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A SURVEY OF OCCUPANT LOAD FACTORS IN CONTEMPORARY OFFICE BUILDINGS

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SUMMARY

Occupant load data are obtained from two survey methods applied in 23 office buildings located in the Washington, DC area. The two survey methods include a building walk-through and a telephone survey. The telephone survey requires substantially less time and effort to complete, but is dependent on building management's knowledge of the occupancy characteristics. The walk-through approach requires a review of building drawings and an onsite walk-through of the building.

Data are presented on the magnitude and distribution of the loads. The data is sorted according to the following groups: open plan office designs v. well-compartmented office designs, and government (federal and county) v. private sector tenants. Statistical summaries of the data are presented. Buildings that are primarily composed of open plan office designs are found to have greater occupant load factors than buildings composed of well-compartmented office designs. County government office buildings are found to have slightly greater occupant load factors than federal government buildings. Federal government buildings have smaller occupant load factors than private office buildings. The mean occupant load factor for all buildings is 248 ft^2/person. The telephone survey technique yields a slightly greater occupant load factor than the building walk-through technique. However, because the two approaches yield relatively similar results, both are considered to be comparable in assessing office building occupant loads.

BACKGROUND

Definition of Occupant Load Factor

In engineering, the design of any system is a function of the anticipated load or demand. As related to the means of egress in buildings, the anticipated load or demand consists of the number of building occupants in the space. One means of estimating the number of building occupants is based on the floor area occupied by each building occupant. Using this approach, the number of building occupants is determined as the product of the floor area occupied by each person and the floor area.

The floor area occupied by each person is referred to as the *occupant load factor* in the *Life Safety Code*.[1] Typically, when designing safety systems, such as the means of egress, loads are accounted for conservatively. In this context, in the *Life Safety Code* defines "occupant load" as the maximum probable number of occupants expected to inhabit a building or space. Consequently, the occupant load factor should represent the least amount of average space expected to be occupied by each person, considering the function of the space.

Occupant load factors first appeared in the *Building Exits Code* in the third edition of the code published in 1934.[2,3] The occupant load factor of 100 ft^2/person was specified for office, factory, and workrooms. The occupant load factors for other occupancies included 40 ft^2/person for schools and courtrooms, 125 ft^2/person for hotels and apartments, 150 ft^2/person for insti-

tutional facilities, and 15 ft²/person for dance halls and places of assembly. All occupant load factors were based on the gross floor area of the building, such that no deduction was permitted for corridors, closets, restrooms, or other subdivisions.

The introduction of occupant load factors in 1934 was part of a major change in the method of assessment of egress design, omitting the complicated formulae and tables in the earlier editions of the *Building Exits Code*.[3] However, there is no formal record indicating the basis of the occupant load factors included in the 1934 *Building Exits Code*. The first survey of occupant load factors by Courtney, *et.al.*, was published in 1935.[4]

In the current edition of the *Life Safety Code*, the occupant load factor for office buildings is unchanged from that specified in the 1934 *Building Exits Code*, *i.e.*, 100 ft²/per person, based on gross floor area.[1] In the *Life Safety Code*, "gross floor area is defined as the area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, thickness of interior walls, columns, or other features" [1, section 3-2].

Changes in office building design have raised concerns about the adequacy of the occupant load factor cited in the *Life Safety Code* for contemporary business occupancies. Contemporary office building designs often incorporate open plan office designs instead of the traditional well-compartmented type designs. The open plan office is composed of open areas that may or may not be partitioned. The *Life Safety Code* states, "An example of an open plan building is one in which the work spaces and accesses to exits are delineated by the use of tables, desks, bookcases, counters, or by partitions that are less than floor to ceiling height" [1, section A-26-3.6.1].

Offices in well-compartmented buildings are usually occupied by one or two people and contain walls which extend from floor to ceiling. Typically, the offices have one entrance. Inherent in office buildings following the open plan design, less space is occupied by the thin portable partitions as compared to the interior walls in the compartmented buildings. Intuitively, the occupant load factor based on gross floor area would be expected to decrease in open-plan offices. In addition, changes in the American workplace, such as the use of workstations, may also have an effect on the occupant load factor.

