Geographic Location			
	Northeast	Northcentral	South	West
1-5	1 (I)	1 (III)	1 (II)	1 (IV)
6-10	1 (III)	1 (I)	1 (IV)	1 (II)
11-20	1 (IV)	1 (II)	1 (I)	1 (III)
> 20	3 (II, I, IV)	1 (IV)	2 (III, II)	2 (I,II)

B. Government Buildings

Height No. of Stories	Geographic Location			
	Northeast	Northcentral	South	West
1-5	1 (IV)	1 (II)	1 (I)	1 (III)
6-10	0	0	0	0
11-20	0	0	1*(II)	0
> 20	1 (I)	0	0	0

* NBS Administration Building

( ) Age Group
I 1-5 yrs.
II 6-10 yrs.
III 11-20 yrs.
IV >20 yrs.

structural system. Information useful in establishing live load reduction factors and the variation of load through the height of the building for purposes of designing the vertical load resisting systems are important with regard to this second consideration.

For the Phase I survey the decision was made to concentrate on the first consideration. Explicit consideration of the combined effects of loads in several areas was deferred to Phase II. Note that results obtained from the Phase I survey would facilitate selection of the portions of the Phase II buildings to concentrate on, to determine the influence of various factors on the loads on the structural system.

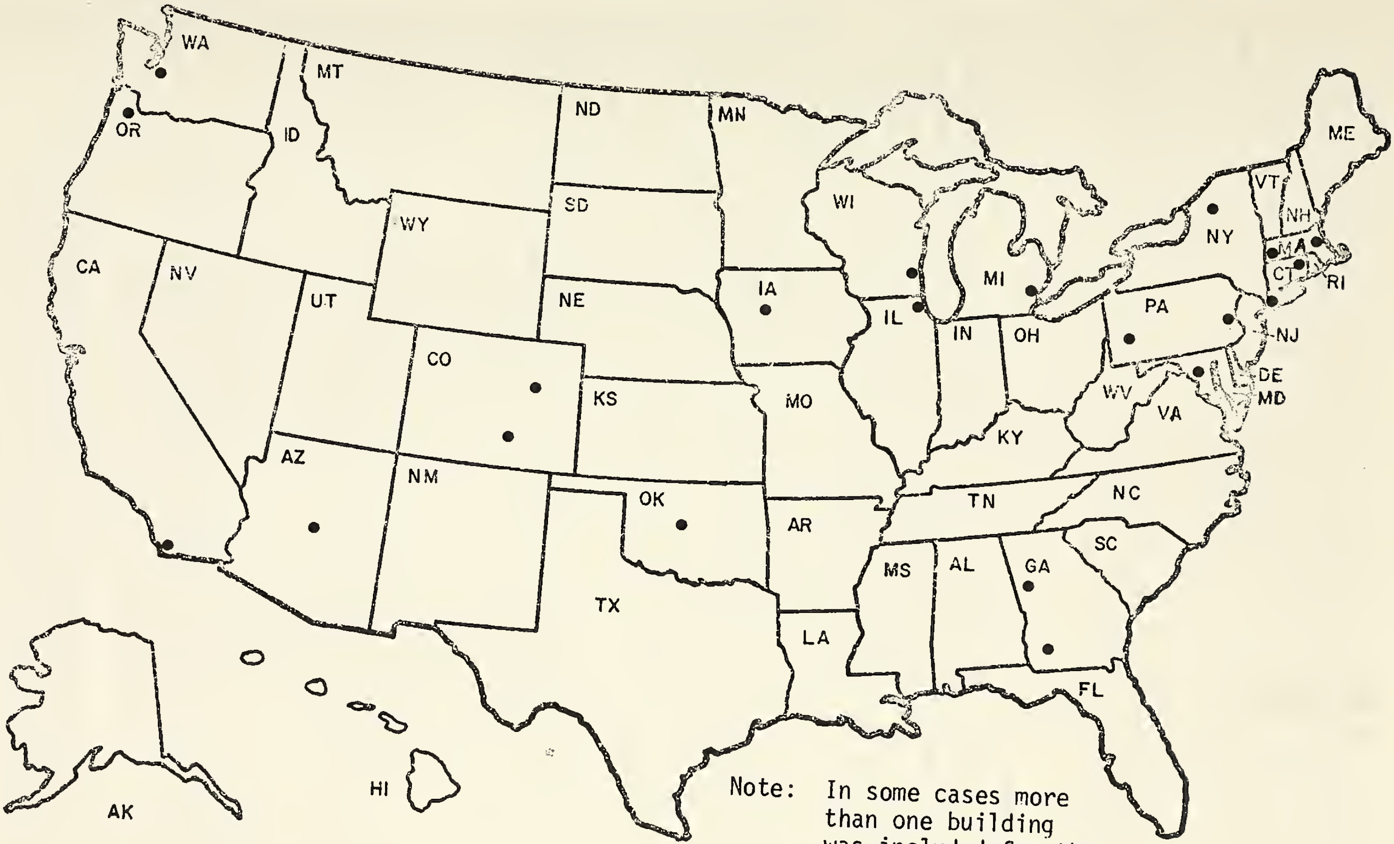
Recognizing that the magnitude of the load varies from room to room, it is of interest to establish the form of this variation. In particular, data from the tails of the frequency distribution are required, i.e., load magnitudes for the lightly loaded and heavily loaded rooms and the number of these rooms in the building. In originally planning the survey, it was anticipated that a special effort would be made to obtain relatively more detailed data on the tails of the distribution (22). Two considerations have caused this part of the survey design to be deferred. First, identification and selection of unusually "light" or "heavy" rooms involves partly-subjective judgment on the part of surveyors. Second, correct interpretation of load data from selected "tail" rooms depends on knowledge of the number or frequency of occurrence of such rooms in a building. That is, even if surveyors are able to select "tail" rooms accurately, there must be a record of the search procedure and of the number of rooms examined in the search for such rooms. In order to avoid imposing this burden on the surveyors, special emphasis on obtaining data on the tails of the distribution was omitted as a design criterion in the Phase I survey. It is anticipated that reduction of the data obtained from the Phase I survey will permit determination of the features which characterize "heavy" rooms. This should minimize the subjective judgment required of the surveyors and facilitate selecting rooms to obtain data on the tails of the distribution in the Phase II survey. Explicit determination of data on the tails of the distribution, therefore, was not used as a criterion to select the rooms in the Phase I survey. Instead, the rooms were selected solely on the basis of the factors assumed to influence load magnitude.

The room characteristic factors selected to be studied in the Phase I sample included: room use and the type of firm occupying the room. Since previous surveys have indicated that the size of the room affects the shape and variance of the frequency distribution for the magnitude of loads, this factor was also included. These three factors may or may not affect the distributions of load magnitudes to a significant degree (statistical and/or practical significance is understood here). The same is true for factors (geographic, height, etc.) describing whole buildings. In order to facilitate the pooling of data corresponding to different factor-combinations, when the factor effects have been judged to be negligible, an effort was made to use a constant sampling fraction (i.e., the same percentage of rooms within each building). Where possible, a constant sampling fraction was used in different buildings within factor-combinations (room use - room size - type of firm).

TABLE 24 CHARACTERISTICS OF BUILDINGS INCLUDED IN PHASE I SURVEY

Building Number	Location		Occupancy Type	Height (No. of Stories)	Age (Years)
	Region	State			
1	North-East	Conn.	Private	4	< 1
2		N.Y.		6	19
3		Penn.		20	79
4		Mass.		40	6
5		Mass.		29	4
6		N.Y.		37	42
7	North-Central	Iowa		5	14
8		Mich.		6	4
9		Wisc.		20	8
10		Ill.		25	15
11	South	Okla.		2	9
12		Ga.		9	67
13		Ga.		13	4
14		Ga.		22	13
15		Ga.		29	6
16	West	Calif.		5	64
17		Oreg.		7	6
18		Az.		17	12
19		Wash.		50	5
20		Colo.		23	20
21	North-East	Penn.	Government	3	46
22		N.Y.		42	6
23	North-Central	Ill.		2	8
24*	South	Md.		12	10
25		Ga.		2	5
26	West	Colo.		2	11

* NBS Administration Building



Note: In some cases more than one building was included for the locations shown

Fig. 22 Location of Buildings in Phase I Survey

Assuming a mean net area of approximately 1000,000 ft^2 for a building based on studies of the GSA building data cited previously and an average of 150 ft^2 per room it was estimated that the 25 buildings in the Phase I survey would contain approximately 15,000 rooms. Since in the total project involving 100 buildings it was planned to survey approximately 10,000 rooms, a sample size of about 2500 rooms was desired for Phase I. Based on this, a sampling rate of 15% or about 90 rooms was selected for each building. The seven room-use categories noted in section 3.3 and Appendix B do not occur with equal frequencies and an effort was made to allocate the sample rooms roughly in proportion to the frequencies of occurrence of room uses. This choice was based on the conjecture that room use was likely to be the factor accounting for the most significant differences in load magnitudes.

In developing the process for selecting the rooms to be surveyed in each building, the existence of several constraints was recognized. An individual building may lack, or have unusually few of, certain types of rooms; e.g., Building X may contain no conference rooms. Furthermore, room sizes and types of firms will often not cover the whole possible range within each individual building. The sampling plan was developed to allow for these contingencies. The procedure adopted for selecting the rooms to be surveyed was as follows:

1. Using the annotated building floor plans described in Appendix B containing information on room use and firm type, add the number of rooms in the building in the following use categories: general office; clerical office; lobby; conference room; file room; storage room; library and multiply by 15% to determine the total number of rooms to be surveyed in that building.

2. Group all the rooms in the building according to the seven room-use categories. Determine the number of rooms to be surveyed in each category by multiplying 90% of the number of rooms to be surveyed as determined in step 1 by the ratio of the number of rooms in the category to the total number of rooms in all seven categories.

3. Subdivide each room-use list from step 2 according to the ten basic firm types given in Appendix B. Further subdivide this list into rooms with area less than 200 ft^2 and rooms with area greater than 200 ft^2.

4. Using the sample size for each room-use category determined in step 2, allocate the sample in the category proportionally among the firm type subcategories defined in step 3. Allocate the sample for each firm type determined in this manner proportionally among the two size groups for that firm. Randomly select the specific rooms to be surveyed from these lists.

5. Randomly select 11% of the specific rooms determined in step 4 i.e., 10% of the total determined in step 1. Select one adjacent room which borders on each of these rooms to also survey.

The selection of adjacent rooms indicated in step 5 was done to insure that survey data would be obtained for areas larger than one individual room. As noted by Cornell (22), such data is of interest with respect to live loads for use in designing the structural framing system. In this case structural bays [or notional bays as used by Mitchell (27)] are of interest rather than loads for individual rooms.

3.5 Data Processing

A complete description of the data processing and analysis including the computer programs developed for this purpose is included in a separate report (29). Only a general description of the procedures employed is presented herein.

Data from the Building Characteristics Form and the Occupancy Data are keypunched for processing. The data forms in Appendix B were set up to facilitate this operation. The numerical values recorded in the blocks provided on these forms and the multiple choice numerical values were keypunched directly without transferal to a keypunch coding sheet.

Data on the location of the various areas within the building are processed using a procedure specifically developed for this project. This involved the use of an electro optical scanning device (programmable flying spot scanner) to scan microfilm copies of specially prepared tracings of the building floor plans and transfer the information to magnetic tape. The procedure permitted determination of the geometric coordinates for the boundaries of all areas within the building (rooms, corridors, etc.) from which the plan area could be calculated. The floor plan tracings are relatively simple to prepare because it is only necessary to trace small portions of the area boundaries. A complete description of this procedure is given in a separate report (29). The data recorded on the floor plans for each area (area use, firm number, type of enclosure) is transferred to the specially prepared FOSDIC (Film Optical Sensing Device for Input to Computers) document shown in Appendix B. This is processed with the floor plan tracings.

The data collection form in Appendix B for the room contents is also a FOSDIC document. After being filled in by the field surveyors, the forms are microfilmed and the microfilm is processed using the same type scanning device as for the floor plans. The microfilm provides a convenient permanent record of the raw field data. Use of the FOSDIC documents and the automatic data processing eliminated the intermediate coding step involved with keypunching data and expedited the data processing operation.

All the data are transferred to magnetic tape for analysis purposes. The arrangement of the data on the tape and a description of the data analysis program is contained in a separate report (29).

3.6 Verification of Survey Technique

The survey technique adopted in this project differs in two respects from previous load surveys. First, an inventory technique using transfer functions and mean weights to obtain the fire loads and live loads is employed as opposed to direct weighing. Second, only a sample of the rooms in any one building are surveyed as opposed to surveying all rooms. It is of interest to assess the effects of these two differences on the fire loads and live loads obtained from the survey.

In order to determine the effect of the inventory procedure, it is planned to compare results obtained in this manner with results from direct weighing. This will be done in the survey of the NBS Administration building. For several randomly selected rooms, total room loads determined using the survey procedure and transfer functions adopted herein will be compared with the total room load obtained by weighing all items in the room. The room contents will be weighed using the Bryson and Gross weighing procedure (15).

In originally planning the project, it was anticipated that this comparison could be made through computer simulation using the original Bryson and Gross data (22). This was not possible, however, because of the manner in which the Bryson and Gross data was recorded. Their procedure involving weighing furniture items together with the contents did not permit utilization of the transfer functions discussed in Section 3.2. Similarly, it was not possible to simulate the surveyors weight estimation of miscellaneous items adopted in this survey. Thus it was necessary to carry out the independent weight comparison noted.

Since the survey technique adopted involved some weight estimating by the surveyors, it was also necessary to ascertain the variability introduced as a result of these subjective estimates. For the randomly selected rooms to be weighed, therefore, several inventory surveys will be conducted. Approximately four different surveyors will independently survey each of the rooms. Comparing results for total room weight obtained by each surveyor together with results obtained from the weight survey will provide an indication of the variability introduced by the surveyors weight estimates.

The survey of the NBS Administration building will include the majority of rooms in the building as opposed to the procedure to be followed for the 100 buildings in which only a sample of the rooms are surveyed. Selecting several rooms from the building in accordance with the room selection procedure in Section 3.4.3, using the data from these rooms and the explanatory load models developed by Cornell to "predict" the loads in the remaining rooms and comparing these results for the entire building with the actual survey results for the entire building will permit evaluation of the approximations resulting from surveying only a sample of the rooms in a building.

4. ACKNOWLEDGMENTS

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The following staff members at NBS contributed to the phase of the project reported herein: Newton Breese and Daniel Gross, Programmatic Center for Fire Research; Tao Ming, Technical Analysis Division; Leighton Greenough, Measurement Engineering Division; Dr. Joan Rosenblatt, Applied Mathematics Division, and Dr. Robert Crist, and Randy Williams, Structures Section. Dr. James Yao of Purdue University carried out the analysis for live loads included in Appendix A during his tenure as a guest worker at NBS. Dr. J. B. Fang from the Programmatic Center for Fire Research carried out the analysis for fire loads included in Appendix A. The cooperation of Erne Wilkins, Gordon Boyd and Henry Betzar of the FOSDIC Branch, Engineering Division of the Bureau of the Census for their assistance in developing the FOSDIC data collection document is gratefully acknowledged.

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Data on the characteristics of government owned buildings included in this report were provided by Howard Smith (GSA). Robert Wiggs of the Building Owners and Managers Association was helpful in obtaining the building data used to determine the characteristics of buildings in the private sector and also in securing permission to survey a number of the buildings.

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APPENDIX A

ACCURACY REQUIRED FOR DETERMINING LOAD LOCATION

The location and magnitude of loads in buildings are important in ascertaining their effects on the structure. For live loads, location with respect to the elements of the vertical load resisting system of the building is important. For fire loads, location with respect to the bounding surfaces or walls of the compartments is important with respect to fire severity effects on these structural elements and fire propagation to adjacent compartments.

As mentioned in discussing the survey data in Section 3.3, the locations of the loads in this project were determined using a two sector model composed of a perimeter strip extending 2 ft. in from the bounding walls and a single sector for the remaining portion of the room. The adequacy of this procedure and comparison of results obtained using more refined locations is considered in this Appendix for both fire load effects and live load effects.

Live Loads--Errors in the Determination of Load Coefficients

The location of loads may be an important consideration in conducting load surveys. In many previous surveys, the exact location of the loads in the building were recorded. Bryson and Gross (15) recorded the load locations only approximately. They divided each room into nine sectors and recorded the magnitude of loads in each sector without determining the exact locations. Using the Bryson and Gross data, Corotis (30, 49) studied the errors resulting from using nine sectors.

In a report to NBS, Cornell (22) recommended the use of a 5-sector model for the purpose of load surveys. The locations of the loads in the survey reported herein are to be recorded using a 2-sector model, which consists of a perimeter strip extending 2 ft. from the bounding walls and a middle sector containing the remaining portion of the room. Since any portion of the furniture items rather than the center of gravity is used to locate the item in one of these 2 sectors, the survey model used is really a one sector or room model for live load purposes. Certain measures of the discretization error using 2-sector, 5-sector, and 9-sector models are computed herein for purposes of comparison.

Consider a structural bay enclosed by four columns containing a room which is divided into nm sectors as shown in Figure A2. Following Corotis (30), assume that the location of the load is equally likely to occur anywhere within the room, i.e.,

$$f_{XY}(x,y) = \frac{1}{a_{ij}} \quad \text{if } (x,y) \text{ is in } ij^{th} \text{ sector} \tag{A1}$$

where X, Y are random variables denoting the location of a point load in the ij^{th} sector, f_{XY} (x,y) denotes the joint probability density function and a_{ij} denotes the area of the ij^{th} sector.

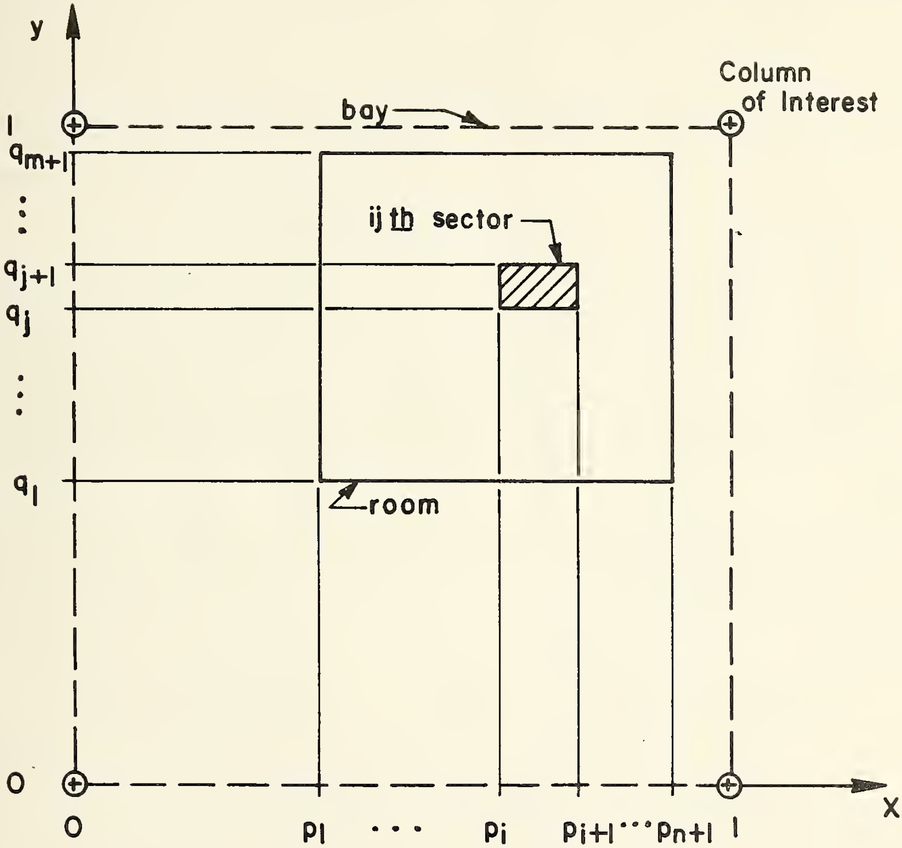


Fig. A1 - Bay Model

Furthermore, let S(X, Y) be the influence surface for the bay. Then the expected value of the influence coefficient in the ijth sector can be found as follows:

$$E[S_{ij}\ (X,Y)] = \int_{p_i}^{p_{i+1}} dx \int_{q_j}^{q_{j+1}} dy\ S(X,Y)\ \frac{1}{a_{ij}} \qquad \text{(A2)}$$

Following Corotis (30), and Clough and Tocher (50), assume that

$$S\ (X,\ Y) = S_1\ (X)\ S_2\ (Y) \qquad \text{(A3)}$$

As examples, for axial-loads in the column,

$$S_1\ (x) = 3\ X^2 - 2\ X^3 \qquad \text{(A4a)}$$

$$S_2\ (Y) = 3\ Y^2 - 2\ Y^3 \qquad \text{(A4b)}$$

and for bending moment about the y-axis of the column,

$$S_1\ (X) + X^2 - X^3 \qquad \text{(A4c)}$$

$$S_2\ (Y) = 3\ Y^2 - 2\ Y^3 \qquad \text{(A4d)}$$

Consequently

$$E[S_{ij}\ (X,\ Y)] = \frac{1}{a_{ij}}\ [w_1(p_{i+1}) - w_1(p_i)]\ [z_1(q_{j+1}) - z_1(q_j)] \qquad \text{(A5)}$$

where,

$$w_1\ (x) = \int S_1(x)dx \qquad \text{(A6a)}$$

$$z_1\ (y) = \int S_2(y)dy \qquad \text{(A6b)}$$

similarly,

$$E[S_{ij}{}^2(X,Y)] = \int_{p_i}^{p_{i+1}} dx \int_{q_j}^{q_{j+1}} dy\ S^2(x,y)\ \frac{1}{a_{ij}} \qquad \text{(A7)}$$

$$\frac{1}{a_{ij}}[w_2(p_{i+1}) - w_2(p_i)][z_2(q_{j+1}) - z_2(q_j)]$$

where

$$w_2(x) = \int S_1{}^2(x)dx \qquad \text{(A8a)}$$

$$z_2(y) = \int S_2{}^2(y)dy \qquad \text{(A8b)}$$

The variance of S_{ij} (X,Y) can be computed as follows:

$$\text{Var}[S_{ij}] = \text{Var}[S_{ij}(X,Y)] = E[S_{ij}{}^2(X,Y)] - (E[S_{ij}(X,Y)])^2 \qquad \text{(A9)}$$

Define Q_{ij} as the discretization error for the resulting column load, i.e.,

$$Q_{ij} = T_{ij} - \hat{T}_{ij} \tag{A10}$$

where T_{ij} denotes the "actual" column load obtained using the complete influence surface, and $\hat{T}_{ij}$ denotes the load computed by lumping all loads in ij^{th} sector at the point of average influence for this particular sector i.e., using the average influence surface value for that sector. Then

$$\text{Var } Q_{ij} = E[N_{ij}]\ E[M_{ij}^{\ 2}]\ \text{Var }[S_{ij}] \tag{A11}$$

where N_{ij} is a random variable denoting the number of loads and M_{ij} denotes the magnitude of these loads in the ij^{th} sector. The variance of the total discretization error can then be found as follows (30):

$$\text{Var } Q = \sum_{i=1}^{n} \sum_{j=1}^{m} E[N_{ij}]\ E[M_{ij}^{\ 2}]\ \text{Var}[S_{ij}] \tag{A12}$$

To compare with Corotis' more approximate calculations, Var Q is computed for the case $E[N_{11}] = E[N_{13}] = E[N_{31}] = E[N_{33}] = E[N_{22}] = 1.05$, $E[N_{12}] = E[N_{21}] = E[N_{23}] = E[N_{32}] = 0.95 = E[N_2]$ for various values of p in a 9-sector model. These numerical results are plotted in Figure A3, in which the dashed line represents Corotis'approximation using a Taylor series expansion in obtaining Var $[S_{ij}]$ in Eq. (A12) (30), and the solid line represents calculations made by the author without the use of the Taylor series expansion. The results in Fig. A3 indicate that both approaches give essentially the same result.

