

OCCUPATIONAL FALLS

Prepared for:

Appalachian Laboratory of Occupational Safety and Health
National Institute for Occupational Safety and Health
Public Health Service
U.S. Department of Health, Education and Welfare
944 Chestnut Ridge Road
Morgantown, West Virginia 26505

Prepared by:

Richard G. Snyder, Ph.D.
Highway Safety Research Institute
The University of Michigan
Ann Arbor, Michigan 48109

Final Report for Period

30 June 1977 through 30 October 1977

Contract No. 77-12125

October 31, 1977

REPRODUCED BY
**NATIONAL TECHNICAL
INFORMATION SERVICE**
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

Technical Report Documentation Page

1. Report No. UM-HSRI-77-51	2. Government Accession No.	3. Recipient's Catalog No. PB299286
4. Title and Subtitle OCCUPATIONAL FALLS		5. Report Date 31 October 1977
		6. Performing Organization Code
7. Author(s) SNYDER, Richard G.	8. Performing Organization Report No. UM-HSRI-77-51	
9. Performing Organization Name and Address Highway Safety Research Institute The University of Michigan Ann Arbor, Michigan 48109		10. Work Unit No. (TRAIS) 015618
		11. Contract or Grant No. 77-12125
12. Sponsoring Agency Name and Address National Institute for Occupational Safety and Health P. O. Box 4292 Morgantown, West Virginia 26505		13. Type of Report and Period Covered FINAL 30 June-31 October 1977
		14. Sponsoring Agency Code NIOSH
15. Supplementary Notes		
16. Abstract An analysis of job-related falls occurring in the United States compared broad occupational categories with age, sex, geographic, and month of year distributions of fall injuries and fatalities. The data base utilized was approximately 32,000 cases previously collected in a 1962-63 and more recent 1975-76 study of free-falls, of which 14,870 cases within the occupational age range of 14-75 years were analyzed. Of these, 38% (5,655) were job related and 19.5% (2,904) occurred in the home. Males showed an overall incidence of 42.9% occupationally related free-falls, compared to only 2.1% for females. General occupational-related fall trends as well as fatality and temporal comparisons between the two basic studies is provided. Craftsmen (painters, roofers, linesmen, iron and steel workers, electricians, and carpenters) were found to have the highest occupational incidence of falls. In this population, based upon free-falls (which excludes falls on the same level, down stairs, or other unimpeded falls), approximately 90% of the falls occurred to males at every age level reported from 14-75 years. Thirty-nine cases of elevator falls are included, involving 148 individuals. An analysis of the fall literature as well as an extensive bibliography is provided.		
17. Key Words Falls Accidental Falls Free-Falls Fall Fatalities Occupational Falls Falls Fall Injury Job-Related Falls		18. Distribution Statement Unlimited
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	22. Price A06-A01

NOTICE

THIS DOCUMENT HAS BEEN REPRODUCED FROM THE BEST COPY FURNISHED US BY THE SPONSORING AGENCY. ALTHOUGH IT IS RECOGNIZED THAT CERTAIN PORTIONS ARE ILLEGIBLE, IT IS BEING RELEASED IN THE INTEREST OF MAKING AVAILABLE AS MUCH INFORMATION AS POSSIBLE.

ACKNOWLEDGEMENTS

Grateful acknowledgement is given to Elaine Umholtz, who hand-sorted some 32,000 data cards and news clippings and provided the multitude of data sheets upon which this analysis is based. Additional data analysis assistance was provided by Dr. Lawrence Schneider, secretarial assistance by Beverly Creviston, and artwork by Kathy Jackson. The author is also appreciative of the data reference assistance provided by Ann Grimm of the HSRI library, the University of Michigan, Stephanie Klans, National Safety Council Library, Chicago, and assistance of the Division of Labor Statistics and Research, The State of California.

CONTENTS

	<u>Page</u>
ABSTRACT-----	i
ACKNOWLEDGEMENTS-----	ii
I. OBJECTIVES-----	1
II. BACKGROUND-----	2
III. METHODS-----	11
1. Literature Review-----	11
2. Data Source-----	12
3. Occupational Classification-----	14
4. Definitions-----	15
IV. RESULTS AND DISCUSSION-----	19
1. Occupational Relationship-----	19
2. Age Distribution-----	30
3. Geographic Comparisons-----	38
4. Seasonal Analysis of Falls-----	45
5. Other Findings: Occupational Falls in Elevators-----	52
V. CONCLUSIONS AND SUMMARY: 1962-63 and 1975-76 DATA TRENDS-----	55
VI. FUTURE RESEARCH NEEDS-----	58
APPENDIX A REFERENCES-----	61
APPENDIX B NATIONAL SAFETY COUNCIL REFERENCES- COMPUTER SEARCH RESULTS-----	73
APPENDIX C OCCUPATIONAL CLASSIFICATION SYSTEM-----	96
APPENDIX D A SUMMARY OF ELEVATOR FALLS-----	101