The intent of this study is to determine the occupant load factor for contemporary business occupancies. In this study, telephone surveys and facility walk-through surveys are utilized to obtain data necessary for establishing occupant load factors, though other methods are considered and addressed. Another purpose of this study is to compare methods of collecting occupant load data and to indicate whether a less time-consuming method provides data comparable to the walk-through method.

Previous Studies

Previously, numerous studies have been conducted to determine the occupant load factors for various occupancies. The studies utilized a variety of data collection methods. After the initial study in 1935, all of the subsequent studies have concluded that the 100 ft²/person occupant load factor noted in the *Life Safety Code* for office occupancies is conservative.[2] An excessively conservative occupant load factor may impact the cost of building construction, by requiring office buildings to have additional egress capacity and number of exits to accommodate the "over-estimated" population.

The first occupant load study was published in 1935 by John H. Courtney and Harry B. Houghton, associate engineers at the National Bureau of Standards, and George N. Thompson, secretary of the *Building Exits Code* Committee.[4] The study involved analyzing the design and construction of building exits in buildings of

Table 1. Office Building Measurements by Courtney, *et.al.*

Building Number	Number of Stories	Floor#	FloorArea (ft^2)	Population on Typical Floor	Gross Area (ft^2/person)
3	33	31–33 23–30 18–22 3–17 1–2	2,500 3,800 6,460 17,700 21,600	142	120
4	21	all	6,900	52	132
5	20	all	8,800	64	137
6	19	all	7,200	100	72
7	17	all	20,000	300	66
9	12	all	6,960	46	151
10	12	all	6,300	92	68
11	11	all	4,850	48	100
12	11	all	8,000	100	80
13	10	all	4,000	25	160
14	9	all	4,700	50	94
17	2	all	8,000	60	133
18	2	all	9,500	70	135
Total			1,594,370	18,302	87.1

various occupancy types. The study investigated buildings located in Atlanta, Georgia, Greenville, South Carolina, Greensboro, North Carolina, Roanoke, Virginia, Washington, D.C., Frederick and Baltimore, Maryland, and Pittsburgh, Pennsylvania.[4]

The characteristics of the 13 buildings surveyed by Courtney, *et.al.*, are noted in Table 1. The population on *typical floors* for the office buildings was determined by actually counting the number of building occupants present at the time of the survey. In their study, building walk-throughs were also conducted to count the number of building occupants in factories and schools. In hotels, an estimate of the population on a typical floor was made by counting the number of beds and assuming all rooms were occupied. The number of seats was noted in theaters, with the assumption that all of the seats were taken. In other occupancies, estimates of the building population were accepted from those individuals in charge of the building, e.g., in apartment buildings the resident manager provided the number of building occupants.

As seen in Table 1, the average occupant load factor ranges from 66–160 ft^2/person, with an average for all buildings of 87.2 ft^2/person (gross area). Though unstated, it is likely that most of the offices included in the survey were well-compartmented, as open plan offices were rarely found in the 1930s.

The next study was conducted approximately 30 years later by the Building Owners and Managers Association (BOMA)[5,6] as part of a national survey distributed to building managers. This survey, repeated annually since 1966, receives responses from approximately 1,000 building managers. The office building occupant load factors (reported as *occupant densities*) are published annually in the BOMA "Experience Exchange Reports".[6] In 1966, BOMA reported the occupant load factor to be 160 ft^2/person (gross). The occupant load factors reported by BOMA from 1966 to 1990 are presented in Figure 1. The overall trend in the data indicates an increase in the occupant load factor during the 25-year period. However, the 25-year