In the study herein, it is assumed that the average number of items in the ij^{th} sector, $E[N_{ij}]$, is proportional to the area of that sector, i.e.,

$$E[N_{ij}] = a_{ij}\ \lambda \tag{A13}$$

and

$$E[M_{ij}^{\ 2}] = E[M^2] \tag{A14}$$

where λ is the average number of items in the room. Then,

$$\text{Var } Q = \lambda\ E[M^2] \sum_{i=1}^{n} \sum_{j=1}^{m} a_{ij}\ \text{Var}[S_{ij}] \tag{A15}$$

or $$\sigma_Q = \sqrt{\text{Var } Q} \tag{A16}$$

To compare this quantity in a non-dimensionalized form, the standard deviation of the discretization error is divided by the average column load, i.e.,

$$\frac{\sigma_Q}{E\ [T]} = \frac{1}{E[M]} \sqrt{\frac{E[M^2]}{\lambda}} \sqrt{\frac{\sum_i \sum_j a_{ij}\ \text{Var }[S_{ij}]}{\sum_i \sum_j a_{ij}\ E\ [S_{ij}]}} \tag{A17}$$

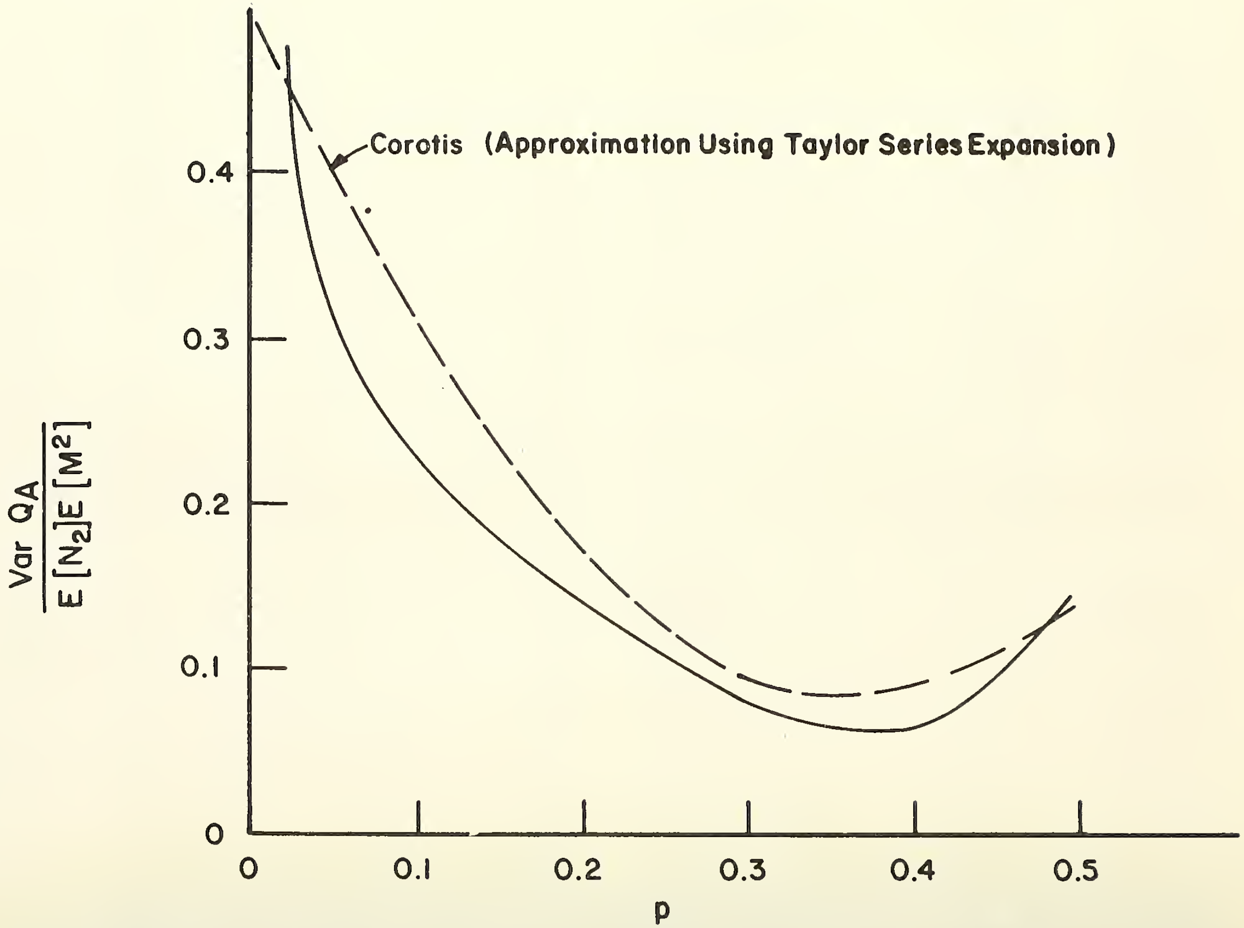


Fig. A2 - Variance of Discretization Error for Column Axial Load (9 sectors, $E[N_2]=0.95$, $X=9.05$)

This quantity gives an indication of the relative errors resulting from room discretization and was computed numerically for the case where the room coincides with the bay using $E[M] = 245$, $E[M_2] = 66{,}000$ and $\lambda = 9.05$. These results are plotted in Figures A4 and A5 for axial loads and bending moments in the column.

As expected, the results in Figs. A4 and A5 indicate that the probability density functions of the discretization errors may be represented qualitatively as shown in Figure A6. If a symetrical density function is assumed, the median (or 50 percentile) error coincides with the average error, which is zero for all three models (2-, 5-, and 9-sector). For a given probability level, say 0.9, the range of discretization error is the largest for the 5-sector model, and the smallest for the 9-sector model.

For illustrative purposes, assume a normal distribution for the discretization error Q_a. Then, the probability that the discretization error will be between $-q_{0.9}$ and $q_{0.9}$ is 0.9, i.e.,

$$P(Q_A \leq q_{0.9}) = 0.9 = 2\Phi\left(\frac{q_{0.9}}{\sigma_{Q_A}}\right) - 1$$

where $\Phi(.)$ denotes the standardized normal distribution. From a normal distribution table, we find that,

$$q_{0.9} = [\Phi^{-1}\ (0.95)]\ \sigma_{Q_A} = 1.65\sigma_{Q_A}$$

Consider the case $p = 0.25$, and $E[T_a] = 550^k$.

From Figure A4,

for the 2-sector model:

$$\sigma_{Q_A} = 0.38 \times 550^k = 209^k$$

$$q_{0.9} = 1.65 \times 209^k = 345^k$$

for the 5-sector model:

$$\sigma_{Q_A} = 0.24 \times 550^k = 132^k$$

$$q_{0.9} = 1.65 \times 132^k = 218^k$$

for the 9-sector model:

$$\sigma_{Q_A} = 0.18 \times 550^k = 99^k$$

$$q_{0.9} = 1.65 \times 99^k = 163^k$$

Thus, on the average, 90% of the time the discretization error for the column axial load is within $\pm\ 345^k$ using the 2-sector model, within $\pm\ 218^k$ using the

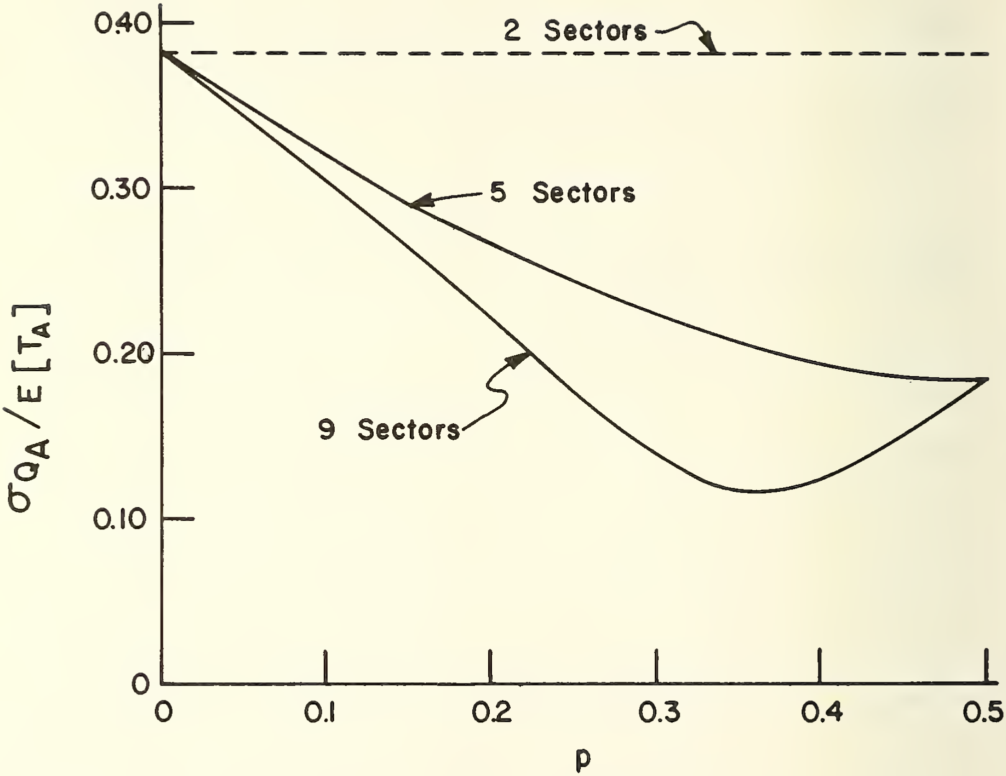


Fig. A3 - Standard Deviation of Discretization Error for Column Axial Load

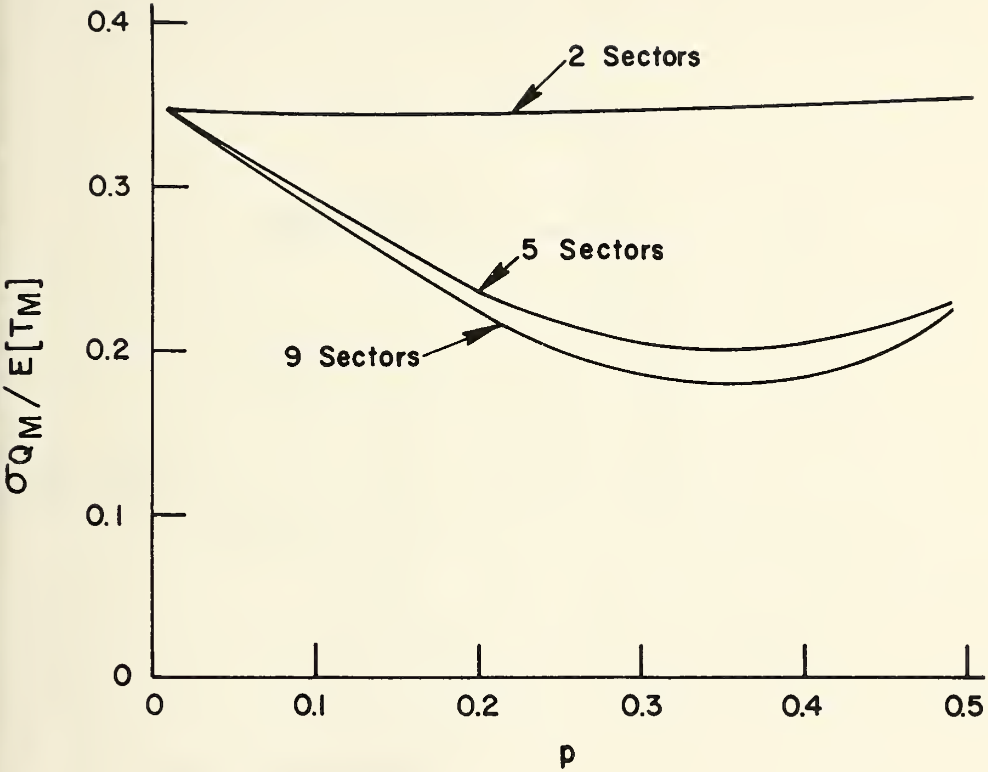


Fig. A4 - Standard Deviation of Discretization Error for Column Moment

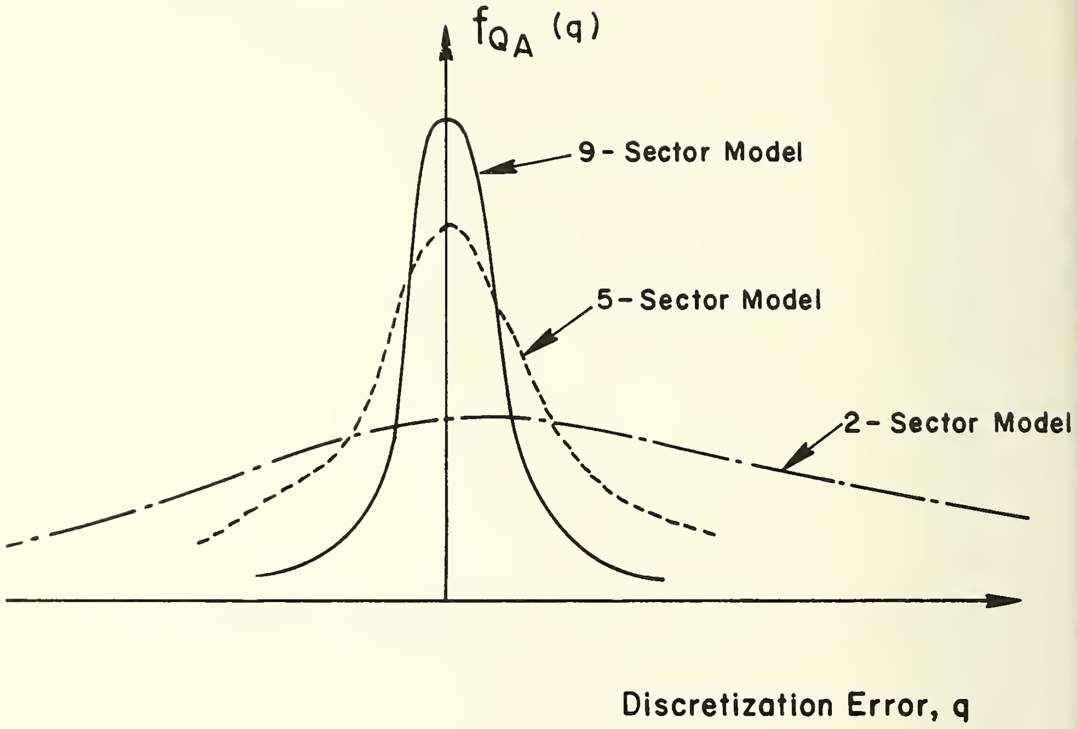


Fig. A5 - Probability Density Functions of Discretization Error

5-sector model, and within $\pm 163^k$ using the 9-sector model for a column with an average axial load of 550^k and a room equal in size to the structural bay.

In conclusion, this study of discretization error indicates that a 9-sector model if and when the location of the load is a significant factor in the design load analysis. However, numerical results indicate that even a 9-sector model leaves something to be desired in terms of possible descretization errors. Additional errors resulting from arbitrary influence surfaces and different probability distributions complicate the problem even further. Therefore, additional studies to resolve the question of the accuracy required in locating loads in a load survey are desirable.

Fire Loads

The integrity of building components exposed to a fully developed room fire is determined by the material thermal properties, and the intensity and duration of the fire involved. Fire behavior is dependent upon the amount and distribution of combustible materials, the degree of ventilation and the thermal characteristics of the bounding surfaces of the room. The purpose of this analysis is to explore some of the theoretical aspects of the effect of fire load location on fire severity, which may be represented by the heat transferred into the enclosing walls, floor and ceiling.

In conventional evaluations of fire loads, it is commonly assumed that combustibles are uniformly distributed and that the temperature is uniform throughout the room. In this analysis, the fire is considered in terms of its predominant thermal characteristics (radiation and convection) and appropriate thermal and geometrical factors. The fire load will be assumed (a) in the center of the room and (b) concentrated along one wall to provide a measure of severity for two widely different load locations.

In order to make the analysis mathematically feasible, the following simplifying assumptions were made:

1. The rate of combustion is controlled by the ventilation of the enclosure with the burning rate proportional to the rate of air supply through the opening.
2. The freely burning fire can be represented by an isothermal radiating parallelogram with an effective constant emittance.
3. The bounding enclosure walls may be considered as inert, graybody, semi-infinite slabs, and the heat transfer through these walls is one-dimensional and uniformly distributed.
4. Radiant transfer due to multiple reflections may be neglected and the emission of energy from a surface is diffuse.

The temperature history of hot gas within a fire compartment can be determined from an overall heat balance for the enclosed space. Assuming that heat supplied by inflowing air, heat losses by radiation through openings, and transient changes in the enthalpy of the gases within the enclosure can be neglected, the rate of heat release by combustion of materials in the compartment will equal the sum of the rates of all heat losses to the interior surfaces plus the heat carried by the outflowing gases. Accordingly, the heat balance equation for the enclosure can be expressed by

$$RQ = -\sum_{i=1}^{n} A_i K_i \left[\frac{d\theta_i}{dx}\right]_{x=0} + \rho C G \theta_g \qquad (A18)$$

where R is the rate of burning, Q is the effective calorific value of the combustible material, A_i is the area of the i-th interior surface, K_i is thermal conductivity of the i-th interior surface, n is total number of interior surfaces, θ_i is the temperature rise relative to ambient of the i-th usrface, x is the perpendicular distance measured from the exposed wall surface in the direction away from the heat source, ρ is the density of hot gas leaving the enclosure, C is the specific heat of hot gas leaving the enclosure, θ_g is the temperature rise above the ambient of the hot gas, and G is the volumetric flow rate of the outflowing hot gas.

For ventilation controlled fires, the average burning rate of wood fuel is determined by the air supply, and can be related to the size of the opening by the approximate relation [52, 53]

$$R = 5.5\ A_w \sqrt{H_w} \tag{A19}$$

where R is the rate of burning in kg/min, A_w is the opening area, in m^2, and H_w is the height of the opening, in m.