LIST OF TABLES

	Page
TABLE I. Average Annual Number of Days of Disability Attributed to Fall Injuries (Based upon 1971, 1972 NCHS estimates, after Wilder, 1974)-----	3A
TABLE II. A Summary Comparison of Occupationally Related Falls by Sex for Both 1962-63 and 1975-76 Data-----	20
TABLE III. Occupational Falls, Detailed Breakdown and Comparison by Occupations for Males, 1975-76 and 1962-63 -----	21,22
TABLE IV. Age Distribution in Falls-----	30
TABLE V. Fatality by Age Group-----	32
TABLE VI. Comparison of 1962-63 Female Falls by Geographic Region as Related to Occupation-----	43
TABLE VII. Comparison of 1962-63 Male Falls by Geographic Region as Related to Occupation-----	43
TABLE VIII. Comparison of 1975-76 Female Falls by Geographic Region as Related to Occupation-----	44
TABLE IX. Comparison of 1975-76 Male Falls by Geographic Region as Related to Occupation-----	44
TABLE X. Summary of Occupational Falls by Month for 1962-63 Females-----	50
TABLE XI. Summary of Occupational Falls by Month for 1962-63 Males-----	50
TABLE XII. Summary of Occupational Falls by Month for 1975-76 Females-----	51
TABLE XIII. Summary of Occupational Falls by Month for 1975-76 Males-----	51

LIST OF FIGURES

	<u>Page</u>
Figure 1. Occupational Falls of Males in the 1975-76 Population by Major Job Classifications-----	25
Figure 2. Summary Statistics for 1975-76 Males Comparing Fatalities in Occupational Falls Reported-----	26
Figure 3. Summary Statistics for 1975-76 Females Comparing Fatalities in Occupational Falls Reported-----	27
Figure 4. Summary Statistics for 1962-63 Females Comparing Fatalities in Occupational Falls Reported-----	28
Figure 5. Summary Statistics for 1962-63 Males Comparing Fatalities in Occupational Falls Reported-----	29
Figure 6. Relationship of Falls by Age Group and Occupation for 1962-63 Females-----	33
Figure 7. Relationship of Falls by Age Group and Occupation for 1962-63 Males-----	34
Figure 8. Relationship of Falls by Age Group and Occupation for 1975-76 Females-----	35
Figure 9. Relationship of Falls by Age Group and Occupation for 1975-76 Males-----	36
Figure 10. Falls by Females by Geographic Region in 1962-63-----	39
Figure 11. Falls by Females by Geographic Region in 1975-76-----	40
Figure 12. Falls by Males by Geographic Region in 1962-63-----	41
Figure 13. Falls by Males by Geographic Region in 1975-76-----	42
Figure 14. Seasonal Variation in Falls for 1962-63 Females-----	46
Figure 15. Seasonal Variation in Falls for 1962-63 Males-----	47
Figure 16. Seasonal Variation in Falls for 1975-76 Females-----	48
Figure 17. Seasonal Variation in Falls for 1975-76 Males-----	49

I. OBJECTIVES

This study was initiated with the following contractual guidelines:

"Prepare a report, based upon falls case files, addressing the following specific issues:

1. What percentage of both the 1962-63 and 1975-76 falls are occupationally related? The occupational sector shall be as defined by the Occupational Safety and Health Act of 1970. Percentages by broad occupational categories shall also be reported; i.e., painters, steel workers, supervisors, etc.
2. What is the age distribution associated with falls? With the age distribution categories chosen, what percentage were fatal?
3. Compare the 1962-63 and the 1975-76 data base with regard to changes in trends between those time bases; i.e., shift in age distribution, occupational versus home, etc.
4. Evaluate both the 1962-63 and the 1975-76 data base with regard to geographic and seasonal effects. If geographic and/or seasonal dependencies emerge, are occupationally related falls dependent in the same fashion?"

II. BACKGROUND

Falls are exceeded only by motor vehicle accidents as a major cause of accidental death in the United States. In 1976 there were 14,300 ⁽¹⁾ deaths attributed to falls from one level to another or on the same level, for a death rate of 6.7 per 100,000 population (National Safety Council, 1977, p.6). During the past five years this represents a relative downward trend from 1971, with 17,900 deaths listed (NSC, 1972, p.2), to 15,300 in 1975 (NSC, 1976, P.6). According to statistics of the National Safety Council, in 1976 of 14,896 total fatal falls, 57% (8,510) involved the elderly over 75 years of age, for a mortality rate of 92.7 per 100,000. Fatalities were reported to be only slightly greater for males at 51.7% (7,696), than females, 48.3% (7,200) (NSC, 1977, p.9).