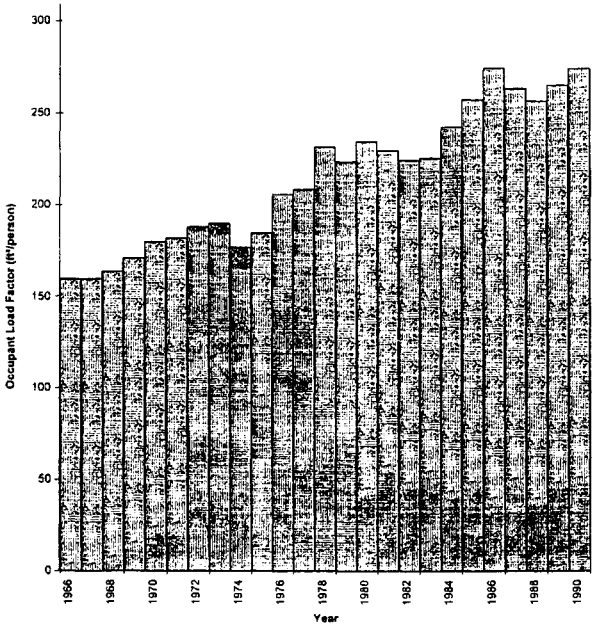

Figure 1. Occupant Load Factors from BOMA Surveys.

period does seem to be divided into years of increasing occupant load factors (1968–1978 and 1983–1986) and stable occupant load factors (1978–1983 and 1986–1990).[5,6] Reasons for the patterns of increasing and stable occupant load factors are not addressed by BOMA.

In 1969, Nelson investigated space utilization in federal government of office buildings.[7] He collected space planning data for federal office buildings located in Philadelphia, Pennsylvania, and Washington, D.C. Nelson determined that the occupant load in these federal office buildings was approximately 150 ft²/person (gross).

In 1977, Johnson and Pauls determined the occupant load factor to be 278 ft²/person (gross) from videotape records of evacuation drills in Canadian office buildings.[8] In 18 evacuation drills, a total number of evacuees was 10,281. However, based on the occupant load factor noted in the *Life Safety Code*, a total of 27,650 evacuees were expected. Similarly, videotape records during a three-day period of the use of an entrance to a 21-story office building by building occupants were used to determine that the maximum occupancy at any time during the three-day period was 1,400 persons. An estimate of the occupant load for that building using the occupant load factor cited in the *Life Safety Code* was 3,400 persons.[8] Based on the videotape records, the resulting occupant load factor for the building was determined to be 243 ft²/person (gross).[8]

In a 1977 study conducted by Cormier, De Wolf, Henning, and Schneider for Public Works Canada, the area of a typical office workstation was determined to be 175–185 ft². By converting the usable floor area to gross floor area, utilizing a conversion factor of 1.25 as proposed by Cormier, *et.al.*, the associated occupant load factor ranged from 220–230 ft²/person (gross).[9]

Bourdeau conducted the most recent occupant load study in 1992, which consisted of walk-through surveys of buildings at the College Park campus of the University of Maryland. Bourdeau surveyed occupants on 18 floor levels in eight different office buildings. The occupant load factors ranged from 175–200 ft²/person (gross).[5]

The results of the original 1935 NBS study and the five most recent studies conducted between 1966 and 1992, are summarized in Table 2. The occupant load factor determined from the five recent surveys in business occupancies ranges from 150–278 ft²/person. This range of values is appreciably greater than the occupant load factor of 100 ft²/person included in the *Life Safety Code* and 87 ft²/person reported in the NBS study.

Table 2. Summary of Previous Occupant Load Surveys.

Survey Team	Occupant Load Factor (ft²/person)(gross)
NBS	87
Nelson	150
BOMA	160–275
Johnson and Pauls	243–278
Cormier, *et.al.*	220–230
Bourdeau	175–200

STUDY PROCEDURE

This study utilized two different procedures to obtain data: a walk-through survey and a telephone survey. The data acquired from either survey method included:

- gross floor area of building
- number of occupants in building
- design of office space: either well-compartmented or open-plan, whichever is most prevalent in the building
- tenant characteristic (either federal or county government, or private sector).

Walk-through surveys have been conducted in several prior studies. Based on a review of the recent survey by Bourdeau in 1992,[5] a preliminary data collection procedure and survey form for trial use were developed. This form was used to conduct an initial occupant load survey in the office space occupied by the National Capital Region of the U.S. General Services Administration located in Washington, D.C. Following a review of this initial effort, the data collection procedure and form was amended. The amended form is presented as Figure 2.