Consider a semi-infinite slab, the lateral surface of which is thermally insulated, having an initial temperature equal to the ambient temperature, subjected to external heating by forced convection from flowing hot gases, and direct radiation from the exposing fire and the other surrounding wall surfaces. The energy equation for the slab with constant thermal properties is given by

$$\frac{\partial\theta_i}{\partial t} = \alpha_i \frac{\alpha^2\theta_i}{\partial x^2} \tag{A20}$$

with the initial and boundary conditions

$$\theta_i(x,0) = 0$$

$$-K_i \frac{\partial\theta_i(0,t)}{\theta x} = h_i[\theta_g(t)-\theta_i(0,t)] \tag{A21}$$

$$+\sum_{j=1}^{n} \varepsilon_i\varepsilon_j\sigma F_{ij}\ [\theta_j^4(0,t)-\theta_i^4(0,t)]$$

and $\theta_i(\infty,\ t) = 0$

where t is the time variable, α_i is thermal diffusivity of the i-th surface, h_i is convection heat transfer coefficient, ε_i and ε_j are the total emissivity of the i-th and the j-th surfaces, respectively, F_{ij} is the configuration factor between the i-th surface and the j-th surface, σ is the Stefan-Boltzmann constant, and θ_j is the temperature rise of the j-th surface.

The boundary condition which contains the absolute temperature raised to fourth power terms can be approximately rewritten as

$$-\frac{\partial\theta_i(0,t)}{\partial x} = h'_i[\theta_g(t) - \theta_i(0,t)] = \sum_{j=1}^{n} H_{ij}[\theta_j(0,t) - \theta_i(0,t)] \qquad \text{(A22)}$$

where

$$h'_i = \frac{h_i}{K_i}$$

$$H_{ij} = \frac{\varepsilon_i\varepsilon_j\ F_{ij}[\theta_i(0,t) = \theta_j(0,t)]^3}{2K_i}$$

The quantities of particular interest with respect to calculation of the rate of heat absorbed by the enclosure walls are the surface temperature and the absorbed heat flux at the surface of the slab.

The surface temperature of a semi-infinite slab at any time can be derived from solution of Eq. A20 at x = 0 and expressed in the following form

$$\theta_i(0,t) = \left[\frac{I_{ij}}{h'_i + \overset{n}{\underset{i=1}{}} H_{ij}}\right]\left[1 - e^{B^2}\ .\mathrm{erfc}(B)\right] \qquad \text{(A23)}$$

and the heat flux absorbed at the surface of the slab is found to be

$$q_i = K_i\frac{d\theta_i(0,t)}{dx} = K_i I_{ij}\ e^{B^2}\ .\mathrm{erfc}(B) \qquad \text{(A24)}$$

where

$$I_{ij} = h'_i \theta_g(t) + \sum_{j=1}^{n} H_{ij} \theta_j(0,t)$$

$$B = (h'_i + \sum_{j=1}^{n} H_{ij}) \sqrt{\alpha_i t}$$

$$\mathrm{erfc}(x) = \frac{2}{\sqrt{\pi}} \int_x^\infty e^{-z^2} dz = \text{complementary error function}$$

ρ_i is the density of the i-th slab, and C_i is the specific heat of the i-th slab.

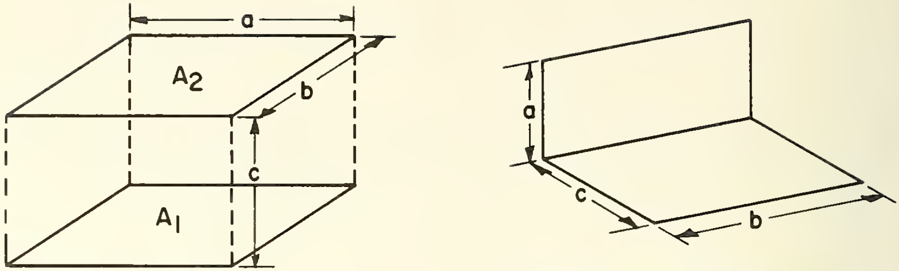
The arrangement of the bounding surface in the compartment and its location relative to the heat source (fire) and the other bounding surfaces are required for calculating the exchange of radiant energy between the enclosing walls, ceiling and floor, and the fire. These may be expressed in terms of configuration factors, F_{ij}, and used in conjunction with Eqs. A23 and A24. The four types of arrangements considered are shown in Fig. A6 and include: opposed parallel rectangles with equal width and length, adjacent rectangles of equal width in perpendicular planes, similar rectangles of different lengths in opposed parallel planes, and perpendicular rectangles of different widths. The expressions for these configuration factors are presented below.

The configuration factor for identical, parallel, directly opposed rectangles A_1 where A_2, as shown in Fig. A6a, in terms of the parameters, M and W, where M = b/c and W = a/c, is given by [54]

$$F_{12} = \frac{1}{MW}\left[\ln\frac{(1 + M^2)(1 + W^2)}{(1 + M^2 + W^2)} - 2W \tan^{-1} W\right.$$

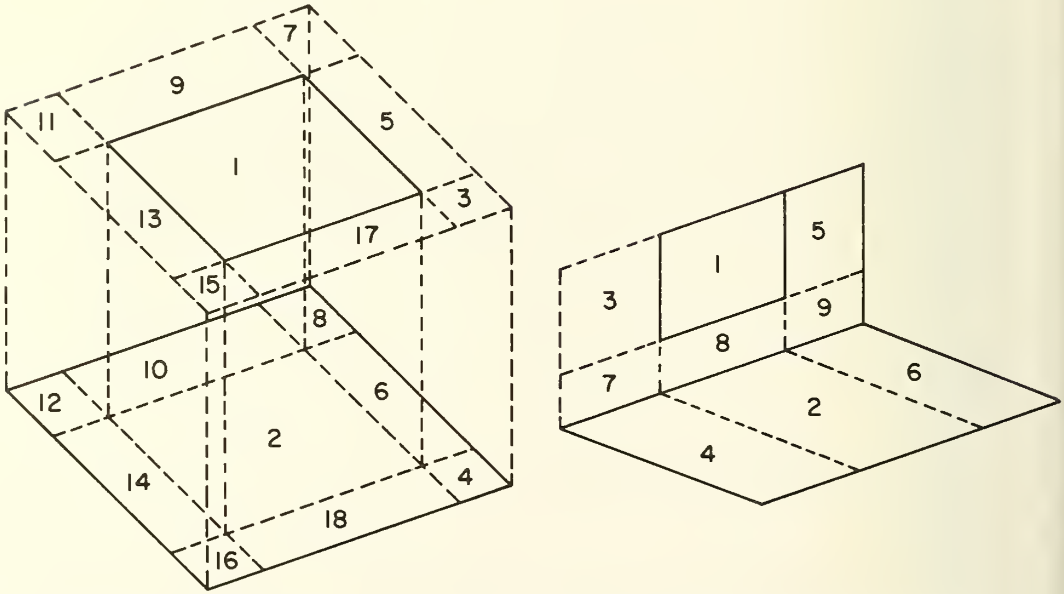
$$- 2M \tan^{-1} M + 2W\sqrt{1 + M^2} \tan^{-1}\left[\frac{W}{\sqrt{1 + M^2}}\right]$$

$$\left. + 2M\sqrt{1 + W^2} \tan^{-1}\left(\frac{M}{\sqrt{1 + W^2}}\right)\right]$$



(a) Opposed Rectangles

(b) Adjacent Rectangles



(c) Parallel Configuration

(d) Perpendicular Configuration

Fig. A6 - Arrangements Used for Determining Configuration Factors

The configuration factor for perpendicular rectangles having a common edge as shown in Fig. A6b is expressed in terms of the dimensionless ratios N=a/b and L=c/b as

$$F_{12} = \frac{1}{\pi L}\left\{L \tan^{-1}\left(\frac{1}{L}\right) + N \tan^{-1}\left(\frac{1}{N}\right) - \sqrt{N^2 + L^2} \tan^{-1}\left(\frac{1}{\sqrt{N^2 + L^2}}\right)\right.$$

$$+ \frac{1}{4} \ln\left[\left(\frac{(1 + L^2)(1 + N^2)}{(1 + N^2 + L^2)}\right)\left(\frac{L^2(1 + L^2 + N^2}{(1 + L^2)(L^2 + N^2)}\right)^{L^2}\right.$$

$$\left.\left.\times\left(\frac{N^2(1 + L^2 + N^2)}{(1 + N^2)(L^2 + N^2)}\right)^{N^2}\right]\right\}$$

The equation for the configuration factor for a parallelogram to a finite rectangle can be obtained through principles of configuration factor algebra [54], and synthesized from the parallel and perpendicular rectangles discussed previously.

For the parallel configuration shown in Fig. A6c, the configuration factor between surface 1 and total lower surface is given by

$$A_1F_{(1,2+4+6+8+10+12+14+16+18)}$$

$$= \frac{1}{4}\left\{A_{(1+13+15+17)}F_{(1+13+15+17,2+14+16+18)}\right.$$

$$+ A_{(3+5+1+17)}F_{(3+5+1+17,4+6+2+8)} + A_{(1+5+7+9)}F_{(1+5+7+9,2+6+8+10)}$$

$$+ A_{(1+9+11+13)}F_{(1+9+11+13,2+10+12+14)} + A_3F_{(3,4)} + A_7F_{(7,8)}$$

$$+ A_{11}F_{(11,12)} + A_{15}F_{(15,16)} - A_{(3+5)}F_{(3+5,4+6)}$$

$$- A_{(5+7)}F_{(5+7,6+8)} - A_{(7+9)}F_{(7+9,8+10)} - A_{(9+11)}F_{(9+11,10+12)}$$

$$- A_{(11+13)}F_{(11+13,12+14)} - A_{(13+15)}F_{(13+15,14+16)}$$

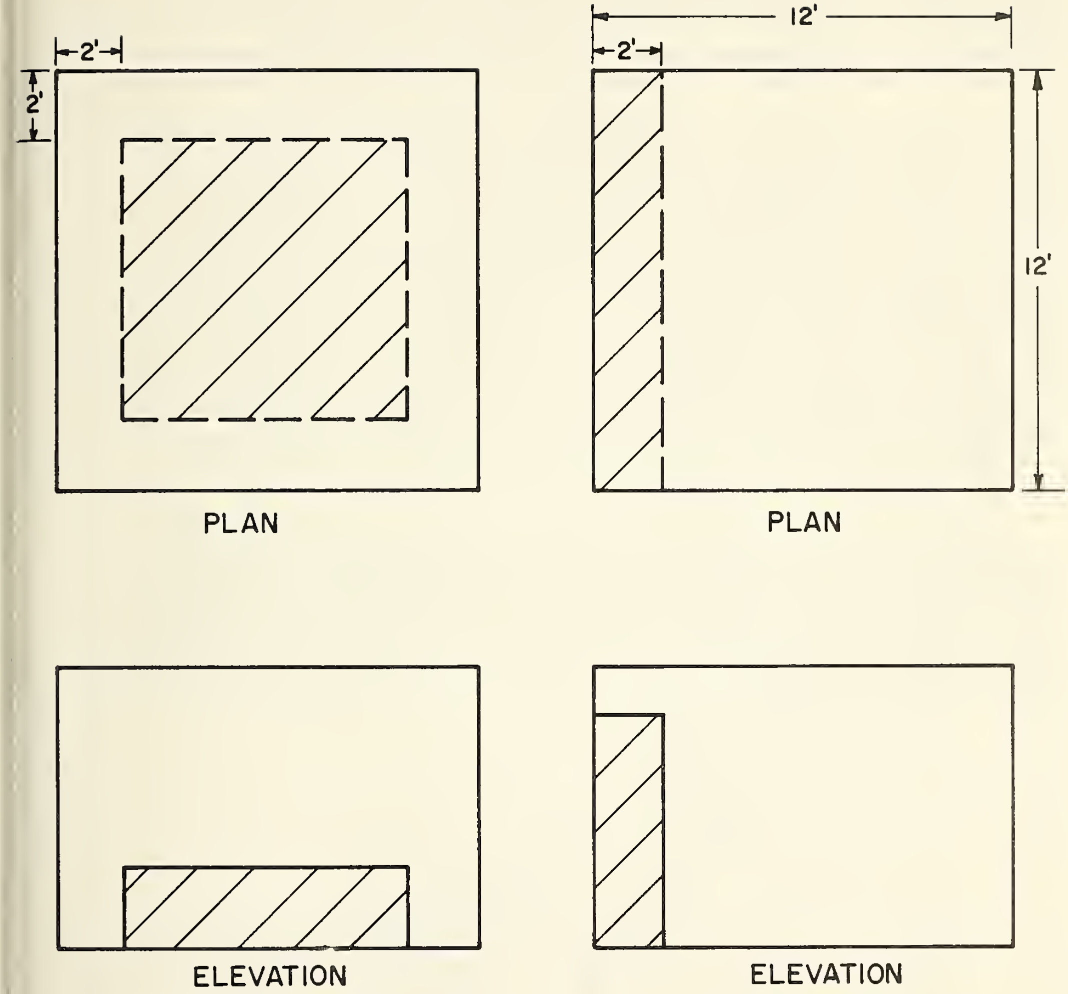
$$\left.- A_{(15+17)}F_{(15+17,16+18)} - A_{(17+3)}F_{(17+3,18+4)}\right\}$$

For the perpendicular configuration depicted in Fig. A6d the configuration factor for the radiant interchange between surface 1 and the bottom plane is

$$\begin{aligned} A_1F_{(1,4+2+6)} = \frac{1}{2}\Big\{ & A_{(2+6)}F_{(2+6,1+8+9+5)} + A_{(4+2)}F_{(4+2,1+3+7+8)} \\ & - A_{(2+6)}F_{(2+6,8+9)} - A_{(4+2)}F_{(4+2,7+8)} \\ & + A_4F_{(4,7)} + A_6F_{(6,9)} - A_4F_{(4,3+7)} \\ & - A_6F_{(6,5+9)}\Big\} \end{aligned}$$

Calculation of the heat flux absorbed by the walls and ceiling of a fire compartment, i.e., a measure of fire severity, can be carried out from Eq. A18 along with Eqs. A23 and A24, and the expressions for configuration factors. Two cases are considered and compared (a) the fire load is distributed in the center of the compartment away from the walls and (b) the fire load is concentrated along [within 0.6 m (2 feet) of] one wall, in a 3.7 x 3.7 x 2.4 m (12 x 12 x 8 ft.) high room with a doorway measuring 0.9 m (35 inch) wide by 2 m (80 inch) high (see Fig. A7). The fire load density in the form of wood cribs is taken to be 49 Kg per square m (10 lbs. per square ft.) of floor area, i.e., 655 Kg (1440 lb.)

Information required for evaluation of the fire severity included thermal properties of the interior lining material (gypsum board), the effective calorific value of the fire load, the flow rate and thermal properties of combustion gases leaving the fire room, and total emisivity of the exposing flames. The values used in the calculations were: $\rho_i = 0.96$ g/cm^3, $K_i = 2.1 \times 10^{-3}$ W/cm-^{o}C, $C_i = 1.1$ J/g-^{o}K and $\varepsilon_i = 0.9$ for the gypsum board lining material, $Q = 1.0 \times 10^4$ KJ/Kg, $G = 4.86R$ m^3/min. [55], $\rho_i = 1.65$ Kg/m^3 and $C = 1.0$ J/g-^{o}K for the combustion products, and $\varepsilon_f = 0.6$ for the flames. Two values of the heat transfer coefficient, h_i used to compute the convective component were assumed to be 2.3 x 10^{-3} W/cm^2-^{o}C for predominantly forced convection and 9.3 x 10^{-4} W/cm^2-^{o}C for natural convection. The size of the fire was assumed to consist of a vertical section covering the entire room height and a horizontal portion along the ceiling. The flame length was estimated on the basis of flame height correlations for two-dimensional and axisymmetric buoyant diffusion flames resulting from burning cribs of wood in an unconfined atmosphere [56]. A constant flame temperature of 1000 ^{o}K was assumed for the early stages of the fire, followed by a varying temperature equal to the average gas temperature when the latter increased beyond 1000 ^{o}K. Based on the total fire load and the rate of burning, the duration of the room fire required to consume the entire fire load was calculated to be approximately 45 minutes.



a) FIRE LOAD DISTRIBUTED IN CENTER OF ROOM

b) FIRE LOAD CONCENTRATED ALONG ONE WALL

Fig. A7 - Assumed Distributions of Fire Load

Table A1 summarizes the results of the calculations including the time history for heat absorbed by the wall and the ceiling, the total heat absorbed by all the bounding surfaces, and the average temperature of hot gas within the fire room. The rate of heat absorbed by a boundary element is the parameter selected for characterizing the severity of a room fire as it closely relates to the potential of structural fire damage. As shown in the table and Fig. A8, this heat absorption rate gradually decreases with time due to a continuous rise in the surface temperatures of the boundary elements. Also, it may be noted that this decrease is accompanied by an increase in the average room gas temperature.

The heat absorbed by the wall and by the ceiling averaged over the first 6 minutes were found to be 2.9 and 2.0 W/cm^2 respectively for the fire load concentrated along one wall, and 1.8 and 2.2 W/cm^2 for the fire load distributed near the center of the room. The room fire due to the concentrated fire load in the former case will have its greatest effect at early times because of the higher incident heat flux, which may cause ignition of combustible walls and ceiling if present, and duration of the fire, the wall surface was exposed to a 6% higher level of heat flux while the ceiling was subjected to a 4% lower flux for the case of the fire load concentrated along one wall. Also, the area under the average gas temperature versus time curve for the load concentrated along one wall was approximately 2% greater than that for the combustibles distributed in the center of the compartment. Consequently, it appears that the former represents a slightly higher potential for structural fire damage than the latter.

Further study is desirable to provide information on the influence of the types and locations of enclosure walls on the rate of burning and the severity of compartment fires. Since the calculations presented herein are based on burning of wood cribs, the burning rates and effective calorific values of combustibles other than wood may affect these results and additional information is required to assess their destructive potential in the event of fire.

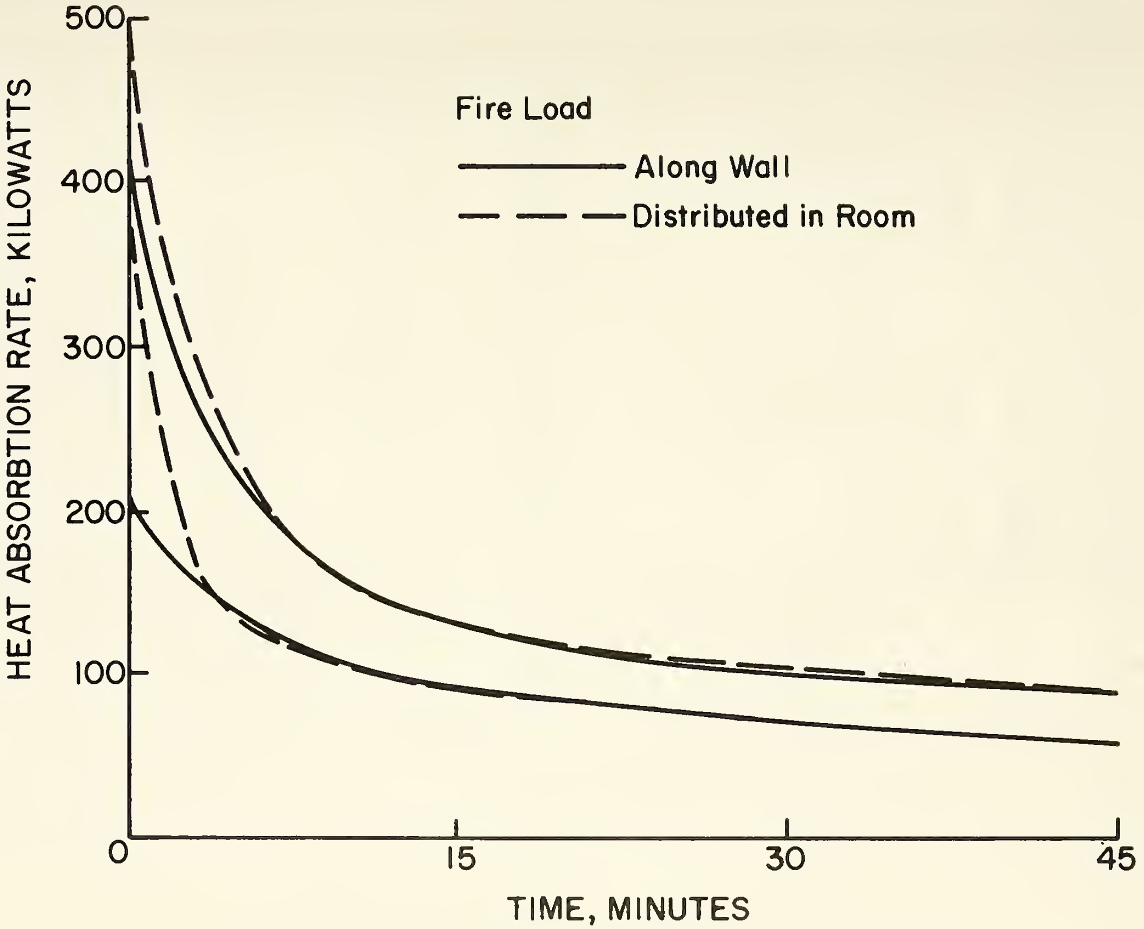


Fig. A8 - Heat Absorbed by Wall and Ceiling Surfaces

Table A1. Effect of Fire Load Location on Rates of Heat Absorbed by Wall and Ceiling, Total Heat Loss Due to Boundary Surfaces, and Average Room Gas Temperature

Time (min.)	Fire Load Distributed							
	Near Center of the Room				Along One Wall			
	Rate of Heat Absorbed (kw)			Room Gas Temperature (°C)	Rate of Heat Absorbed (kw)			Room Gas Temperature (°C)
	Wall	Ceiling	Total		Wall	Ceiling	Total	
0.01	202	494	1588	409	349	405	1395	500
3	156	244	1104	668	165	229	1005	731
6	123	188	865	778	128	183	836	795
9	107	163	753	832	110	160	736	844
12	97	147	681	872	99	144	668	881
15	90	135	628	903	90	132	611	900
18	83	125	582	918	84	124	576	930
21	78	118	547	935	79	116	541	943
24	74	112	519	951	75	110	513	956
27	71	107	496	965	71	105	490	969
30	68	102	476	977	68	101	470	981
33	65	98	458	988	66	97	453	991
36	63	94	439	995	63	93	435	998
39	61	92	426	1001	61	91	422	1004
42	59	89	414	1007	59	87	407	1011
45	57	86	401	1012	58	85	397	1017

APPENDIX B

DATA COLLECTION FORMS AND INSTRUCTIONS

The survey procedure involving collection of data on the building characteristics, the building occupancy and the fire and live loads in the rooms consisted of the following:

1. Completion of Building Characteristic Form
2. Completion of Occupancy Data Form
3. Annotation of Building Floor Plans
4. Completion of Room Survey Form

The survey forms and instructions are presented in this section.