Building _____ Date _____
Floor _____ Time _____
Surveyor _____

Room #[1]	Area[2]	Present[3]	Apparent[4]	Reference[5]	C/O. [6]	Comments

[1] Room #: designation of room
[2] Area: floor area of room (ft^2)
[3] Present: number of people present in room at time of survey
[4] Apparent: number of people apparently regularly present in room or workstation, based on personal belongings, operating computer, etc.
[5] Reference: number of people present in area, based on comment by other person
[6] Office design:
C = compartmented
O = open plan

Figure 2. Occupant Load Survey Form.

A second survey, utilizing the amended form, was conducted on Friday, 13 January, 1995 of the third and fourth floors of the headquarters building of the U.S. General Services Administration in Washington, DC. A walk-through type survey attempted to account for all occupants on the two floor levels. Several challenges associated with collecting data in a large office building became apparent, requiring resolution to accurately determine the occupant load. Many of the challenges related to the movement of building occupants during the time period required to complete the survey. The identified principal challenges of the building walk-through method were:

1. Only about one-third of the workforce was present during the time required to complete the walk-through survey. This was attributed to the following two factors.
    - In many government buildings, a reduced workforce is present on Mondays and Fridays due to flexible work schedules.
    - The particular Friday of the building survey was prior to a three-day weekend (the following Monday was a federal holiday), possibly compounding the reduced workforce problem.
2. On occasion, more than one person was present at a particular workstation or office. The "extra person" was either a visitor or a co-worker who temporarily left his or her own workstation. These co-workers could be counted twice if they returned to their workstation by the time a member of the survey team reached that location. Because the survey team wanted to minimize the interruption of meetings and conversations, the extra person was often counted, unless the opportunity arose to ask a quick question concerning the status of the extra person, such as "Are you a visitor?" or "Do you work here?"
3. Some workstations or offices were vacant, either because of downsizing, an individual absent on the day of the survey, or located elsewhere in the building.
4. Often building maintenance and custodial staff or construction workers were readily identified by their different working attire and distinguished from most office workers and visitors. However, these individuals typically moved continuously throughout the building, perhaps being missed or counted more than once.
5. Spaces behind locked doors posed several problems. Occupants could have been in these spaces and thus excluded. Alternatively, some spaces should have been excluded from the survey if classified as another occupancy or under renovation (as was the case in one building survey).
6. It is difficult to account for occupants walking in corridors or located in rest rooms, lobbies, supply rooms, etc. without also possibly being included at their respective workstation.

The project team reviewed and discussed possible alternative survey procedures to obtain occupant load data. The feasibility of each alternative procedure was assessed based on the following considerations:

- How well did the procedure address the listed challenges discovered during the initial survey?
- How time consuming was the procedure?
- What resources did the procedure require?
- Were the required resources available?

An adaptation of the procedure utilized by Johnson and Pauls' study of 1977 consisting of videotaping the flow of building occupants into or from a building is an alternate means of determining the occupant load of the building. Providing videotape cameras or manual counters at each building entrance has several drawbacks, including several cameras being necessary

to record occupant movement into office buildings with numerous entrances. Another drawback of this method results from individuals who enter, leave, and re-enter the building during the survey period. In addition, distribution of occupants within the building is not addressed by this procedure, which is especially relevant in multi-use buildings where building occupants may proceed to a building area other than that devoted for office use. The method does not account for any employees out of the office on sick leave, vacation, or traveling.

Allowing facilities management to provide the required parameters through telephone surveys is feasible, but also has limitations. The data held by facilities management usually only accounts for company employees and excludes visitors, construction personnel, custodial and maintenance personnel, and perhaps other personnel, such as contractors who are temporarily in the office. The method includes any employees out of the office on sick leave, vacation, or traveling.

Despite the limitations and challenges associated with the walk-through method and telephone survey methods, these methods are selected in this study as the preferred methods for data collection, considering the advantages and limitations of the other methods. The drawbacks of each method can be minimized by taking the following steps.

1. Conducting surveys during times when a reduced workforce is expected as a result of flexible work schedules or holidays can be avoided.

2. Using polite interruptions to correctly identify and account for multiple occupants located in a single workstation or in break areas, restrooms, or corridors.