INSTRUCTIONS FOR COMPLETING BUILDING CHARACTERISTICS DATA COLLECTION FORM

The purpose of this form is to record information about general building characteristics such as height, age, occupancy type (page 1) as well as information about the firms occupying the building (subsequent pages of the form).

Questions 1 through 7

The building number, building name, building address and age of the building to be surveyed have been entered on the first page of the form. Instructions for completing the remainder of the form are provided below.

Filling out the Data Collection Form

The surveyor's name, date of the survey and a record of the page number are to be recorded in the upper right corner of the first page. The remaining entries are to be completed as follows:

> Question 8 - Count and record the number of all floors in the building including mezzanines and mechanical equipment floors above the ground level (include the ground floor). For buildings on sloping terrain with two or more entrances at differing ground levels use the lowest level entrance in determining the number of floors. Floors completely below grade are considered basements and are not to be counted.
>
> Question 9 - Circle the appropriate digit describing the type of vertical load resisting system (9a) and the material used for this system (9b).

Question 10 - Circle the appropriate digit which describes the type of occupancy for the building.

After completing the above, information about the firms occupying the building is to be recorded on the "Occupancy Data" form. Use as many forms as necessary to record the data for all the firms in the building. For government buildings, each agency in the building is to be considered as a different firm. If only one agency occupies the building, the firm type recorded for each room will be the same.

The building number from page one should be recorded in the upper right-hand corner of the "Occupancy Data" form. Each occupancy data sheet for the building should be numbered sequentially starting with number 2.

Each firm in the building should be assigned a number. This number, the firm name and firm type and the age of the firm must be recorded on the form. Names of the firms may be obtained from the building directory in the lobby or by walking through the building. The firms should preferably be listed in alphabetical order and numbered sequentially if a directory is suitable. If a building directory is not available, they may be numbered in any convenient fashion, e.g., in the order encountered in walking through the building.

The type of firm is to be selected from the list of firm types provided. In making this selection, the two digit category which best describes the type of activity conducted by the firm should be used.

The firm age refers to the number of years the firm has occupied the rooms in the building which is being surveyed.

BUILDING CHARACTERISTICS

DATA COLLECTION FORM

Surveyed by ____________________

Date ____________________

Sheet __________ of __________

1. Building Number - ☐☐☐

2. Building Name ____

3. Street Address ____

4. City ____

5. State ____ ☐☐

6. Zip Code - - - - - - - - - - - - - - - - - - ☐☐☐☐☐

7. Year Building Completed - - - - - - - - - - - - - - - - - ☐☐☐☐

8. Number of floors above ground level - - - - - - - - - - - - - - ☐☐

9. Vertical Load Resisting System (Circle appropriate digit)

a. Type

- Column - 1
- Bearing Wall - 2

b. Material

- Concrete - 1
- Steel -2
- Masonry -3
- Wood - 4

10. Occupancy Type

- Federal Government - 1
- State Government - 2
- Local Government - 3
- Private - 4
- Private and Government (Federal, state, or local) - - - - - - - - - - - 5

BUILDING CHARACTERISTICS
DATA COLLECTION FORM
(Occupancy Data)

Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age
Firm Number	Firm Name	Firm Type	Firm Age

LIST OF FIRM TYPES TO CHOOSE FROM:

The firm type is to be determined by the product or group of products produced or handled, or services rendered.

Agriculture, Forestry, and Fisheries
- Type 01. Agricultural production--crops
- Type 02. Agricultural production--livestock
- Type 07. Agricultural services
- Type 08. Forestry
- Type 09. Fishing, hunting, and trapping

Mining
- Type 10. Metal Mining
- Type 11. Anthracite mining
- Type 12. Bituninous coal and lignite mining
- Type 13. Oil and gas extraction
- Type 14. Mining and quarrying of nonmetallic minerals, except fuels

Contract Construction
- Type 15. Building construction--general contractors and operators
- Type 16. Construction other than building construction--general contractors
- Type 17. Construction--special trade contractors

Manufacturing
- Type 20. Food and kindred products
- Type 21. Tobacco manufactures
- Type 22. Textile mill products
- Type 23. Apparel and other finished products made from fabrics and similar materials
- Type 24. Lumber and wood products, except furniture
- Type 25. Furniture and fixtures
- Type 26. Paper and allied products
- Type 27. Printing, publishing, and allied industries
- Type 28. Chemicals and allied products
- Type 29. Petroleum refining and related industries
- Type 30. Rubber and miscellaneous plastics products
- Type 31. Leather and leather products
- Type 32. Stone, clay, glass, and concrete products
- Type 33. Primary metal industries
- Type 34. Fabricated metal products, except machinery and transportation equipment
- Type 35. Machinery, except electrical
- Type 36. Electrical and electronic machinery, equipment and supplies
- Type 37. Transportation equipment
- Type 38. Measuring, analyzing, and controlling instruments; photographic, medical and optical goods; watches and clocks
- Type 39. Miscellaneous manufacturing industries

LIST OF FIRM TYPES TO CHOOSE FROM:

Transportation, Communication, Electric, Gas, and Sanitary Services
    Type 40. Railroad transportation
    Type 41. Local and suburban transit and interurban highway passenger transportation
    Type 42. Motor freight transportation and warehousing
    Type 43. U.S. Postal Service
    Type 44. Water transportation
    Type 45. Transportation by air
    Type 46. Pipe lines, except natural gas
    Type 47. Transportation services
    Type 48. Communication
    Type 49. Electric, gas and sanitary services

Wholesale and Retail Trade
    Type 50. Wholesale trade--durable goods
    Type 51. Wholesale trade--nondurable goods
    Type 52. Building materials, hardware, garden supply, and mobile home dealers
    Type 53. General merchandise stores
    Type 54. Food stores
    Type 55. Automotive dealers and gasoline service stations
    Type 56. Apparel and accessory stores
    Type 57. Furniture, home furnishings, and equipment stores
    Type 58. Eating and drinking places
    Type 59. Miscellaneous retail

Finance, Insurance, and Real Estate
    Type 60. Banking
    Type 61. Credit agencies other than banks
    Type 62. Security and commodity brokers, dealers, exchanges, and services
    Type 63. Insurance
    Type 64. Insurance agents, brokers, and service
    Type 65. Real estate
    Type 66. Combinations of real estate, insurance, loans, law offices
    Type 67. Holding and other investment officers

Service (s)
    Type 70. Hotels, rooming houses, camps, and other lodging places
    Type 72. Personal services
    Type 73. Business services
    Type 75. Automotive repair, services, and garages
    Type 76. Miscellaneous repair services
    Type 78. Motion pictures
    Type 79. Amusement and recreation services, except motion pictures.
    Type 80. Health services
    Type 81. Legal services

LIST OF FIRM TYPES TO CHOOSE FROM:

- Type 82. Educational services
- Type 83. Social services
- Type 84. Museums, art galleries, botanical and zoological gardens
- Type 86. Membership organizations
- Type 88. Private households
- Type 89. Miscellaneous services

Public Administration

- Type 91. Executive, legislative, and general government, except finance
- Type 92. Justice, public order, and safety
- Type 93. Public Finance, taxation, and monetary policy
- Type 94. Administration of human resources programs
- Type 95. Administration of environmental quality and housing programs
- Type 96. Administration of economic programs
- Type 97. National security and international affairs

Nonclassifiable establishments

- Type 99. Nonclassifiable establishments

EXAMPLE

Ajax Hardware - Central office for hardware store chain in present offices for 28 years.

J. H. Brown, Attorney Law Firm in present offices for 3 years.

Etc. . .

FIRM NO.	FIRM NAME	FIRM TYPE	FIRM AGE
001	Ajax Hardware	52	028
002	J. H. Brown	81	003

etc. . .

INSTRUCTIONS FOR ANNOTATING THE BUILDING FLOOR PLANS

Information related to the location of each firm within the building and the use of the various rooms will be utilized in connection with this survey. This information will be collected using the building floor plans.

Copies of the floor plan layout for the building to be surveyed will be provided by NBS. The first step involved in this portion of the survey will be to walk through the building with the floor plans and ascertain their correctness through visual observation. The purpose of this inspection is to verify that the floor plans correctly depict the locations of all rooms, corridors, stairways and elevator shafts. Any necessary corrections to the floor plans indicating new wall locations or removal of original walls etc., are to be made on the floor plans during this walk through.

In addition, for each area in the building the following information is to be recorded directly on the floor plans:

a. Firm number occupying area, if applicable, and
b. Type of enclosure, if applicable.
c. Area use.

This data will be written in each area in the above order followed by slashes between each code using the following coding system:

A. Firm number - The firm number (the three digit number assigned to the firm on the Building Characteristic Data Collection Form) for the firm occupying the area shall be recorded except for exempt areas.

B. Type of Enclosure - For all areas except exempt areas select

1. Fully enclosed - individual rooms with all walls extending the full distance from floor to ceiling.

   2. Open area with partial height partitions - large open areas usually with several occupants with partial height partitions subdividing the area into individual work stations.

   3. Open area without partial height partitions - large open area without any internal partitions subdividing the area.

C. Area use - select one of the following classifications which best describes the use of the particular area

   1. General Office - used primarily for administrative functions as opposed to clerical function (e.g., professional office, executive or managerial office, etc.).

   2. Clerical Office - used primarily by clerical staff (e.g.,secretarial areas, bookkeeping, typing pool, key punch room).

   3. Lobby - used primarily as an entrance area or reception area

   4. Conference - used primarily for group meetings.

   5. File Room - used primarily for the storage and maintenance of files.

   6. Storage Room - used for the storage of office materials other than files or books.

   7. Library - used primarily for the storage of books.

   8. Stairway

   9. Elevator

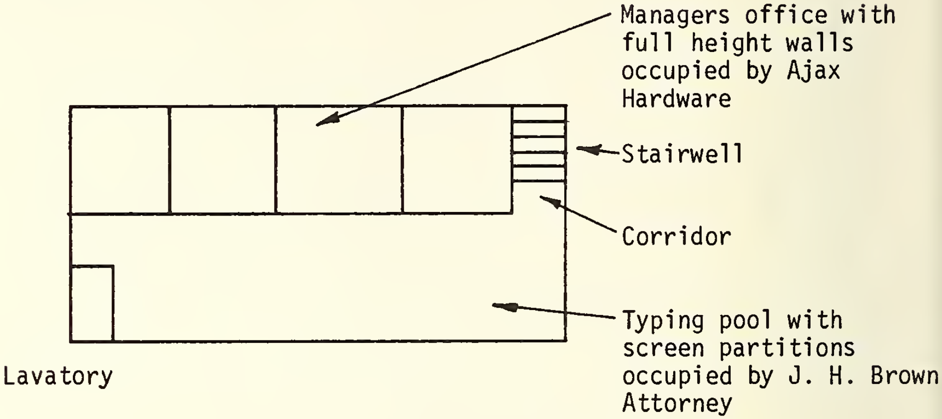
   10. Corridor

   11. All other areas - lavatories, mechanical equipment room janitors closet, etc.

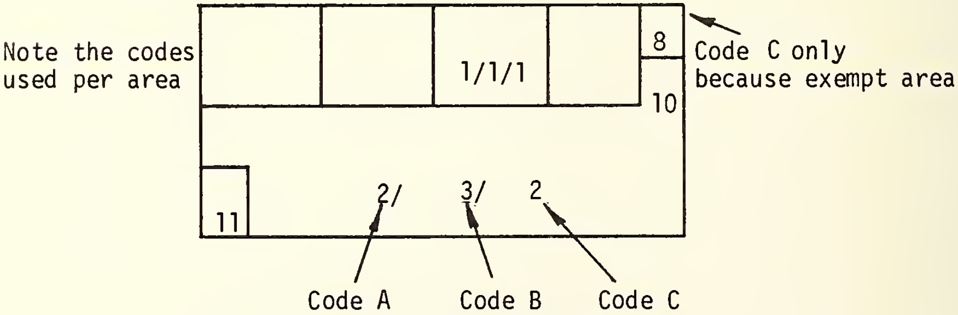
   12. Vacant room

The numbers described for the area use, type of enclosure and firm number shall be written on the plans in sequential order for each area (Code A/Code B/Code C).

Example of Possible Floor Plan



Example of Floor Plan After Surveyors Annotations



6-13-74
2015

FIRE LOAD AND LIVE LOAD SURVEY

NATIONAL BUREAU OF STANDARDS

BUILDING	FLOOR	1	2	HOR. REF. 1	HOR. REF. 2	VERT. REF. 1	VERT. REF. 2	3	4	5	6	7	8	9	10	11

① Same as before ○ or ✓	FIRM	ROOM NUMBER	Mark below if area is to be subdivided	Mark one: Fully enclosed ○ Open with partitions ○ without partitions ○	NO. IMAG. ROOMS: None ○ or mark two at right	ROOM USE: General ○ Clerical ○ Lobby ○ Conference ○ File Stor. ○ Library ○ Stairway ○ Elevator ○ Corridor ○ Other ○	X Y Z

(Same block repeated for entries ② to ⑱.)

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INSTRUCTIONS FOR DATA COLLECTION AND RECORDING

General

These instructions cover the collection and recording of data in the designated rooms. In surveying a room all data will be recorded on the room data collection forms.

There are four types of room data collection forms;

1. The first type of form (Form #1 "Bounding Surfaces") involves information to be recorded for the ceiling, floors, walls, internal partitions, and trim of the room.
2. The second type of form (Form #2 through 6) involves information to be collected on furniture items and their associated contents. These forms are:
   a. Form #2 "Desks"
   b. Form #3 "Tables"
   c. Form #4 "Cabinets"
   d. Form #5 "Shelving"
   e. Form #6 "Seating"
3. The third type of form (Form #7 "Miscellaneous") deals with items that may not have been previously accounted for on Forms #1 through 6.
4. The fourth type of Form (Form A, B, & C) are extra unnumbered forms for use as continuation sheets for recording information on Forms #2 through 7. These forms are:

   Form A - free and enclosed contents (paper & books)
   Form B - equipment
   Form C - free & enclosed contents other than paper & books

The data collected will be used to obtain information about the weight of the items in the room and their fire characteristics. In this regard, the information of primary interest for each item in the room consists of:

1. Type of material - wood, metal, etc.
2. Dimensions
3. Estimated weight where required

Instructions have been prepared indicating the procedures to follow in completing the forms. The descriptions in these instructions for the items in the various categories such as desks, tables, etc. are based on characteristics used to establish equations for converting the information on the data collection form to the weight of the item. Note that in some cases, the descriptions do not include items which one would normally consider to be part of the category.

Built-in items such as book cases, etc. should be considered as miscellaneous items and it will be necessary to estimate the weight for such items.

Undoubtedly, items will be encountered which do not exactly fit the descriptions provided in the instructions and judgement will be required. For these cases, the information of primary interest in the survey should be considered in arriving at a decision. If, for example, the material type for an item does not exactly correspond to the multiple choices provided on the form, the material type which most closely approximates the combustibility and weight should be selected. Similarly, if it is not clear whether an item of furniture fits the description provided for Forms 2 through 6, it should be regarded as a miscellaneous item using Form 7.

The type of material is to be recorded for each item. In selecting the material type for furniture items, laminated coverings should be neglected. For example, most desk tops have a plastic or vinyl covering. This should not be recorded but rather the material used to construct the desk (wood, metal, or plastic). Where items are composed of two materials, the material comprising the largest portion of the item should be recorded. In some cases, e.g.,chairs, space has been provided for recording the different material types for the various component parts of the item.

If the dimensions of an item are greater than the values provided for on the data sheet, record the largest value possible.

The entries to be made on each data collection form must be chosen from the multiple choices provided. If the choice is, for instance, between "wood" and "metal", one should fill in the circle following either wood or metal, whichever is appropriate as shown below:

e.g. Wood o

If Wood Wood ●
Metal o

Metal o

In the case where dimensions are required, the circle below the appropriate number for each of the digits should be filled in in order. For example, if the entry is a dimension, such as 7 ft.-2 in., the sheet should be marked as follows:

0 1 2 3 4 5 6 7 8 9
ft. o o o o o o o ● o o

in. o o ● o o o o o o o

It is important to note that when numbers are recorded, values must be shown for all the quantities on the data sheet. If for example, a dimension is 9" and the dimensions shown in the space on the form are as follows:

0 1 2 3 4 5 6 7 8 9 10 11

ft. o o o o o o o o o o

in. o o o o o o o o o o o o

The dimension is to be recorded as 0'-9" i.e.

0 1 2 3 4 5 6 7 8 9 10 11

ft. ● o o o o o o o o o

in. o o o o o o o o o ● o o

Similarly if the dimension is an even number of feet, the zero should be marked for the inch dimension. Thus wherever numbers are provided for the item which has been recorded on the form and the value is zero for the quanitity associated with that item, the zero must be marked. Dimensions less than 1" are to be rounded off to the nearest inch. Values less than 1/2" should be neglected. Values between 1/2" and 1" should be rounded off to 1".

Room Survey Procedure

A standard number of forms has been provided in the following order:

1. Form #1 Bounding Surfaces
2. Form #2 Desks
3. Form #3 Tables
4. Form #4 Cabinets
5. Form #5 Shelving
6. Form #6 Seating
7. Form #7 Miscellaneous

Extra Forms A, B, & C

The floor number and room number of the room to be surveyed have been indicated at the upper right hand corner of the first sheet. This floor number and room number are in accordance with the numbering system posted in the building.

After entering a room the surveyor should record the information on Form #1 on the ceiling, floor, trim, and walls first. Then record information on all desks (Form #2) next, one desk per form. All information associated with the desk should be recorded on the desk form, including enclosed and free contents. Next all information on the tables in the room should be recorded. All information on cabinets, shelving, and seating should be recorded in order. The last form, Form #7, should then be filled out to account for all room contents not previously recorded. To expedite the survey operation, small miscellaneous items encountered on top of furniture items may be aggregated and also recorded using Form #7. An alternate procedure, for example, is to proceed around the room surveying the items as encountered. This will facilitate keeping track of what items have been surveyed and insure that items are not skipped. It is important that the surveyor follow a systematic procedure to insure that all items in the room are recorded, the survey of the room completed expeditiously and creates a minimum disruption of the office activities. It may be necessary to adjust the above suggested procedure based on the situation encountered in the room.

For large open areas such as secretarial pools, etc. sometimes referred to as office landscaping, see the Special Items (JIC) section of the special instructions for Form #1.

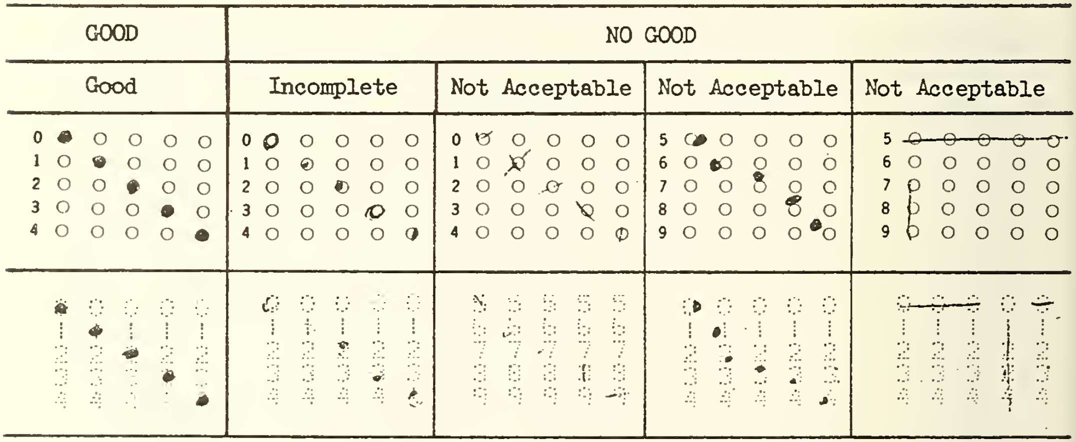
For each form, the individual sheets should be numbered in the upper right hand corner (e.g., 1 of 2, 2 of 2, etc.). When there is not sufficient space on a particular form to record all the information for that item (e.g. if the free contents on top of one desk cannot be recorded on a single desk form), the appropriate extra form, (Form A, B, or C) should be used. In this case, the extra form should be inserted immediately following the form for the item for which it was used and the heading at the top of the sheet should be marked indicating it is an "extra form."