3. Asking other workers in the area to determine the occupancy of vacated workstations, being careful not to burden the other office workers by too many questions or interruptions. Individuals are counted at workstations that appear occupied, even though they are absent at the time the surveyor reaches that location if either personal belongings (e.g. pictures, purses, coats) or an operating computer unit are present. Name plates at office entrances can be referenced to make judgments on the presence of occupants.

4. Maintenance and custodial people are included and easily distinguished by their working attire. Areas that are inaccessible because of locked doors or other restrictions are excluded from the survey, with the area of the section subtracted from the gross floor area.

Gross floor areas are obtained from information provided by facilities management, direct measurement or floor plans. The type of office space, open or compartment, is observed and verified by facilities management. The building ownership or leasing information is provided by facilities management.

DATA

A total of 35 office building representatives were asked to participate in this study, either by permitting a walk-through of the building or assisting with the telephone survey. Sixteen of the 35 representatives chose to participate in the study, resulting in a survey sample size of 23 buildings. In some cases, one representative helped to arrange for a survey in multiple buildings. Ten buildings were surveyed utilizing the telephone survey, and 45 floors in thirteen buildings were surveyed utilizing the walk-through method. Data from each of the floor levels is interpreted as a "sample." A total floor area of 3,608,899 ft^2 and 14,549 occupants composed the data utilized in this study.

The walk-through surveys were conducted in the following buildings:

- NASA Goddard, Greenbelt, Maryland (buildings 2, 18, 21, 22, and 23)
- General Services Administration Headquarters, Washington, D.C.
- Marriott Headquarters, Bethesda, Maryland
- Prince Georges County Administration Building, Upper Marlboro, Maryland
- Prince Georges County Largo Center, Largo, Maryland
- Switzer Building, Washington, D.C.
- US Department of Housing and Urban Development, Washington, D.C.
- Brunswick Building, Fairfax, Virginia
- Culpepper Building, Fairfax, Virginia.

Telephone surveys were conducted for determining the occupant load factor in the following office spaces or entire buildings:

- FBI Building S-5, Woodlawn, Maryland
- Liberty Loan Building, Washington, D.C.
- Portsmouth Federal Building, Portsmouth, Virginia
- Blue Ridge Office Center, Manassas, Virginia
- SEABAT Building, Suffolk, Virginia
- GEICO Insurance Corporation, Fredericksburg, Virginia
- Verlan Fire Insurance, Silver Spring, Maryland
- Schirmer Engineering Corporation, Falls Church, Virginia
- Hardwick Building, College Park, Maryland
- Cohen Building, Washington, D.C.

Table 3 presents the number of occupants and gross floor areas identified for each floor, building, and site surveyed. Each office and building are classified by type and category. Data from the walk-through surveys is presented on a floor-by-floor basis. In contrast, the data from the telephone surveys is presented on a building basis, because total occupant loads were reported for the entire building by the respective building or office managers. Occupant load factors are calculated for each floor, building, and site.

Table 3. Summary of Data.

Sample #	Building #	Floor #	Design[1]	Tenant[2]	Survey Method[3]	Gross Area (ft^2)	No. of Occupants	Occupant Load Factor (ft^2/person)
1	1	Ground	C	FG	W	14,674	69	213
2		1				16,153	102	158
3		2				16,250	85	191
		Total				47,077	256	184
4	2	1	C	FG	W	12,591	75	168
5		2				5,567	33	169
		Total				18,158	108	168
6	3	Ground	C	FG	W	15,935	94	170
7		1				16,270	79	206
8		2				16,727	96	174
		Total				48,932	269	182
9	4	Ground	C	FG	W	28,858	155	186
10		1				24,147	137	176
11		2				20,870	121	172
12		3				22,350	139	161
		Total				96,225	552	174

Table 3. Summary of Data (continued)