Marking Instructions

The information recorded by you on these forms will be processed on an electronic reading machine called FOSDIC. (The letters stand for Film Optical Sensing Device for Input to Computers.) These forms are microfilmed and the negative film is fed through the FOSDIC. The resulting electronic impulses are recorded on magnetic tape which is then used to feed the computers.

By using negative microfilm, the marks you make on these forms will show as clear spots on the negative microfilm. An "electric eye" will shine through the spot and create an impulse on magnetic tape. Accordingly, it is imperative that you make complete, black marks. Two types of marking guides are provided--circles and perforated numbers. Where circles are provided, the entire circle should be filled. Where perforated numbers are provided, the mark should be a spot at least as large and complete as in the circle and in the center of the number itself. If possible, when marking perforated numbers, a circle is preferred. A circular motion is recommended.

Shown below are examples of acceptable and unacceptable marks for each type of marking guide.



One final word of caution: These forms should not be filled out with ink, neither ball-point pens or fountain pens. Only black pencils can be used. Further, wherever possible, a good No. 2 or No. 2-1/2 lead pencil should be used. This is important because anything softer than No. 2 deposits too much graphite and smears, while anything harder than No. 2-1/2 makes too gray a mark.

A space is provided on the first sheet for the room for the surveyor to write in any significant notes. Comments on such things as:

1. The type of plastic if know (for furniture, equipment, etc.),
2. The estimated weight and volume of free combustibles (e.g., cardboard cartons, trash containers, etc.) in the corridor adjacent to the room surveyed (when observed),
3. The existance of flammable liquids (solvents, oils, inks, glues, etc.),
4. The percentage of windows which can be opened,

should be included if appropriate.

Specific instructions for filling out each of the individual data collection forms are given in the following.

SPECIAL INSTRUCTIONS FOR FORM #1 - BOUNDING SURFACES

This is the first sheet to be completed in surveying a room. Note that the surveyors name and date of the survey are to be filled in at the upper right hand corner. The building name and the floor number and room number using the numbering system posted in the building have already been marked to identify the room to be surveyed.

This form contains information on the room use; the number of occupants; the type of walls; the type of ceiling, floor and trim; and the wall material. The procedure for filling out the form is indicated below.

1. Room Use

Select the one most appropriate category which describes the type of activity conducted in the room in accordance with the following:

a. General - used primarily for administrative functions as opposed to clerical function (e.g., professional office, executive or managerial office, etc.).

b. Clerical - used primarily by clerical staff (e.g., secretarial areas, bookeeping, typing pool, key punch room.

c. Lobby - used primarily as an entrance area or reception area.

d. Conference - used primarily for group meetings

e. File - used primarily for the storage and main tenance of files

f. Storage - used for the storage of materials other than files or books

g. Library - used primarily for the storage of books.

2. Normal Number of Occupants

The number of people who normally use the room should be recorded. This can be determined by:

a. asking someone in the room

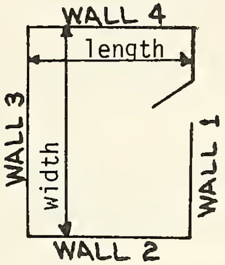
b. by assuming one person sits at each desk if an occupant of the room is not available

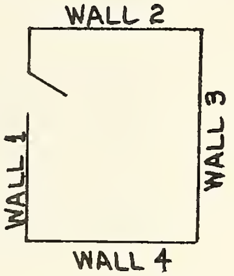
c. for a conference room, library or lobby - assume one person uses each available chair

3. Wall Types

The four vertical boundaries of the room (either walls, partial height partitions or open imaginary boundary) should be numbered and the type of wall indicated for each in accordance with the following:

a. Designation of wall number - for reference purposes the wall containing the door used to enter the room shall be designated as wall 1. Proceeding in a clockwise direction from wall 1, the remaining walls will be numbered 2, 3, & 4 accordingly. Note: partial height partitions located <u>within</u> the boundaries of the room should not be considered in selecting the four walls.





b. type of wall

1. full height - wall which completely extends from the floor to the ceiling.

2. partial height - wall which does not extend the full distance from floor to ceiling. (e.g., screen partitions, area dividers, etc.).

3. open - imaginary boundary surface for the room, i.e., no full height walls or screen partitions.

If a room is encountered with more than four walls, it will be necessary to combine walls in an approximate fashion and consider the room to have only four walls.

4. Ceilings, floors, and trim

A. Ceiling - select the <u>one</u> most appropriate material type.

1. wood - wood based material (e.g., masonite, hardboard, plywood) wood paneling, strips, etc.

2. metal - steel, aluminum, metal tiles, etc.

3. plastic - fiberglass panels, vinyl sheeting, etc.

4. acoustical tile - precut panels or sheets with a porous or irregular surface texture

5. non-combustible - material not included above which would not be expected to burn (e.g.,gypsum board, plaster, masonry, etc.).

B. Floor - select the one most appropriate material type which characterizes the top surface of the floor.

1. wood - wood based material, (e.g.,oak flooring, hardboard, plywood, etc.).

2. non-combustible - material which would not be expected to burn, concrete, brick, stone, metal, etc.

3. resilient flooring - vinyl, vinyl coated sheet, vinyl coated tile, cork, rubber, tiles, linoleum, asphalt tile, etc.

4. carpet - if there is carpeting over 50% or more of the total floor area, select carpeting. If carpeting covers less than 50% of the total floor area select another material type disregarding the carpeting.

C. Trim - trim refers to the baseboard molding, molding located where the wall and ceiling join, molding around windows and doors or doorways. Each of these locations will be handled separately on the data collection form. For the case in which there is no trim or the trim covers less than 50% of the perimeter in one or more of the above locations leave that section blank and do not indicate the type of trim. Where the trim exceeds 50% or more of the perimeter in a location indicate the type of trim material. The trim around each window in the room should be combined and considered as a single total linear footage for that room. This also applies to doors. If more than one type of trim is used in any one location (ceiling, floor, doors, windows), choose the type of material which is characteristic of 50% or more of the total linear footage for that location.

5. Walls

Complete this section, for each full height wall indicated in Section 3 of this form. For each partial height wall indicated in Section 3 complete the portion of Section 7 dealing with walls 1 to 4.

Both the wall material and wall covering are to be recorded. The wall material refers to the material comprising the exterior surface of the wall (gypsum wall board, paneling, etc.). Covering refers to the finish applied to the wall material. In the case where an entire wall is composed of windows, the section for material and covering for that wall should not be checked.

A. Material - select the most appropriate material type which comprises more than 50% of the wall.

   1. wood - paneling, hardboard, etc.

   2. metal - steel, aluminum, etc.

   3. plastic - translucent plastic sheeting plastic coated paneling, etc.

   4. non combustible - masonry, concrete, glass block, etc.

   5. plaster

   6. gypsum board

B. Covering - select the most appropriate wall covering. Note for certain types of wall material there may be no covering present and this section should be left blank e.g., wood paneling, would normally not be painted or papered.

   1. paint - if 50% or more of the wall is covered with paint, lacquer, varnish, etc.

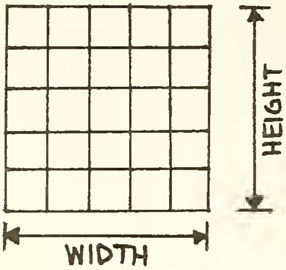
   2. paper - if 50% or more of the wall is covered with wallpaper, bulletin boards, posters, etc.

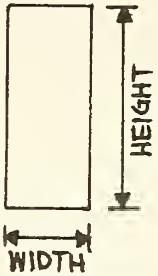
   3. vinyl

   4. drapes - if 50% or more of the wall is covered with textile material or draperies. If drapes cover 50% or more of a painted or papered wall record only drapes.

6. Wall Openings

Doors and windows should be recorded for each wall separately. The height and width dimensions are for the opening and do not include the trim or casement. For windows the height above the floor refers to the distance between the bottom of the window and the floor.





For the case of more than one door or window in a wall, it is only necessary to record the dimensions for one of each and indicate the total number of doors and windows in the wall. If there are several doors and/or windows in a given wall and they vary in size, the length and width dimensions recorded for that wall should be average values.

7. Partial Height Partitions

For each partial height wall indicated in Section 3 of the form as well as for any partial height partitions which may be within the room, complete this section.

The partial height wall data should be recorded in accordance with the wall numbering system established in Section 3. The material type (wood, metal, plastic, fabric) for the partition refers to the material comprising the exterior surface of the partition. Note, some internal partitions consist of a frame of one material and a panel of another material, e.g., a fabric panel with a metal frame. For such cases the panel material should be recorded. Partitions are also made with different panel materials on the two sides e.g., one side metal, one side fabric. For such cases the heavier material should be recorded. The length and height should also be recorded. For curved partitions the arc length measured along the curved surface should be used for length.

For internal partitions record the same information as noted above. In addition, the proximity of the partition to the boundary walls should be recorded.

8. Room Dimensions

The height, length and width of the room are to be recorded to the nearest inch. The height should be measured from the floor to the upper most part of the visible portion of the ceiling. Where suspended or false ceilings are present measure only to the suspended ceiling. Where equipment ducts are present and suspended from the ceiling disregard and measure to the ceiling.

The length and width of the room are to be measured between the wall surfaces i.e. approximation to account for wall thickness should not be made. The length is the dimension parallel to walls 2 and 4 and the width the dimension parallel to walls 1 and 3 as shown in the sketch in section 3 -- wall types. For non-rectangular rooms or rooms with wall offsets resulting from closets, etc. the length and width should be measured taking these into account in an appropriate manner such that the two dimensions recorded represent the exposed floor area visible to an observer, i.e., neglect closets.

Sepcial Items (JIC)

If the room surveyed was included on the original list of rooms to be surveyed, do not mark the first section of this portion of the form. If the room was not included on the original list of rooms to be surveyed but was an adjacent room selected by the surveyor, mark the circle under the number on the multiple choice.

For large open areas such as secretarial pools, etc. sometimes referred to as office landscaping, the following procedure is to be followed:

1. Complete Form #1 for the entire area i.e., record the data for the four bounding surfaces, the number of doors and windows and the length, width and height of the area. Do not complete the section dealing with internal partitions.

2. Select one or more small segments of the room which are "representative" of the entire room with respect to the amount and type of furniture, equipment, etc.

3. Treat each representative segment as a room and complete all the necessary survey forms required for that segment.

4. Form #1 for each of these representative segments should only contain the building, floor and room number (use the same as recorded in step 1), the dimensions of the segment and data on internal partitions if they are present. Use the estimated weight portion in the second section of the Special Items (JIC) space to record the total number of sections in the room (including the one surveyed) which are the same as the representative segment surveyed.

SPECIFIC INSTRUCTIONS FOR FORM #2 DESKS

For each desk in the room a separate data form will be completed. Prior to recording data, count the number of desks in the room and check to ascertain that the proper number of forms is available.

The data to be recorded for desks includes the type of desk, its proximity to the wall, the type of desk material, the type and number of drawers, the dimensions of the top surface of the desk, information on the contents of the drawers (enclosed contents) and the material on the top of the desk (free contents).

1. DESK TYPE

Select either double pedestal, single pedestal, or "with legs". A double pedestal desk as seen on the illustrations has drawers on both the right and left sides of the desk. A single pedestal desk has drawers on only one side. Select "with legs" if all four legs of the desk are greater than 12 inches in height.

2. PROXIMITY TO WALL

If any part of the desk is within 2 feet of a wall select 2 feet or less. Otherwise select more than 2 feet. Direct measurement to determine this information is only necessary where the choice is not obvious.

3. DESK MATERIAL TYPE

Select the material type that best characterizes the desk. In making this selection, disregard the thin plastic or formica laminate used on the top surface and possibly on the sides and drawer fronts. Where more than two materials are used select the most predominant which is estimated to comprise 50% or more of the weight of the desk. For example, if the desk legs are metal, and the rest of the desk is wood, wood should be chosen as the material type. If there is a question as to whether the desk material is wood or plastic simulated--wood, sometimes the best indicator of material type would be to look at the narrow edges of the desk drawers, where the desk material may be exposed to observation.

4. NUMBER OF DRAWERS

The number of each of the three types of drawers in the desk should be recorded. The three types of drawers are:

a. box drawer - standard drawer measuring approximately 6" high

b. file drawer - larger size drawer approximately 12" high for filing papers and folders.

c. personal drawer - smaller size drawer that tends to be no greater than 3" high, the center drawer, if present, should be counted as a personal drawer.

5. DESK TOP DIMENSIONS

The length and width of the top surface of the desk including any overhang should be measured to the nearest inch and recorded on the data sheet. Where a desk top may have a shape other than rectangular, record the curved lengths or widths as if it were a rectangular desk.

6. FREE CONTENTS

Free contents include items on top of the desk such as paper, books, equipment, etc. This section should be used to record data on paper or books. Form A should be used if enough space is not available on the form for recording data on all the paper and books. Section 7 of this form should be used to record data on typewriters calculators and telephones. Any other items should be aggregated with items on other furniture and recorded using Form #7 Miscellaneous (see instructions for Form #7).

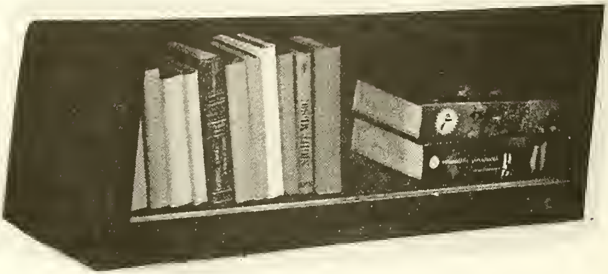
In dealing with paper and books, data will be recorded in terms of "piles". For each "pile" the following information will be recorded: 1. Dimensions of pile, 2. percent compaction

a. For each pile of paper and books the length width and height of the pile should be recorded. The length and width are to be selected from the choices given. The height of the pile is to be estimated to the nearest inch. Piles less than 1" in height should be combined with the height of other piles in recording the data. Where papers are not arranged neatly in piles on the desk, it will be necessary to estimate pile height by assumming the papers were stacked neatly into discrete piles.

   For papers or books with length and width dimensions different from the multiple choice values listed on the sheet, the closest dimensions should be selected and height of the pile estimated accordingly to compensate for this difference.

   In an unusual case where the height of a pile may exceed the maximum value of 119" on the data sheet, simply record the data in terms of smaller piles.

b. Estimate a % compaction of the pile to the nearest 10%. Compaction is defined as the ratio of the actual volume of the pile to the volume of the smallest rectangular box into which the pile could be placed. For example, piles of paper or books resting horizontally on the desk top under the effect of gravity are fully compacted (100%) where items such as books or paper are filed vertically as in a vertical letter tray the % compaction would simply be the ratio of the height of the pile if the material were removed from the tray and stacked on the desk top to the length of the letter tray. In the following case, the compaction is approximately 75%.



7. EQUIPMENT

Space has been provided for recording data on typewriters, calculators and phones which may be present either on top of or in the desk.

a. For typewriters record whether it is electric or manual, whether the typing element is a ball or distinct keys (typing bar), the carriage length and the base dimensions. Note, in some cases the carriage length in inches may be marked directly on the machine. Accessory units such as magnetic card or tape units used with the typewriter should be recorded as miscellaneous items and their weight estimated.

b. For calculators record whether it is manual or electric, whether it has a paper tape, whether it has a mechanical dial read out or an illuminated electronic read out and the base dimensions.

c. For telephones record if it is a personal phone or a call director (a call director is a phone which has more than 6 push buttons), select the number of buttons and the appropriate number of telephone units.

Other pieces of equipment, such as dictating machines, tape recorders, projectors, slide carosels, etc., should be recorded on a copy of Form C which would be then inserted immediately following the desk form.

8. ENCLOSED CONTENTS

Enclosed contents include all material contained in the drawers of the desk. The procedure for paper, books, and equipment is the same as as that for free contents. Note that this data will be recorded separately for each drawer in the desk. The same instructions as for free contents also apply for enclosed contents. For the case in which folders are filed vertically in the file drawer in the desk, the % compaction is simply the ratio of the length of folders to the length of the drawer.

9. OTHER ENCLOSED CONTENTS

The Special Items (JIC) space should be used to record data on the other enclosed contents. Small items such as paper clips, pencils, personal pictures, etc., should be aggregated into a group and recorded as a single item. One block of the four JIC spaces provided should be used for each aggregate.

The multiple choice section should be used to indicate combustibility for these aggregates. For non-combustible items, mark "one" under the multiple choice. For combustible items, mark "two." The length, width, and height to the nearest inch should be recorded for the aggregate. For irregular shaped objects, use average dimensions.

Finally the weight should be estimated as accurately as possible. Obviously for heavier items it will not be reasonable to estimate the weight to the nearest pound.

SPECIFIC INSTRUCTIONS FOR FORM #3 TABLES

For each table in the room a separate data form will be completed. This form should be used for the usual types of tables consisting of a top, four legs or pedestal and possibly a center drawer such as a conference table, work tables, typing tables, coffee tables and end tables. Special types of tables such as drafting tables, specially designed tables with a double pedestal base instead of four legs, or a single pedestal, should be recorded on Form 7 for miscellaneous items.

Information to be recorded for tables includes type of table, proximity to the wall, type of material for the legs and top, dimensions of the table top, height of the table, free contents on top of the table and enclosed contents in a center drawer.

1. TABLE TYPE

Select the most appropriate table type either single pedestal or with legs. See previous illustrations. Note as shown on these sketches several types of units commonly referred to as Tables do not fall in this category and should be recorded as miscellaneous items.

2. PROXIMITY TO WALL

If any part of the table is within 2 ft. of a wall select 2 ft. or less. Otherwise select more than 2 ft.

3. TABLE MATERIAL TYPE

Select the most appropriate material type for both the table top and the legs or pedestal. Formica or plastic laminates should be ignored in making this selection.

4. TABLE DIMENSIONS

Measure the length, width and height of the table to the nearest inch. The table height is the distance from the floor to the top of the table. Include any folding table leaves in the length and width dimensions for the table top. For non-rectangular tables record the appropriate length and width of a rectanguar table having the same surface area.

5. DRAWERS

Record whether the table has a drawer.

6. FREE CONTENTS

Items on top of the table such as paper, books, equipment, etc. should be recorded in the same manner as described previously for desks.

7. EQUIPMENT

Typewriters, calculators and phones on the table or in the center drawer should be recorded in the same manner as described previously for desks.

8. ENCLOSED CONTENTS

Items contained in a center drawer in the table should be recorded in the same manner as described previously for desks.

SPECIFIC INSTRUCTIONS FOR FORM #4 - CABINETS

For each cabinet in the room a separate data form will be completed. Where several individual cabinet units are stacked, use a separate sheet for each separate unit.

A cabinet is a storage unit which is enclosed on all sides (enclosed on 6 sides). It may have shelves or drawers inside. If one or more sides of the unit are glass it will not be considered a cabinet, but would be treated as shelving using Form 5. See the illustrations accompanying these instructions.

The data to be recorded for cabinets include the type of cabinet, its proximity to the wall, the type of cabinet material, the number of drawers and/or shelves, the cabinet dimensions, and information on the contents of the cabinet (enclosed contents) and the material on the top of the cabinet (free contents).

1. CABINET TYPE

Select the most appropriate type for the cabinet:

a. filing -a cabinet designed to store legal or letter size files.

b. file safe -a safe used for the storage of files This type of cabinet will generally have a com bination lock, be made of sturdy material and appear quite heavy.

c. blueprint- a cabinet with drawers designed to store blueprints, plans, maps or other large pieces of paper.

d. card file- a cabinet with drawers designed to store index card files.

e. general purpose - all other types of cabinets not described above, including cabinets with shelves and drawers.

2. PROXIMITY TO WALL

If any part of the cabinet is within 2 ft of a wall, select 2 ft. or less. Otherwise select more than 2 ft.

3. CABINET MATERIAL TYPE

Select the most appropriate material type. If it is difficult to determine the type of material used, the underside or edges of drawers or shelves should be checked.

4, 5. NUMBER OF DRAWERS AND/OR SHELVES

Record the total number of drawers and/or shelves in the unit.

6. CABINET DIMENSIONS

The depth, width and height of the cabinet should be measured to the nearest inch.

7. DRAWER TYPE

The number of each type of drawer (box, file, personal) is to be recorded. See the instructions for desks for a description of each of the types of drawers.

8. FREE CONTENTS

Items on top of the cabinet should be recorded in the same manner as described previously for desks.

9. EQUIPMENT

Typewriters, calculators, and phones on the cabinet or enclosed in the cabinet should be recorded in the same manner as previously described for desks.

10 ENCLOSED CONTENTS

Items within the cabinet should be recorded in the same manner as described previously for desks.

SPECIFIC INSTRUCTIONS FOR FORM #5 - SHELVING

For each distinct group of shelves (including bookcases) a separate data form will be completed.

There are two categories of shelving as follows:

a. Bookcases - A distinct item of furniture including built in units in which all the contents are enclosed on five sides. Bookcases enclosed on a sixth side with a glass door are included. Note that built in units should be considered as miscellaneous items and Form 7 used to record the data i.e., the weight should be estimated.

b. Free shelving - shelving in which all the contents are not enclosed on five sides. For example, shelves which hang on a wall.

1. SHELVING CATEGORY

Select the type of shelving, i.e. bookcase or free shelving.

2. PROXIMITY TO WALL

If any part of the shelving is within 2 feet of a wall, select 2 feet or less, otherwise select more than 2 feet.

3. SHELVING MATERIAL TYPE

Select the most appropriate type of shelving material. If there is a problem discriminating between types of material, the undersides or edges of shelves will be a useful indicator of the actual material type.

4. SHELVING DIMENSIONS

The depth, width and height for the group of shelves should be recorded to the nearest inch.

5, 8. FREE CONTENTS

Provisions have been made for recording data on paper, books, typewriters, calculators and phones, which may be present on each shelf.or on top of the bookcases. In cases where other miscellaneous items may be present on the shelves, the Special Items section on the back of the form should be used in the same manner as described for desks. Similarly, if miscellaneous material is stored on top of a bookcase, it should be aggregated with items on other furniture and recorded using Form #7 Miscellaneous (see instructions for Form #7).

a. For each shelf select the type of material (paper or books) which represents the major portion (over 50%) of the material. In this case paper refers to unbound items. Select the appropriate size from the choices listed. If various sizes occur on the shelf, select the most representative (average) size.

b. Record the length of the stack of books or paper on that shelf to the nearest inch.

c. If the books or papers are not tightly compacted on the shelf, estimate a % compaction to the nearest 10% as the ratio of the length of the paper or books if they were tightly compressed to the actual length.

d. For miscellaneous items on any of the shelves use Form C to record these items. In this case it will not be possible to record these for each shelf but rather use a single form or more if necessary to report all the items associated with the bookcase or group of shelves.

6. EQUIPMENT

Typewriters, calculators and phones on the shelves should be recorded in the same manner as described previously for desks.

7. NUMBER OF SHELVES

The first Special Items (JIC) category on the back of the form is to be used to record the number of shelves. Use the "Estimated Weight in Pounds" section of the first category to record the number of shelves i.e.,disregard the heading on the form and assume it to be labeled "Number of Shelves".

SPECIFIC INSTRUCTIONS FOR FORM #6 SEATING

For each seating type in the room a separate data form will be completed. Note that the form provides for recording up to nine different seating types in one room.

The data to be recorded for seating include the seating type, proximity of the seating to the wall, the number of seats, the frame seat and back material, the presence of arms, whether the back, seat or arms are padded, and dimensions.

1. SEATING TYPE

Select the most appropriate type of seating (see previous illustrations).

a. Pedestal - has a pedestal base

b. Legs - stands on four stationary legs.

c. Upholstered - all visable surfaces of the chair excluding possibly the legs & seat bottom, are covered by fabric. Seats only one individual.

d. Sofa - upholstered seating designed to seat more than one individual.

e. Bench - seating unit with no arms or back.

f. Drafting stool - unit in which the seat is more than 2 ft. above the floor. Drafting stools usually do not have arms.

g. Classroom chair - chair which has one arm that serves as a writing table.

2. PROXIMITY TO WALL

If any part of the seat is within 2 feet of a wall select 2 feet or less. Otherwise select more than 2 feet. Direct measurement to determine this information is only necessary where the choice is not obvious. The location of the majority of chairs (50% or more) should be used in making this selection.

3. NUMBER OF ABOVE TYPE

Designate total number of seating units of the type checked above in the room. If there are several seating units which are connected count each unit separately as shown in the illustrations.

4. MATERIAL TYPE

A. Frame

The frame outlines the entire shape of the seating unit. It includes the seating unit base and exterior structure of the chair. Check the most predominant visable frame material.

B. Seat

Select the type of material the seat is made of. Ignore cushions or paddings as these will be dealt with later. If there is no padding, the seat material will be visible from the top side of the seat. If the item is padded or has a cushion, check the bottom of the seat to determine the seat material. In some instances there will be no seat material only a frame and cushion. If this is the case, leave this section blank.

C. Back

Select the type of material the back is made of. Ignore cushions or paddings as these will be dealt with later. If there is no padding, the back material will be visible. If the item is padded or has a cushion, check the back side of the back to determine the back material. In some instances there will be no back material only a frame and cushion. If this is the case, leave this section blank.

5. OTHER CHARACTERISTICS

Select only those characteristics below which apply to the particular seating unit being recorded on this sheet

a. with arms - seating unit has arms
b. without arms - seating unit has no arms
c. padded back - the seating unit has padding or a cushion on the front of the back. Select the most appropriate type of padding material--vinyl or fabric.

d. padded seat - the seating unit has padding or a cushion on the top of the seat. Select the most appropriate type of padding material, vinyl or fabric.
e. padded arms - the seating unit has padding or a cushion on the top of the arms. Select the most appropriate type of padding material, vinyl, fabric, or wood.

6. BASE DIMENSIONS

Record the length and width of the base of the chair at the floor level. These dimensions will be the distances between the four outermost legs or points of contact with the floor. The height of the top of the chair back to the floor should also be recorded.

7. FREE CONTENTS

Where items such as paper, books or equipment are piled on chairs insert the appropriate form, Forms A and/or B following the seating form and record data on these forms. In this case the designation "Extra sheet" at the top of Forms A, B, is to be checked and the Misc. Item No. corresponding to the seating type number on the seating form is to be checked to indicate which seats the items are piled on.

SPECIFIC INSTRUCTIONS FOR FORM #7 - MISCELLANEOUS

This form is to be used for separate items which have not been included as furniture on Forms 2 - 6. Items which would be included on this form are waste baskets, copying machines, attache cases, tape recorders, visual aids, dictaphone, "L" desk attachments, tables with two pedestals, etc.

1. ITEM NUMBER

Each item recorded should be numbered. The first item on the form would be numbered 1, all other items should be given consecutive numbers.

2. DESCRIPTION

Two or three descriptive words should be written on the form indicating the type of item.

3. COMBUSTIBLE NON-COMBUSTIBLE

If 50% or more of the material comprising the item will burn, it should be marked as combustible. Otherwise non-combustible should be recorded.

4. PROXIMITY TO WALL

If any part of the item is within 2 ft. of a wall, select 2 ft. or less. Otherwise select more than 2 ft.

5. DIMENSIONS

The length, width and height of the item should be recorded to the nearest inch. For irregular shaped objects "average" dimensions should be recorded.

6. ESTIMATE OF WEIGHT

The total weight of each item should be estimated. Estimate small items to the nearest pound and large items accordingly.

7. FREE CONTENTS, ENCLOSED CONTENTS AND EQUIPMENT

If there is paper, books or equipment on top of the item or enclosed within the item, Forms A and/or B should be used by inserting them following Form 7. In this case, the section headed "Miscellaneous Item Number" on Forms A, B, should be used to indicate which item the free or enclosed contents are associated with. The procedure for recording enclosed contents other than paper, books or equipment should be the same as indicated in the instructions for Forms 2 - 6, i.e. the Special Items section on the back of Form 7 should be used.

NOTE

Form 7 may also be used to record the aggregate of free contents on top of furniture items. Use of this aggregation procedure will expedite the survey in that it will not be necessary to record separately all the various small items such as flower pots, staplers, tape dispensers, etc. usually found on top of furniture. In aggregating this material, the following four spearate categories should be used to distinguish the important characteristics

1. Non-comb, 2 ft. or less
2. Non-comb, more than 2 ft.
3. Comb., 2 ft. or less
4. Comb., more than 2 ft.

After aggregating the free contents into these groups, one separate copy of Form 7 should be used to record all the data. Each group should be considered to be a separate miscellaneous item and the combustibility, proximity to the wall, dimensions of the aggregate, and the estimated weight recorded. To indicate that the data recorded refers to an aggregation, write aggregate in the blanks provided on Form 7 and also mark "one" on the back of the form in the multiple choice section of the first Special Item category.

SPECIFIC INSTRUCTIONS FOR FORMS A, B, AND C

These forms are to be used in conjunction with Forms 2 through 7. They provide space for recording additional data for those cases in which there is insufficient space available on Forms 2 through 7. Form A deals with paper and books; Form B with typewriters, calculators, and telephones; Form C with other items.

To use these forms simply insert one or more immediately following the appropriate form for which it is necessary to record additional data. Indicate that it is an extra sheet by checking the section "extra sheet" at the top and record the data in the same manner as described in the instructions for Forms 2 - 7. Forms A and B may also be used for free contents such as paper, books, typewriters, calculators, and telephones which are not associated with any other item (e.g., paper piled on the floor or window sill, etc.). In this case, check the "separate item" category at the top of the sheet.

It will be necessary to indicate whether the data on Forms A, B, or C refer to free or enclosed contents by marking each item accordingly. A second space marked 2' is provided on Forms A and B. This should only be used when these forms are used to record data for separate items not associated with (on top of or in) other items. After checking the first circle indicating the item is free contents, use the second circle to indicate whether the item is less than or equal to 2 ft. from the wall. If the item is greater than 2 ft. from the wall it will not be necessary to indicate this on the form.

Example 1 - Distinct free contents less than 2 ft. from the wall:

separate item ●

F ● ●

Example 2 - Distinct free contents greater than 2 ft. from the wall

separate item ●

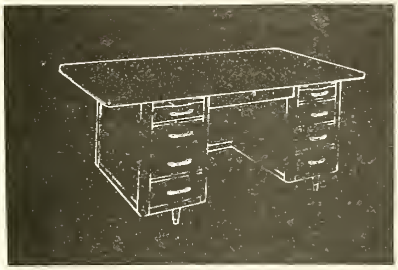
F ● ○

When using Forms A, B, or C in connection with Form 7, also indicate the appropriate miscellaneous item number for which the data is applicable (i.e. with which miscellaneous item the material recorded is associated).

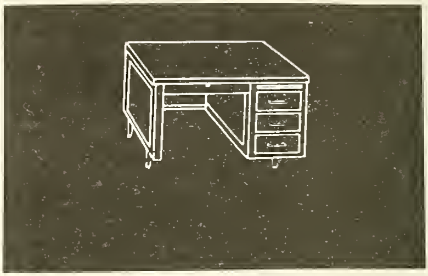
INSTRUCTIONS FOR RECORDING TYPES OF FURNITURE AND EQUIPMENT

The following pictures have been provided to clarify the types of items included in each category. Also shown are several examples of items commonly referred to as being in the category but which have been excluded due to the nature of the conversion factors which will be used to convert the survey data to weight. These excluded items are to be accounted for by treating them as miscellaneous items using Form 7.

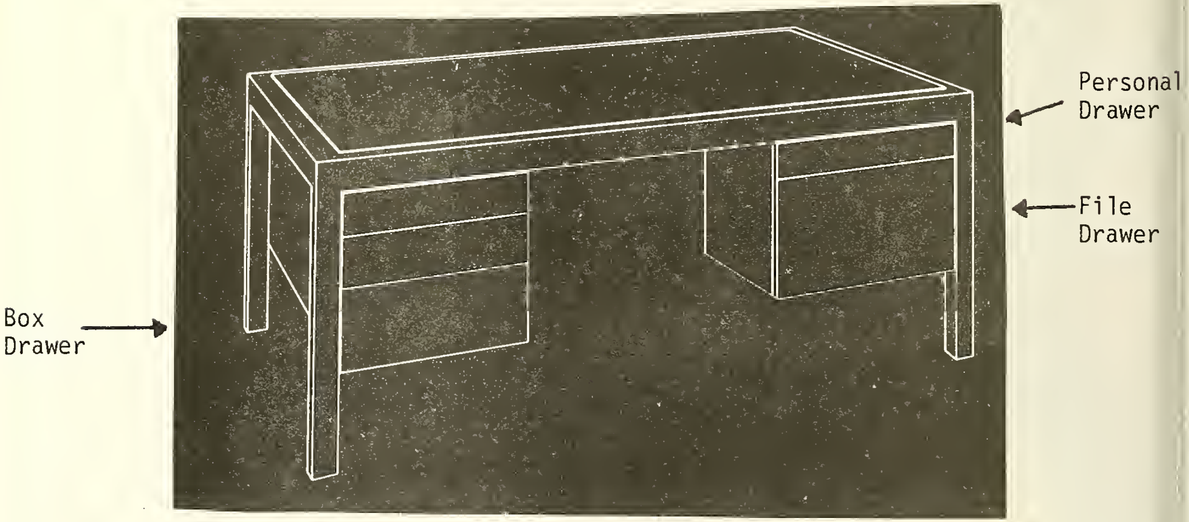
DESKS



Double Pedestal



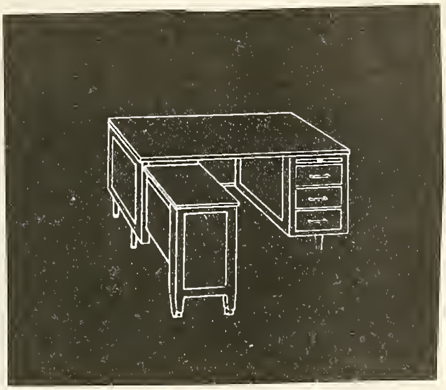
Single Pedestal



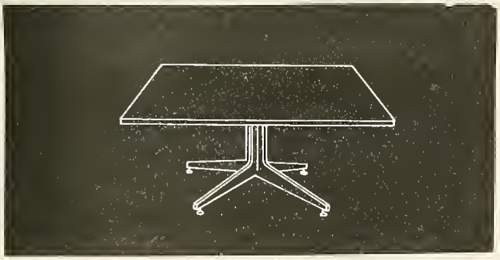
Legs

Record Desk on
Form 2

L unit as Misc.
on Form 7 →



TABLES

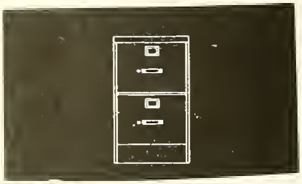


Pedestal

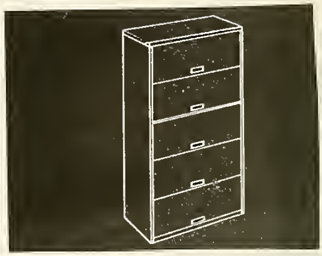
Legs

Record as Miscellaneous Items (Form 7)
not Tables

CABINETS

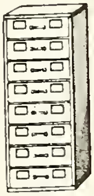


File

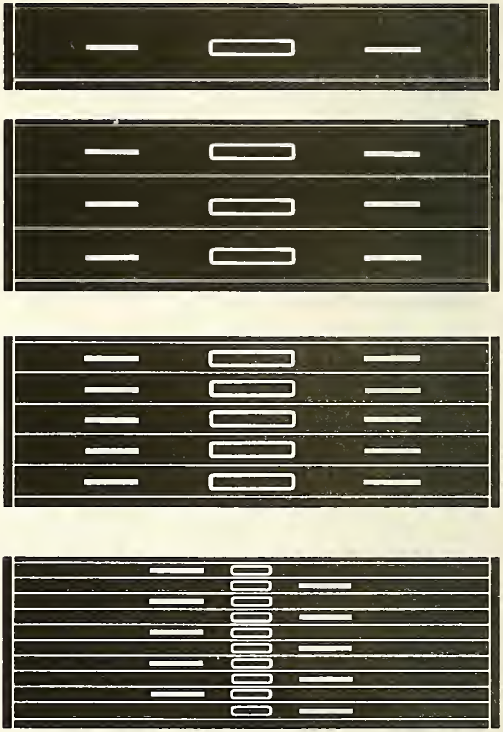


Lateral File - Treat as File

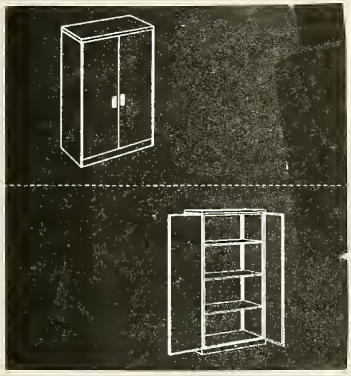
File Safe

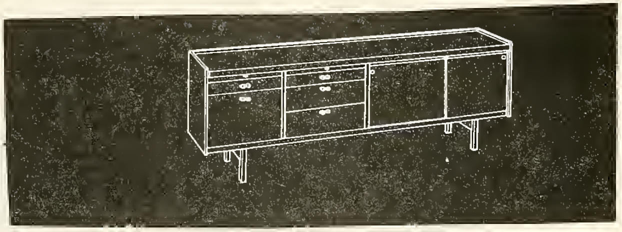


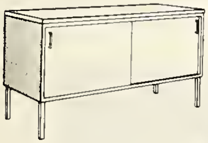
Card File

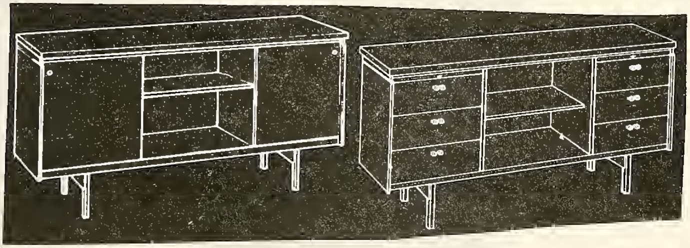


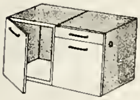
Blueprint











General Purpose

SHELVING

Free Shelving

Bookcase

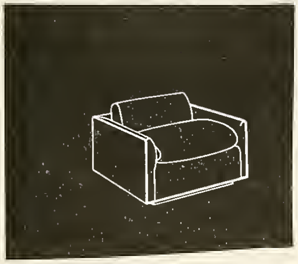
SEATING

Pedestal
(without arms)

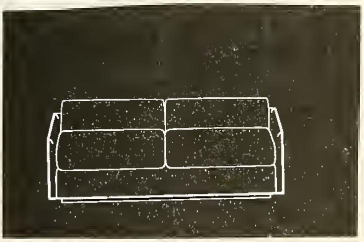
Pedestal
(with arms)

Legs
(without arms)

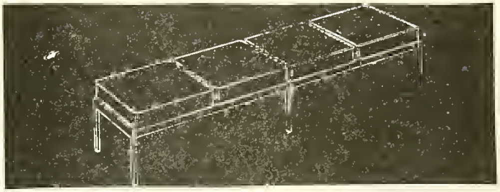
Legs
(with arms)



Upholstered



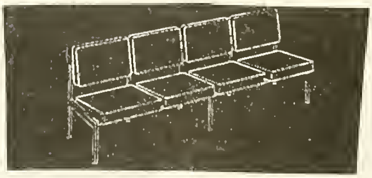
Sofa



Bench
(Note: record as 4 benches)

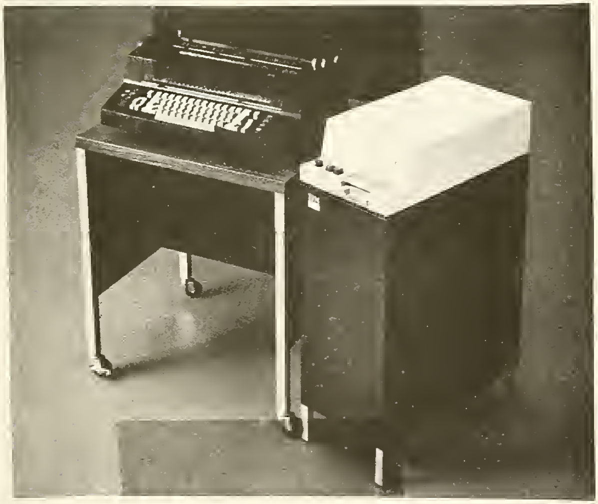
Drafting Stool

Classroom Chair



Legs
(Note: record as 4 items of same type)

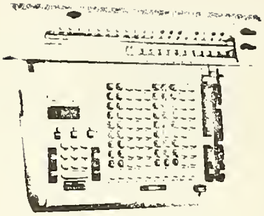
TYPEWRITERS



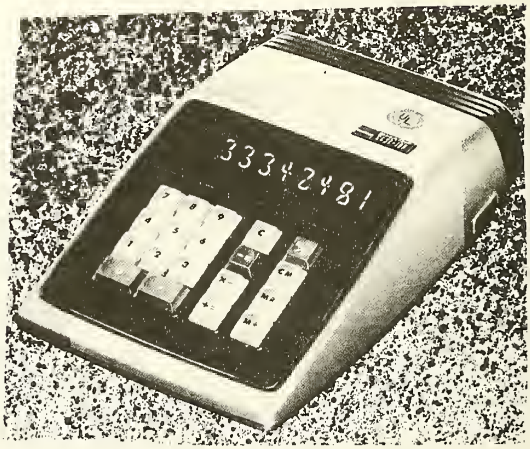
magnetic card
unit

Record typewriter and table separately, treat magnetic card unit as miscellaneous item