Sample #	Building #	Floor #	Design[1]	Tenant[2]	Survey Method[3]	Gross Area (ft^2)	No. of Occupants	Occupant Load Factor (ft^2/person)
13	5	1	C	FG	W	12,361	82	151
14		2				24,718	142	174
15		3				12,878	64	201
16		4				12,878	92	140
		Total				62,835	380	165
17	6	2	O	FG	W	74,804	251	298
18		3				74,877	243	308
19		4				74,787	250	299
20		5				74,743	259	289
		Total				299,211	1,003	298
21	7	Total	C	FG	T	42,667	200	213
22	8	Total	C	FG	T	170,000	450	378
23	9	Total	C	FG	T	72,000	375	192
24	10	Total	O	FG	T	47,000	220	214
25	11	2	O	P	W	121,240	591	205
26		Total			T	866,000	3,840	226
27	12	1	O	CG	W	30,000	121	248
28		2				30,744	110	279
29		3				30,744	113	272
30		4				30,744	116	265
31		5				30,744	100	307
		Total				152,976	560	273
32	13	1	O	CG	W	15,464	55	281
33		4				17,205	75	229
		Total				32,669	130	251
34	14	Total	C	FG	T	200,000	540	370
35	15	Total	O	P	T	350,000	1,500	233
36	16	Total	C	P	T	4,000	12	333
37	17	Total	C	P	T	2,800	12	233
38	18	Total	C	P	T	50,000	186	269
39	19	Total	O	FG	W	405,765	1,543	263
40	20	Total	C	FG	T	330,000	1,346	245
41	21	1	C	FG	W	64,428	226	285
42		2				64,428	209	308
43		3				64,428	224	288
		Total				193,284	659	293

Table 3. Summary of Data (continued)

Sample #	Building #	Floor #	Design[1]	Tenant[2]	Survey Method[3]	Gross Area (ft^2)	No. of Occupants	Occupant Load Factor (ft^2/person)
44	22	1	O	P	W	11,600	39	297
45		2				7,600	19	400
46		3				11,600	47	247
47		4				10,200	27	378
48		5				11,600	43	270
49		6				10,900	36	303
		Total				63,500	211	301
50	23	1	0	P	W	11,700	35	334
51		2				11,700	28	418
52		3				11,700	50	234
53		4				5,900	32	184
54		5				5,900	27	219
55		6				5,900	25	236
		Total				52,800	197	268

[1] Office design: C = Compartmented O = Open plan

[2] Tenant: FG = Federal government CG = County government P = Private

[3] Survey Method: W = Walk-through T = Telephone

Table 4. Summary of Occupant Load Factors.

Parameter	# of Samples	Mean	Standard Deviation	95% Confidence Interval
Well-compartmented	27	219	66.2	194–244
Open-plan	28	276	55.5	255–297
Government	37	234	62.2	214–254
Private sector	18	279	67.0	248–310
Walk-through	44	244	67.8	224–264
Telephone	11	264	62.5	237–301

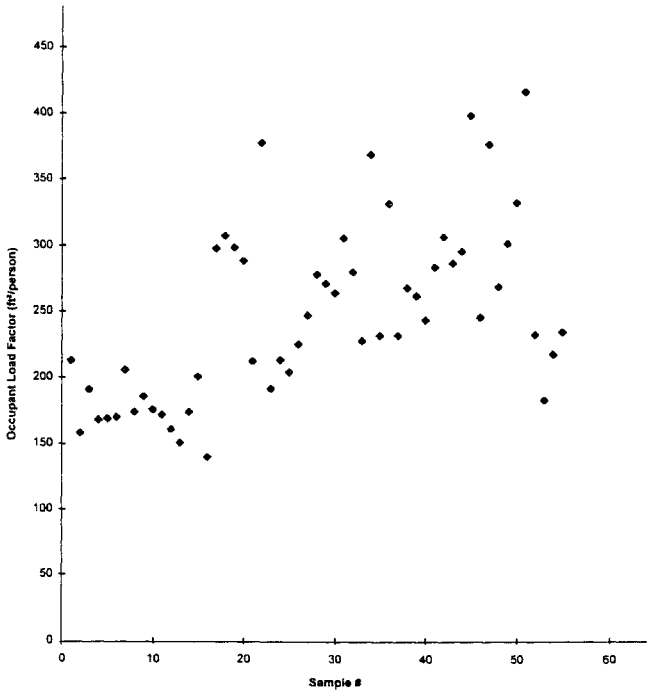

Figure 3. Summary of Occupant Load Factors from Survey.