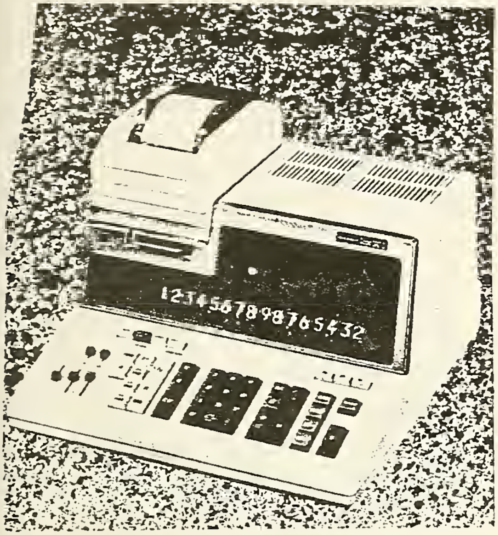
CALCULATORS



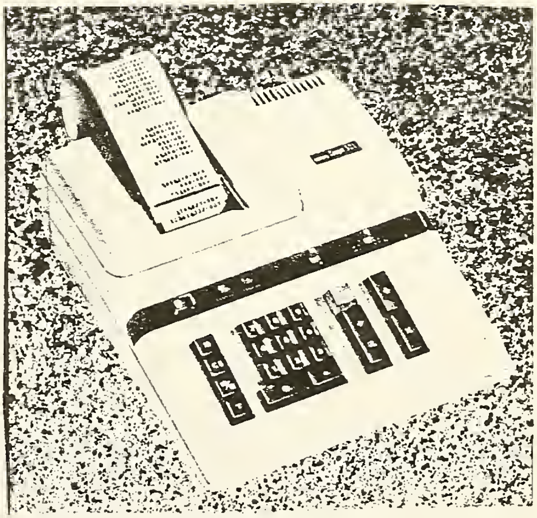
Dial Read out



Illuminated Read out



Illuminated Read out
with tape



Paper tape only

5-13-74

FIRE LOAD AND LIVE LOAD SURVEY

NATIONAL BUREAU OF STANDARDS

SHEET ________ OF ________

SURVEYOR'S NAME

DATE

BUILDING

FLOOR

ROOM

FORM 1 BOUNDING SURFACES

1. ROOM USE

GENERAL ... ○
CLERICAL ... ○
LOBBY ...... ○
CONFERENCE ○
FILE .... ○
STORAGE .... ○
LIBRARY .... ○

2. NORMAL NO. OF OCCUPANTS

0	1	2	3	4	5	6	7	8	9	10	10 ∧
○	○	○	○	○	○	○	○	○	○	○	○

3. WALL TYPES

	FULL	OPEN	PARTIAL
1	○	○	○
2	○	○	○
3	○	○	○
4	○	○	○

4. CEILINGS, FLOORS, DOORS, AND TRIM

	WOOD	METAL	PLASTIC	ACOUS. TILE	NON-COMB	RES. FLOOR	CARPET	RUBBER
CEILING	○	○	○	○	○	-	-	-
FLOOR	○	-	-	-	○	○	○	-
DOORS..	○	○	○	-	-	-	-	-
TRIM:								
CEILING	○	○	○	-	-	-	-	○
FLOOR .	○	○	○	-	-	-	-	○
DOORS..	○	○	○	-	-	-	-	○
WINDOWS	○	○	○	-	-	-	-	○

5. WALLS – COMPLETE FOR THE FULL HEIGHT WALLS ONLY. FOR THE PARTIAL HEIGHT WALLS COMPLETE NO. 7.

	WALL MATERIAL						COVERING			
	WOOD	METAL	PLASTIC	NON-COMB	PLASTER	GYPSUM BOARD	PAPER	DRAPES	VINYL	PAINT
WALL 1	○	○	○	○	○	○	○	○	○	○
WALL 2	○	○	○	○	○	○	○	○	○	○
WALL 3	○	○	○	○	○	○	○	○	○	○
WALL 4	○	○	○	○	○	○	○	○	○	○

6. WALL OPENINGS

WALL 1

NO. OF DOORS
0 ○ 3 ○
1 ○ 4 ○
2 ○ 5 ○

NO. OF WINDOWS
0 ○ 3 ○
1 ○ 4 ○
2 ○ 5 ○

DOORS				WINDOWS					
HEIGHT		WIDTH		HEIGHT		WIDTH		HGT. ABOVE FLR.	
FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.
0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○
1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○
2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○
3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○
4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○
5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○
6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○
7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○
8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○
9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○
	10 ○		10 ○		10 ○		10 ○		10 ○
	11 ○		11 ○		11 ○		11 ○		11 ○

WALL 2

NO. OF DOORS
0 ○ 3 ○
1 ○ 4 ○
2 ○ 5 ○

NO. OF WINDOWS
0 ○ 3 ○
1 ○ 4 ○
2 ○ 5 ○

FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.
0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○
1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○
2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○
3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○
4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○
5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○
6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○
7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○
8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○
9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○
	10 ○		10 ○		10 ○		10 ○		10 ○
	11 ○		11 ○		11 ○		11 ○		11 ○

WALL 3

NO. OF DOORS
0 ○ 3 ○
1 ○ 4 ○
2 ○ 5 ○

NO. OF WINDOWS
0 ○ 3 ○
1 ○ 4 ○
2 ○ 5 ○

FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.
0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○
1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○
2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○
3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○
4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○
5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○
6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○
7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○
8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○
9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○
	10 ○		10 ○		10 ○		10 ○		10 ○
	11 ○		11 ○		11 ○		11 ○		11 ○

WALL 4

NO. OF DOORS
0 ○ 3 ○
1 ○ 4 ○
2 ○ 5 ○

NO. OF WINDOWS
0 ○ 3 ○
1 ○ 4 ○
2 ○ 5 ○

FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.
0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○	0 ○
1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○	1 ○
2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○	2 ○
3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○	3 ○
4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○	4 ○
5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○	5 ○
6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○	6 ○
7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○	7 ○
8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○	8 ○
9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○	9 ○
	10 ○		10 ○		10 ○		10 ○		10 ○
	11 ○		11 ○		11 ○		11 ○		11 ○

2 3 4 5 6 7 8 9

2 3 4 5 6 7 8 9 0

1 2 3 4 5 6 7 8 9 0

FOR OFFICE USE ONLY

BLDG.			FLOOR		ROOM			
	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
	3	3	3	3	3	3	3	3
	4	4	4	4	4	4	4	4
	5	5	5	5	5	5	5	5
	6	6	6	6	6	6	6	6
	7	7	7	7	7	7	7	7
	8	8	8	8	8	8	8	8
	9	9	9	9	9	9	9	9

SURVEYOR CODE

0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9

NOTES

FORM 1 BOUNDING SURFACES (CON'T)

7. PARTIAL HEIGHT PARTITIONS

	MATERIAL	DIMENSIONS			PROXIMITY TO WALL
				0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
WALL 1	WOOD ○ METAL ○ PLASTIC ○ FABRIC ○ NON-COMB ○	LENGTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
		HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
WALL 2	WOOD ○ METAL ○ PLASTIC ○ FABRIC ○ NON-COMB ○	LENGTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
		HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
				0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
WALL 3	WOOD ○ METAL ○ PLASTIC ○ FABRIC ○ NON-COMB ○	LENGTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
		HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
WALL 4	WOOD ○ METAL ○ PLASTIC ○ FABRIC ○ NON-COMB ○	LENGTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
		HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
				0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
INTERNAL PARTITION	WOOD ○ METAL ○ PLASTIC ○ FABRIC ○ NON-COMB ○	LENGTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	2 FT. OR LESS ○ MORE THAN 2 FT. ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
		HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
INTERNAL PARTITION	WOOD ○ METAL ○ PLASTIC ○ FABRIC ○ NON-COMB ○	LENGTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	2 FT. OR LESS ○ MORE THAN 2 FT. ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
		HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
				0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
INTERNAL PARTITION	WOOD ○ METAL ○ PLASTIC ○ FABRIC ○ NON-COMB ○	LENGTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	2 FT. OR LESS ○ MORE THAN 2 FT. ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
		HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
INTERNAL PARTITION	WOOD ○ METAL ○ PLASTIC ○ FABRIC ○ NON-COMB ○	LENGTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	2 FT. OR LESS ○ MORE THAN 2 FT. ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
		HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
				0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	

8 ROOM DIMENSIONS

			0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
HEIGHT	FT.		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	IN.		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
WIDTH	FT.	X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
		X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	IN.		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
LENGTH	FT.	X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
		X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	IN.		○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

● 2 3 4 5 6 7 8 9

1 ● 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE ①	1 2 3 4	DIMENSIONS		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
	○ ○ ○ ○	HGT.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
EST. WEIGHT IN POUNDS	0 1 2 3 4 5 6 7 8 9		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE ②	1 2 3 4	DIMENSIONS		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
	○ ○ ○ ○	HGT.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
EST. WEIGHT IN POUNDS	0 1 2 3 4 5 6 7 8 9		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

MULTIPLE CHOICE ③	1 2 3 4	DIMENSIONS		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
	○ ○ ○ ○	HGT.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
EST. WEIGHT IN POUNDS	0 1 2 3 4 5 6 7 8 9		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

MULTIPLE CHOICE ④	1 2 3 4	DIMENSIONS		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
	○ ○ ○ ○	HGT.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
EST. WEIGHT IN POUNDS	0 1 2 3 4 5 6 7 8 9		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

GPO : 1974 O - 550-010 (1)

FORM 2 SHEET ______ OF ______

DESKS

1. DESK TYPE

SINGLE PED. ○
DOUBLE PED. ○
WITH LEGS ○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. NUMBER OF DRAWERS

BOX...... 0 1 2 3 4 5 6 7 8 9
FILE..... 0 1 2 3 4 5 6 7 8 9
PERSONAL 0 1 2 3 4 5 6 7 8 9

3. DESK MATERIAL TYPE

WOOD ○ METAL ○ PLASTIC ○

5. DESK TOP DIMENSIONS

0 1 2 3 4 5 6 7 8 9 10 11

LENGTH FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

WIDTH FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

6. FREE CONTENTS (PAPER AND BOOKS)

PILE	PAPER SIZES 8½ × 11	8½ × 15	11 × 15	15 × 20 >	BOOK SIZES < 7 × 7¼	≥ 7 × 7¼ ≤ 10 × 6½	10 × 6½ >	HEIGHT OF PILE 0 1 2 3 4 5 6 7 8 9 10 11	% COMPACTION 10 20 30 40 50 60 70 80 90 100
1	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
2	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
3	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
4	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
5	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
6	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
6	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
8	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
9	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
10	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
								0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100

7. EQUIPMENT

	CHARACTERISTICS	CARRIAGE LENGTH	BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
TYPEWRITER FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	LENGTH FT. ○ ○ ○ ○ LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
TYPEWRITER FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	LENGTH FT. ○ ○ ○ ○ LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

	CHARACTERISTICS	BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
CALCULATOR FREE ○ ENCLOSED ○	MANUAL ○ PAPER TAPE ○ ELECTRIC ○ NO PAPER TAPE ○ ILLUM. READ OUT ○ DIAL READ OUT ○	LENGTH FT. ○ ○ ○ ○ LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
CALCULATOR FREE ○ ENCLOSED ○	MANUAL ○ PAPER TAPE ○ ELECTRIC ○ NO PAPER TAPE ○ ILLUM. READ OUT ○ PAPER TAPE ○	LENGTH FT. ○ ○ ○ ○ LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

TELEPHONES	PERSONAL ○ CALL DIRECTOR ○	NO. OF BUTTONS 0 ○ 6 ○ 10 ○ 12 ○ 18 ○ 20 ○ 30 ○	NO. OF PHONES 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○

8. ENCLOSED CONTENTS (PAPER AND BOOKS)

PILE	PAPER SIZES				BOOK SIZES			HEIGHT OF PILE													% COMPACTION									
	8½ x 11	8½ x 15	11 x 15	15 x 20 >	< 7 x 7¼	> 7 x 7¼ < 10 x 6½	10 x 6½ >		0	1	2	3	4	5	6	7	8	9	10	11	10	20	30	40	50	60	70	80	90	100
1	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
2	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
3	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
4	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
5	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
6	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
7	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
8	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
9	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
10	○	○	○	○	○	○	○	FT.	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○	○
								IN.	○	○	○	○	○	○	○	○	○	○	○	○										
	8½ x 11	8½ x 15	11 x 15	15 x 20>	< 7 x 7¼	> 7 x 7¼ < 10 x 6½	10 x 6½>		0	1	2	3	4	5	6	7	8	9	10	11	10	20	30	40	50	60	70	80	90	100

/

SPECIAL ITEMS *(J.I.C.)*

MULTIPLE CHOICE	1	2	3	4
①	○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

MULTIPLE CHOICE	1	2	3	4
③	○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

SPECIAL ITEMS *(J.I.C.)*

MULTIPLE CHOICE	1	2	3	4
②	○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

MULTIPLE CHOICE	1	2	3	4
④	○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

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FORM 3 SHEET ______ OF ______

TABLES

1. TABLE TYPE

SINGLE PED ○
WITH LEGS ○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

3. TABLE MATERIAL TYPE

	WOOD	METAL	PLASTIC
TOP	○	○	○
PED/LEGS	○	○	○

4. TABLE DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
LENGTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

5. DRAWERS

WITH DRAWER ○
WITHOUT DRAWER ○

6. FREE CONTENTS (PAPER AND BOOKS)

PILE	PAPER SIZES				BOOK SIZES			HEIGHT OF PILE 0 1 2 3 4 5 6 7 8 9 10 11	% COMPACTION 10 20 30 40 50 60 70 80 90 100
	8½ × 11	8½ × 15	11 × 15	15 × 20 >	< 7 × 7¼	> 7 × 7¼ < 10 × 6½	10 × 6½ >		
1	○	○	○	○	○	○	○	FT ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
2	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
3	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
4	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
5	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
6	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
7	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
8	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
9	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
10	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
								0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100

7. EQUIPMENT

	CHARACTERISTICS	CARRIAGE LENGTH	BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
TYPEWRITER FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	LENGTH FT. ○ ○ ○ ○ LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
TYPEWRITER FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	LENGTH FT. ○ ○ ○ ○ LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

	CHARACTERISTICS		BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
CALCULATOR FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○	PAPER TAPE ○ NO PAPER TAPE ○	LENGTH FT. ○ ○ ○ ○ LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	ILLUM. READ OUT ○ DIAL READ OUT ○		
CALCULATOR FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○	PAPER TAPE ○ NO PAPER TAPE ○	LENGTH FT. ○ ○ ○ ○ LENGTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	ILLUM. READ OUT ○ PAPER TAPE ○		

			0	6	10	12	18	20	30		1	2	3	4	5	6	7	8
TELEPHONES	PERSONAL ○ CALL DIRECTOR ○	NO. OF BUTTONS	○	○	○	○	○	○	○	NO. OF PHONES	○	○	○	○	○	○	○	○

FORM 3

8. ENCLOSED CONTENTS (PAPER AND BOOKS)

PILE	PAPER SIZES				BOOK SIZES			HEIGHT OF PILE	% COMPACTION									
	8½ x 11	8½ x 15	11 x 15	15 x 20 >	< 7 x 7¾	> 7 x 7¾ < 10 x 6½	10 x 6½ >	0 1 2 3 4 5 6 7 8 9 10 11	10	20	30	40	50	60	70	80	90	100
1	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
10	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
	8½ x 11	8½ x 15	11 x 15	15 x 20 >	< 7 x 7¾	> 7 x 7¾ < 10 x 6½	10 x 6½ >	0 1 2 3 4 5 6 7 8 9 10 11	10	20	30	40	50	60	70	80	90	100

● 2 3 4 5 6 7 8 9

1 2 3 4 5 ● 7 8 9 0

1 2 3 4 5 6 7 8 9 0

SPECIAL ITEMS (I.I.C.)

MULTIPLE CHOICE ①

1	2	3	4
○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

SPECIAL ITEMS (I.I.C.)

MULTIPLE CHOICE ②

1	2	3	4
○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

MULTIPLE CHOICE ③

1	2	3	4
○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

MULTIPLE CHOICE ④

1	2	3	4
○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

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FORM 4

SHEET ________ OF ________

CABINETS

1. CABINET TYPE

FILING ○
FILE SAFE ○
BLUEPRINT ○
CARD FILE ○
GEN. PURPOSE ○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

3. CABINET MATERIAL TYPE

WOOD ○
METAL ○
PLASTIC ○

4. NO. OF DRAWERS

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

5. NO. OF SHELVES

0	1	2	3	4	5	6	7	8	9
○	○	○	○	○	○	○	○	○	○

6. CABINET DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

7. DRAWER TYPE – COMPLETE FOR GENERAL PURPOSE CABINETS ONLY

BOX
○ 1 2 3 4 5 6 7 8 9

FILE
○ 1 2 3 4 5 6 7 8 9

PERSONAL
0 1 2 3 4 5 6 7 8 9

8. FREE CONTENTS (PAPER AND BOOKS)

PILE	PAPER SIZES 8½ × 11	8½ × 15	11 × 15	15 × 20 >	BOOK SIZES < 7 × 7¾	> 7 × 7¾ < 10 × 6½	10 × 6½ >	HEIGHT OF PILE 0 1 2 3 4 5 6 7 8 9 10 11	% COMPACTION 10	20	30	40	50	60	70	80	90	100
1	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
10	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○	○	○	○	○	○	○	○	○	○
								0 1 2 3 4 5 6 7 8 9 10 11	10	20	30	40	50	60	70	80	90	100

9. EQUIPMENT

TYPEWRITER

FREE ○
ENCLOSED ○

CHARACTERISTICS: MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○

CARRIAGE LENGTH: 11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○

BASE DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
LENGTH	FT.	○	○	○	○								
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○								
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

TYPEWRITER

FREE ○
ENCLOSED ○

CHARACTERISTICS: MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○

CARRIAGE LENGTH: 11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○

		0	1	2	3	4	5	6	7	8	9	10	11
LENGTH	FT.	○	○	○	○								
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○								
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

CALCULATOR

FREE ○
ENCLOSED ○

CHARACTERISTICS: MANUAL ○ ELECTRIC ○ PAPER TAPE ○ NO PAPER TAPE ○ ILLUM. READ OUT ○ DIAL READ OUT ○

BASE DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
LENGTH	FT.	○	○	○	○								
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○								
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

CALCULATOR

FREE ○
ENCLOSED ○

CHARACTERISTICS: MANUAL ○ ELECTRIC ○ PAPER TAPE ○ NO PAPER TAPE ○ ILLUM. READ OUT ○ PAPER TAPE ○

		0	1	2	3	4	5	6	7	8	9	10	11
LENGTH	FT.	○	○	○	○								
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○								
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

TELEPHONES

PERSONAL ○ CALL DIRECTOR ○

	0	6	10	12	18	20	30
NO. OF BUTTONS	○	○	○	○	○	○	○

	1	2	3	4	5	6	7	8
NO. OF PHONES	○	○	○	○	○	○	○	○

FORM 4

10. ENCLOSED CONTENTS (PAPER AND BOOKS)

PILE	PAPER SIZES 8½ × 11	8½ × 15	11 × 15	15 × 20>	BOOK SIZES < 7 × 7¼	> 7 × 7¼ < 10 × 6½	10 × 6½>	HEIGHT OF PILE 0 1 2 3 4 5 6 7 8 9 10 11	% COMPACTION 10 20 30 40 50 60 70 80 90 100
1	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
2	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
3	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
4	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
5	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
6	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
7	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
8	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
9	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
10	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	8½ × 11	8½ × 15	11 × 15	15 × 20>	< 7 × 7¼	> 7 × 7¼ < 10 × 6½	10 × 6½>	0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100

SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE ①	1 2 3 4 ○ ○ ○ ○	DIMENSIONS	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS	0 1 2 3 4 5 6 7 8 9	HGT. FT. HGT. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○
X100	○○○○○○○○○○	WDH. FT. WDH. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○
X10	○○○○○○○○○○		
X1	○○○○○○○○○○	LGH. FT. LGH. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○

MULTIPLE CHOICE ③	1 2 3 4 ○ ○ ○ ○	DIMENSIONS	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS	0 1 2 3 4 5 6 7 8 9	HGT. FT. HGT. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○
X100	○○○○○○○○○○	WDH. FT. WDH. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○
X10	○○○○○○○○○○		
X1	○○○○○○○○○○	LGH. FT. LGH. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○

SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE ②	1 2 3 4 ○ ○ ○ ○	DIMENSIONS	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS	0 1 2 3 4 5 6 7 8 9	HGT. FT. HGT. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○
X100	○○○○○○○○○○	WDH. FT. WDH. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○
X10	○○○○○○○○○○		
X1	○○○○○○○○○○	LGH. FT. LGH. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○