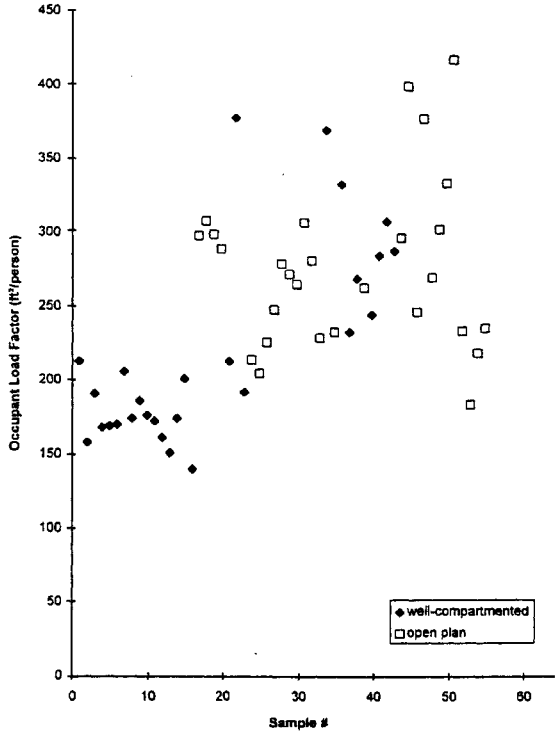

Figure 4. Comparison of Occupant Load Factors for Well-Compartmented and Open Plan Offices.

ANALYSIS

Table 4 presents a summary of the data of the occupant load factors for the different building types, e.g. open plan versus well-compartmented designs and federal and county government versus private tenants. The number of samples refers to the number of floor levels surveyed by the walk-through method or the number of buildings included in the telephone surveys.

The mean occupant load for all of the observations is 248 ft²/person (gross), with a standard deviation of 67.3 ft²/person. Data from all of the observations are summarized in Figure 3. The range of all of the observations is 140 to 418 ft²/person. Assuming that the data is normally distributed, the 95 percent confidence interval is determined by:

$$\mu \pm 1.96 \frac{\sigma}{\sqrt{n}} \qquad (1)$$

where:
m = mean
s = standard deviation
n = number of samples.

The 95 percent confidence interval for the occupant load factor for the entire sample is 230–266 ft²/person. Consequently, the occupant load factor of 100 ft²/person cited in the *Life Safety Code* is appreciably outside of this confidence interval.

The occupant load factor for buildings that contain primarily well-compartmented type office space have lower occupant load factors than the open plan office designs. The comparison of the occupant load factors between the two office designs is illustrated in Figure 4. Further, the mean for the open plan office designs is outside of the 95 percent confidence interval for the well-compartmented office designs indicating a statistically significant difference between the designs.

Privately owned or leased office buildings are less densely occupied than are government office buildings. Further, the differ-

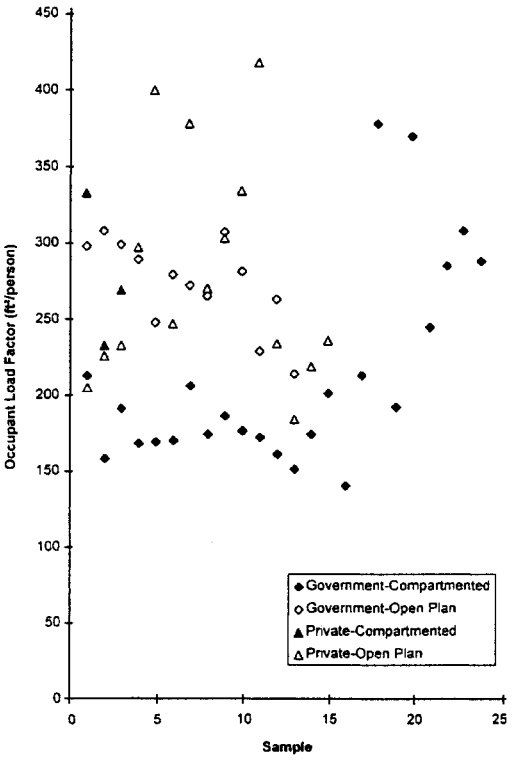

Figure 5. Comparison of Occupant Load Factors for Government and Private Sector Offices.

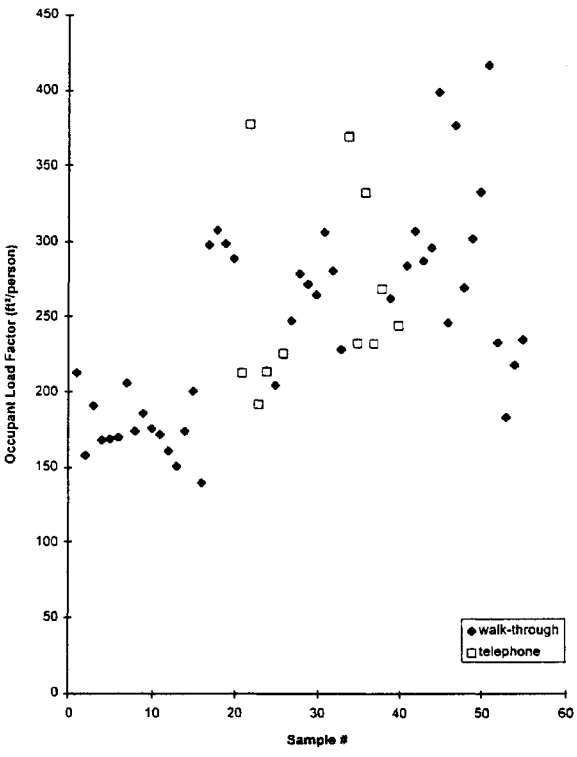

Figure 6. Comparison of Occupant Load Factors Determined by Walk-through and Telephone Survey Methods.

ence in the occupant load factors for office spaces with government versus private sector tenants is statistically significant at the 95 percent confidence interval. Differences in the occupant load factors for the two sets of tenants are presented in Figure 5.

Further analysis of the occupant load factors for government and private sector tenants and design of office space are included in Table 5. Even though only three samples of the well-compartmented design with a private sector tenant are included in the survey, the mean occupant load factor for the private sector tenant is virtually the same for both the well-compartmented and open plan designs. Conversely, the differences noted for the designs of offices with government tenants are statistically significant.

Table 5. Comparison of Occupant Load Factors.

Tenant	Design	# Samples	Mean	Standard Deviation	95% Confidence Interval
Government	Well-compartmented	24	212	65.0	
	Open-plan	13	273	28.1	
	Total	37	234	62.2	214-254
Private	Well-compartmented	3	278	41.4	
	Open-plan	15	287	71.0	
	Total	18	279	67.0	246-310

Comparing the results from the two survey procedures, the occupant load factors determined from the telephone survey procedure are slightly greater than those determined from the walk-through procedure. The comparison is illustrated in Figure 6. There are 11 observations obtained from the telephone survey procedure with a mean occupant load factor of 264 ft^2/person. There are 44 samples from building walk-through procedure with a mean occupant load factor of 244 ft^2/person. As indicated in Table 4, the differences are statistically insignificant.

Summary

A telephone survey and a building walk-through survey procedure have been formulated to obtain occupant load factors of contemporary office buildings. Both of the survey methods used, as well as others considered, have drawbacks which are not easily overcome without providing an inconvenience or disruption to office workers. Data collected from the telephone survey method is comparable to that obtained from the building walk-throughs, which is especially noteworthy given that substantially less time is required to conduct the telephone survey.

This research is significant in providing information to assess whether the currently specified occupant load factor in the *Life Safety Code* is appropriate, given the actual occupant loads measured. Some difference in occupant load factors from surveys and a code should be expected because the occupant load factor from surveys reflects average occupant loads in office buildings, where the *Life Safety Code* specifies occupant load to address the maximum probable number of occupants. When the occupant load factor was first included in the *Building Exits Code*, this factor was approximately the same as that reported in a survey conducted in that decade. However, results from occupant load surveys conducted in office buildings since 1966, including this research, have indicated that the actual occupant load factor is substantially greater than the occupant load factor of 100 ft^2/person cited in the *Life Safety Code* for office buildings. Consequently, it appears that a change in the *Life Safety Code* should be considered to reflect the change in occupant loading for office buildings that has been reported from numerous surveys conducted during the last 30 years.

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