MULTIPLE CHOICE ④	1 2 3 4 ○ ○ ○ ○	DIMENSIONS	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS	0 1 2 3 4 5 6 7 8 9	HGT. FT. HGT. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○
X100	○○○○○○○○○○	WDH. FT. WDH. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○
X10	○○○○○○○○○○		
X1	○○○○○○○○○○	LGH. FT. LGH. IN.	○○○○○○○○○○○○○○○ ○○○○○○○○○○○○

GPO : 1974 O - 5[illegible]-010 (4

FORM 5 SHEET ______ OF ______

SHELVING

1. SHELVING CATEGORY

BOOKCASE ○
FREE SHELVING ○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

3. SHELVING MATERIAL TYPE

WOOD ○
METAL ○
PLASTIC ○

4. SHELVING DIMENSIONS

		0 1 2 3 4 5 6 7 8 9 10 11
HEIGHT	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
WIDTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
DEPTH	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

5. FREE CONTENTS (PAPER AND BOOKS)

PILE	PAPER SIZES				BOOK SIZES			HEIGHT OF PILE	% COMPACTION									
	8½ × 11	8½ × 15	11 × 15	15 × 20 >	< 7 × 7¼	> 7 × 7¼ < 10 × 6½	10 × 6½ >	0 1 2 3 4 5 6 7 8 9 10 11	10	20	30	40	50	60	70	80	90	100
1	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
10	○	○	○	○	○	○	○	FT. ○○○○○○○○○○ IN. ○○○○○○○○○○○○	○	○	○	○	○	○	○	○	○	○
								0 1 2 3 4 5 6 7 8 9 10 11	10	20	30	40	50	60	70	80	90	100

6. EQUIPMENT

	CHARACTERISTICS	CARRIAGE LENGTH	BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
TYPEWRITER FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	LENGTH FT. ○○○○ LENGTH IN. ○○○○○○○○○○○○ WIDTH FT. ○○○○ WIDTH IN. ○○○○○○○○○○○○
TYPEWRITER FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	LENGTH FT. ○○○○ LENGTH IN. ○○○○○○○○○○○○ WIDTH FT. ○○○○ WIDTH IN. ○○○○○○○○○○○○

	CHARACTERISTICS		BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
CALCULATOR FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○ ILLUM. READOUT ○ DIAL READOUT ○	PAPER TAPE ○ NO PAPER TAPE ○	LENGTH FT. ○○○○ LENGTH IN. ○○○○○○○○○○○○ WIDTH FT. ○○○○ WIDTH IN. ○○○○○○○○○○○○
CALCULATOR FREE ○ ENCLOSED ○	MANUAL ○ ELECTRIC ○ ILLUM. READOUT ○ PAPER TAPE ○	PAPER TAPE ○ NO PAPER TAPE ○	LENGTH FT. ○○○○ LENGTH IN. ○○○○○○○○○○○○ WIDTH FT. ○○○○ WIDTH IN. ○○○○○○○○○○○○

TELEPHONES	PERSONAL ○	CALL DIRECTOR ○	NO. OF BUTTONS	0 ○	6 ○	10 ○	12 ○	18 ○	20 ○	30 ○	NO. OF PHONES	1 ○	2 ○	3 ○	4 ○	5 ○	6 ○	7 ○	8 ○	

FORM 5

8. FREE CONTENTS (PAPER AND BOOKS)

PILE	PAPER SIZES				BOOK SIZES			HEIGHT OF PILE	% COMPACTION
	8½ x 11	8½ x 15	11 x 15	15 x 20>	< 7 x 7¼	> 7 x 7¼ < 10 x 6½	10 x 6½>	0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100
1	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
2	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
3	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
4	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
5	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
6	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
7	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
8	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
9	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
10	○	○	○	○	○	○	○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	8½ x 11	8½ x 15	11 x 15	15 x 20>	< 7 x 7¼	> 7 x 7¼ < 10 x 6½	10 x 6½>	0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100

SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE ①	1 2 3 4 ○ ○ ○ ○	DIMENSIONS		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS		HGT.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	0 1 2 3 4 5 6 7 8 9		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

MULTIPLE CHOICE ③	1 2 3 4 ○ ○ ○ ○	DIMENSIONS		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS		HGT.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	0 1 2 3 4 5 6 7 8 9		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE ②	1 2 3 4 ○ ○ ○ ○	DIMENSIONS		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS		HGT.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	0 1 2 3 4 5 6 7 8 9		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

MULTIPLE CHOICE ④	1 2 3 4 ○ ○ ○ ○	DIMENSIONS		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS		HGT.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	0 1 2 3 4 5 6 7 8 9		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10	○ ○ ○ ○ ○ ○ ○ ○ ○ ○		IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X1	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH.	FT.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			IN.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

GPO : 1974 O - 550-010 (5)

FORM 6 SEATING SHEET ______ OF ______

①

1. SEATING TYPE

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

②

1. SEATING TYPE

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN	○	○	○	○	○	○	○	○	○	○	○	○

③

1. SEATING TYPE

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

④

1. SEATING TYPE

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

⑤

1. SEATING TYPE

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

⑥

1. SEATING TYPE

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD.
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

FORM 6 SEATING

1. SEATING TYPE

⑦

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

1. SEATING TYPE

⑧

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

1. SEATING TYPE

⑨

PEDESTAL ○
LEGS ○
UPHOLSTERED ○
SOFA ○
BENCH ○
DRAFTING STOOL ○
CLASSROOM CHAIR ○

3. NUMBER OF ABOVE TYPE

	0	1	2	3	4	5	6	7	8	9
TENS	○	○	○	○	○	○	○	○	○	○
UNITS	○	○	○	○	○	○	○	○	○	○

2. PROXIMITY TO WALL

2 FT. OR LESS ○
MORE THAN 2 FT. ○

4. MATERIAL TYPES

	WOOD	METAL	PLASTIC
FRAME	○	○	○
SEAT	○	○	○
BACK	○	○	○

5. OTHER CHARACTERISTICS

A. WITH ARMS ○ WITHOUT ARMS ○

B.	VINYL	FABRIC	WOOD
PADDED SEAT	○	○	○
PADDED BACK	○	○	○
PADDED ARMS	○	○	○

6. DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○						
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

● 2 3 4 5 6 7 8 9

I 2 3 4 5 6 7 8 9 0

I ● 3 4 5 6 7 8 9 0

SPECIAL ITEMS *(J.I.C.)*

MULTIPLE CHOICE ① 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

SPECIAL ITEMS *(J.I.C.)*

MULTIPLE CHOICE ② 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

MULTIPLE CHOICE ③ 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

MULTIPLE CHOICE ④ 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

GPO : 1974 O - 550-010 (6)

FORM 7 MISCELLANEOUS ITEMS SHEET ______ OF ______

ITEM NO. AND DESCRIPTION	DIMENSIONS	EST. WEIGHT IN POUNDS

①

NON-COMB ○
COMB ○
2 FT. OR LESS ○
MORE THAN 2 FT. ○

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9
X1000	○	○	○	○	○	○	○	○	○	○
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

②

NON-COMB ○
COMB ○
2 FT. OR LESS ○
MORE THAN 2 FT. ○

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9
X1000	○	○	○	○	○	○	○	○	○	○
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

● 2 3 4 5 6 7 8 9

③

NON-COMB ○
COMB ○
2 FT. OR LESS ○
MORE THAN 2 FT. ○

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9
X1000	○	○	○	○	○	○	○	○	○	○
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

1 2 3 4 5 6 7 8 9 0

④

NON-COMB ○
COMB ○
2 FT. OR LESS ○
MORE THAN 2 FT. ○

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9
X1000	○	○	○	○	○	○	○	○	○	○
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

1 2 ● 4 5 6 7 8 9 0

⑤

NON-COMB ○
COMB ○
2 FT. OR LESS ○
MORE THAN 2 FT. ○

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9
X1000	○	○	○	○	○	○	○	○	○	○
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

FORM 7 MISCELLANEOUS ITEMS (CONT)

ITEM NO. AND DESCRIPTION	DIMENSIONS	EST. WEIGHT IN POUNDS
⑥ NON-COMB ○ COMB ○ 2 FT. OR LESS ○ MORE THAN 2 FT. ○	0 1 2 3 4 5 6 7 8 9 10 11 HEIGHT FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HEIGHT IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	0 1 2 3 4 5 6 7 8 9 X1000 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
⑦ NON-COMB ○ COMB ○ 2 FT. OR LESS ○ MORE THAN 2 FT. ○	0 1 2 3 4 5 6 7 8 9 10 11 HEIGHT FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HEIGHT IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	0 1 2 3 4 5 6 7 8 9 X1000 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
⑧ NON-COMB ○ COMB ○ 2 FT. OR LESS ○ MORE THAN 2 FT. ○	0 1 2 3 4 5 6 7 8 9 10 11 HEIGHT FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HEIGHT IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	0 1 2 3 4 5 6 7 8 9 X1000 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE / EST. WEIGHT IN POUNDS	DIMENSIONS
MULTIPLE CHOICE 1 2 3 4 ① ○ ○ ○ ○ EST. WEIGHT IN POUNDS 0 1 2 3 4 5 6 7 8 9 X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+ HGT. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HGT. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
MULTIPLE CHOICE 1 2 3 4 ③ ○ ○ ○ ○ EST. WEIGHT IN POUNDS 0 1 2 3 4 5 6 7 8 9 X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+ HGT. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HGT. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE / EST. WEIGHT IN POUNDS	DIMENSIONS
MULTIPLE CHOICE 1 2 3 4 ② ○ ○ ○ ○ EST. WEIGHT IN POUNDS 0 1 2 3 4 5 6 7 8 9 X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+ HGT. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HGT. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
MULTIPLE CHOICE 1 2 3 4 ④ ○ ○ ○ ○ EST. WEIGHT IN POUNDS 0 1 2 3 4 5 6 7 8 9 X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+ HGT. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HGT. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

GPO : 1974 O - 550-010 (7)

FORM A FREE OR ENCLOSED PAPER OR BOOKS SHEET ______ OF ______

EXTRA SHEET ○ SEPARATE ITEM(S) ○

MISC. ITEM NO. 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○

FREE OR ENCLOSED	PAPER SIZES 8½ × 11 8½ × 15 11 × 15 15 × 20 >	BOOK SIZES < 7 × 7¼ > 7 × 7¼ <10 × 6½ 10 × 6½ >	HEIGHT OF PILE 0 1 2 3 4 5 6 7 8 9 10 11	% COMPACTION 10 20 30 40 50 60 70 80 90 100
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
			0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
F ○ ○ E ○	○ ○ ○ ○	○ ○ ○	FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	8½ × 11 8½ × 15 11 × 15 15 × 20 >	< 7 × 7¼ > 7 × 7¼ <10 × 6½ 10 × 6½ >	0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100

FORM A FREE OR ENCLOSED PAPER OR BOOKS (CONT)

EXTRA SHEET ○ SEPARATE ITEM(S) ○

	1	2	3	4	5	6	7	8
MISC. ITEM NO.	○	○	○	○	○	○	○	○

FREE OR ENCLOSED 2*	PAPER SIZES 8½ x 11	8½ x 15	11 x 15	15 x 20 >	BOOK SIZES < 7 x 7¼	> 7 x 7¼ <10 x 6½	10 x 6½ >	HEIGHT OF PILE 0 1 2 3 4 5 6 7 8 9 10 11	% COMPACTION 10 20 30 40 50 60 70 80 90 100
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
								0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	●	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ●○○○○○●○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ●	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
F ○ ○ E ○	○	○	○	○	○	○	○	FT. ○○○○○○○○○○○○ IN. ○○○○○○○○○○○○○	○○○○○○○○○○
	8½ x 11	8½ x 15	11 x 15	15 x 20 >	< 7 x 7¼	> 7 x 7¼ <10 x 6½	10 x 6½ >	0 1 2 3 4 5 6 7 8 9 10 11	10 20 30 40 50 60 70 80 90 100

SPECIAL ITEMS (I.I.C.)

MULTIPLE CHOICE ① 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

SPECIAL ITEMS (I.I.C.)

MULTIPLE CHOICE ② 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

GPO : 1974 O - 550-010 (A)

FORM B EQUIPMENT SHEET ________ OF ________

EXTRA SHEET ○	SEPARATE ITEM(S) ○		1	2	3	4	5	6	7	8	9
		MISC. ITEM NO.	○	○	○	○	○	○	○	○	○

F = FREE E = ENCLOSED 2' (OF WALL)	CHARACTERISTICS	CARRIAGE LENGTH	BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
TYPEWRITER F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
TYPEWRITER F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
TYPEWRITER F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

● 2 3 4 5 6 7 8 9

	CHARACTERISTICS		BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
CALCULATOR F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ DIAL READ OUT ○ ILLUM. READ OUT ○	PAPER TAPE ○ NO PAPER TAPE ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
CALCULATOR F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ DIAL READ OUT ○ ILLUM. READ OUT ○	PAPER TAPE ○ NO PAPER TAPE ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
CALCULATOR F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ DIAL READ OUT ○ ILLUM. READ OUT ○	PAPER TAPE ○ NO PAPER TAPE ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7 8 9 0

TELEPHONES				0	6	10	12	18	20	30		1	2	3	4	5	6	7	8
2' ○	PERSONAL ○	CALL DIRECTOR ○	NO. OF BUTTONS	○	○	○	○	○	○	○	NO. OF PHONES	○	○	○	○	○	○	○	○
TELEPHONES				0	6	10	12	18	20	30		1	2	3	4	5	6	7	8
2' ○	PERSONAL ○	CALL DIRECTOR ○	NO. OF BUTTONS	○	○	○	○	○	○	○	NO. OF PHONES	○	○	○	○	○	○	○	○

1 2 3 4 5 6 ● 8 9 0

FORM B EQUIPMENT (CONT)

EXTRA SHEET ○ SEPARATE ITEM(S) ○	MISC. ITEM NO. 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○

F = FREE E = ENCLOSED 2' (OF WALL)	CHARACTERISTICS	CARRIAGE LENGTH	BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
TYPEWRITER F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
TYPEWRITER F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
TYPEWRITER F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○ TYPING BALL ○ TYPING BAR ○	11" – 14" ○ 15" – 16" ○ 17" – 20" ○ 21" – 24" ○ 25" – 30" ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

	CHARACTERISTICS		BASE DIMENSIONS 0 1 2 3 4 5 6 7 8 9 10 11
CALCULATOR F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○	PAPER TAPE ○ NO PAPER TAPE ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	DIAL READ OUT ○ ILLUM. READ OUT ○		DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
CALCULATOR F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○	PAPER TAPE ○ NO PAPER TAPE ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	DIAL READ OUT ○ ILLUM. READ OUT ○		DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
CALCULATOR F ○ 2' ○ E ○	MANUAL ○ ELECTRIC ○	PAPER TAPE ○ NO PAPER TAPE ○	WIDTH FT. ○ ○ ○ ○ WIDTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	DIAL READ OUT ○ ILLUM. READ OUT ○		DEPTH FT. ○ ○ ○ ○ DEPTH IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

TELEPHONES 2' ○	PERSONAL ○ CALL DIRECTOR ○	NO. OF BUTTONS 0 ○ 6 ○ 10 ○ 12 ○ 18 ○ 20 ○ 30 ○	NO. OF PHONES 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○
TELEPHONES 2' ○	PERSONAL ○ CALL DIRECTOR ○	NO. OF BUTTONS 0 ○ 6 ○ 10 ○ 12 ○ 18 ○ 20 ○ 30 ○	NO. OF PHONES 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○

SPECIAL ITEMS *(I.I.C.)* SPECIAL ITEMS *(I.I.C.)*

MULTIPLE CHOICE ① 1 ○ 2 ○ 3 ○ 4 ○	**DIMENSIONS** 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS 0 1 2 3 4 5 6 7 8 9	HGT. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HGT. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

MULTIPLE CHOICE ② 1 ○ 2 ○ 3 ○ 4 ○	**DIMENSIONS** 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS 0 1 2 3 4 5 6 7 8 9	HGT. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HGT. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

MULTIPLE CHOICE ③ 1 ○ 2 ○ 3 ○ 4 ○	**DIMENSIONS** 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS 0 1 2 3 4 5 6 7 8 9	HGT. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HGT. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

MULTIPLE CHOICE ④ 1 ○ 2 ○ 3 ○ 4 ○	**DIMENSIONS** 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+
EST. WEIGHT IN POUNDS 0 1 2 3 4 5 6 7 8 9	HGT. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ HGT. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X100 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	WDH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ WDH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
X10 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ X1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	LGH. FT. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ LGH. IN. ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

GPO : 1974 O - 550-010 (B)

FORM C FREE OR ENCLOSED OTHER THAN PAPER, BOOKS, TYPEWRITERS, CALCULATORS OR TELEPHONES SHEET ______ OF ______

EXTRA SHEET ○

MISC. ITEM NO.	1	2	3	4	5	6	7	8	9
	○	○	○	○	○	○	○	○	○

DIMENSIONS — EST. WEIGHT IN POUNDS

			0	1	2	3	4	5	6	7	8	9	10	11		0	1	2	3	4	5	6	7	8	9
FREE ○	HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○												
ENCLOSED ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X100	○	○	○	○	○	○	○	○	○	○
	WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X10	○	○	○	○	○	○	○	○	○	○
NON-COMB ○	DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
COMB ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X1	○	○	○	○	○	○	○	○	○	○
FREE ○	HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○												
ENCLOSED ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X100	○	○	○	○	○	○	○	○	○	○
	WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X10	○	○	○	○	○	○	○	○	○	○
NON-COMB ○	DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
COMB ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X1	○	○	○	○	○	○	○	○	○	○
			0	1	2	3	4	5	6	7	8	9	10	11		0	1	2	3	4	5	6	7	8	9
FREE ○	HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○												
ENCLOSED ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X100	○	○	○	○	○	○	○	○	○	○
	WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X10	○	○	○	○	○	○	○	○	○	○
NON-COMB ○	DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
COMB ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X1	○	○	○	○	○	○	○	○	○	○
FREE ○	HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○												
ENCLOSED ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X100	○	○	○	○	○	○	○	○	○	○
	WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X10	○	○	○	○	○	○	○	○	○	○
NON-COMB ○	DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
COMB ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X1	○	○	○	○	○	○	○	○	○	○
			0	1	2	3	4	5	6	7	8	9	10	11		0	1	2	3	4	5	6	7	8	9
FREE ○	HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○												
ENCLOSED ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X100	○	○	○	○	○	○	○	○	○	○
	WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X10	○	○	○	○	○	○	○	○	○	○
NON-COMB ○	DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○												
COMB ○		IN.	○	○	○	○	○	○	○	○	○	○	○	○	X1	○	○	○	○	○	○	○	○	○	○

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FORM C FREE OR ENCLOSED OTHER THAN PAPER, BOOKS, TYPEWRITERS, CALCULATORS OR TELEPHONES (CONT)

EXTRA SHEET ○

	1	2	3	4	5	6	7	8	9
MISC. ITEM NO.	○	○	○	○	○	○	○	○	○

FREE ○
ENCLOSED ○
NON-COMB ○
COMB ○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

FREE ○
ENCLOSED ○
NON-COMB ○
COMB ○

HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

● 2 3 4 5 6 7 8 9

FREE ○
ENCLOSED ○
NON-COMB ○
COMB ○

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

FREE ○
ENCLOSED ○
NON-COMB ○
COMB ○

HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

1 2 3 4 5 6 7 8 9 0

FREE ○
ENCLOSED ○
NON-COMB ○
COMB ○

		0	1	2	3	4	5	6	7	8	9	10	11
HEIGHT	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
WIDTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○
DEPTH	FT.	○	○	○	○	○	○	○	○	○	○	○	
	IN.	○	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

1 2 3 4 5 6 7 8 9 ●

SPECIAL ITEMS (I.I.C.)

MULTIPLE CHOICE ① 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

SPECIAL ITEMS (I.I.C.)

MULTIPLE CHOICE ② 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

MULTIPLE CHOICE ③ 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

MULTIPLE CHOICE ④ 1 2 3 4 ○ ○ ○ ○

EST. WEIGHT IN POUNDS

	0	1	2	3	4	5	6	7	8	9
X100	○	○	○	○	○	○	○	○	○	○
X10	○	○	○	○	○	○	○	○	○	○
X1	○	○	○	○	○	○	○	○	○	○

DIMENSIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
HGT.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
WDH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			
LGH.	FT.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	IN.	○	○	○	○	○	○	○	○	○	○	○	○			

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16. ABSTRACT *(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)*

The development of a survey program for determining the fire loads and live loads in office buildings is described. Considerations involved in planning the program which is directed toward establishing the factors affecting the loads in buildings are presented. The type of data to be collected and a data collection technique which utilizes visually observed information on the characteristics of building content items to determine weight are discussed. Procedures employed to select buildings to be included in a nation-wide office building load survey being conducted by the National Bureau of Standards and a sampling plan for selecting rooms to be surveyed in these buildings are also discussed.

17. KEY WORDS *(six to twelve entries; alphabetical order, capitalize only the first letter of the first key word unless a proper name; separated by semicolons)*

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