In 1976 51.7% (7,700) of all reported fatal falls occurred in the home, and 30.9% (4,600) occurred in public accidents (NSC, 1977). However, deaths from falls in the home have reportedly decreased significantly over the past decade. For example, of those aged 75 and over, 8,100 individuals were fatally injured in falls in 1967, but only 4,900 in 1976, a 40% decrease over a 10-year time period. During this time, the number of individuals in the over 75 years age group increased 24%, therefore resulting in a home falls death rate per 100,000 population decrease of 51% (from 115.2 to 56.1). For all ages, deaths from home falls dropped some 36% (from 12,000 in 1967 to 7,700 in 1976), and the population death rate decreased 41% (from 6.1 to 3.6). The National Safety Council has attributed improvements in emergency and long-range medical care as an important factor in this decline in deaths from falls. A similar decline in falls, from 225 reported in 1955, to 105 in 1976, has apparently occurred in farming accidents (excluding farm home deaths). Despite these mortality trends, overall, job-related fatalities and injuries in falls remain a significant problem and

⁽¹⁾ Excludes falls in or from transport vehicles, or while alighting from them.

according to National Safety Council data the second cause of all compensable work injuries.

Falls also result in an estimated additional 13.6 million injuries annually, many of which result in permanent disability, loss of time from work or school. These injury accidents represent a major economic loss. While injury data are more illusive than fatality records, some states are good sources of limited data. The State of California Department of Industrial Relations keeps comprehensive records on accidental work injuries as well as deaths, and for 1973 California work injuries attributed to slips and falls totaled 55,126 cases, or 21.8% of the 253,416 accidental work injuries reported for that year (NSC, 1975, P.31). U.S. National Health Surveys indicate that 24,012,000 Americans were injured during the period 1971-1975 in home accidents (12,331,000 inside the home; 11,681,000 outside the home) (Howard, 1977, p. 417). During 1971-1972, some 6,961,000 million females over the age of 16 years were injured in home accidents (Wilder, 1976). In 1974 about 5.9 million job-related injuries and illnesses occurred to workers in private industry alone in the United States (Cohen, 1976).

A major source of injury information is provided by data published by the National Center for Health Statistics (NCHS) of the Public Health Service. The Division of Interview Statistics has attempted to estimate such data based upon household interviews conducted by the Bureau of the Census on behalf of the National Health Survey in a probability sample of the United States, exclusive of the population in institutions. For example, during 1971 and 1972 there were 88,000 interviewed households involving approximately 267,000 individuals, upon which data for the entire U.S. population was projected (Wilder, 1974). Since these data appear to be the most recent published by NCHS relative to injury incidence and disability, previous studies having been published in 1969 and 1964 (Wilder 1964; 1969), findings may be summarized as follows.

For 1971 and 1972 it was determined that an annual average of 63,400,000 individuals per year were injured, of which 2,588,000 were hospitalized. Of these, it was reported that 13,611,000 individuals, or 21.5% of the total injuries, were injured in falls. Note that these are only estimates. The annual estimate of individuals injured is based upon those injuries reported during a two-week reference period immediately prior to the household interview, and projected to the total population. Falls on stairs, steps, or from a height, resulted in 4,403,000 injuries; all other falls caused 9,208,000 injuries. About 25% of the falls required bed disability for at least one day. Falls on stairs, steps, or from a height had a higher percentage of bed disability than did other falls. For this period the average annual number of individuals injured while at work due to falls on stairs, steps, or from a height, was estimated at 568,000, while 697,000 were injured in all other kinds of falls.

The socio-economic effects can also be readily visualized from data projected on loss of work-days. The annual average number of "restricted activity" days due to fall injury, based upon the 1971 and 1972 data, was estimated to be 57,230 days lost from falls on stairs, steps, or from a height, and an additional 107,211 days lost due to injuries from all other falls. As shown in Table I, fall injuries result in a substantial loss of work-days.

TABLE I. Average Annual Number of Days of Disability Attributed to Fall Injuries. (Based upon 1971, 1972 NCHS estimates, after Wilder, 1974)

INJURY CAUSE	NUMBER OF DAYS LOST			
	Restricted Activity	Bed Disability	Lost from Work (1)	Lost from School (2)
Fall on stairs, step or from a height	57,230	14,995	9,536	1,289
All other falls	107,211	31,075	12,380	2,468
Total Falls	164,442	46,029	21,916	3,757
(1) Currently employed individuals 17 years of age or older (2) Children 6-16 years of age				

Occupational fall data from the State of California indicate that lost-time injuries involving falls from elevated working surfaces averaged 2,800 per year from 1966 through 1973 (State of California, 1977). Falls through 1971 accounted for 13% of total injuries in construction, and 9% in 1975. Ladders accounted for the largest number of falls in construction (519 or 31%), and carpenters sustained 24% of all occupational injuries. Falls from scaffolds accounted for 19% of the construction falls, while 14% were from roof tops. Employees of general building contractors and roofing contractors each accounted for approximately 40% of all injuries caused by falls from roofs. The 1976 California data also indicate that employees of general building contractors accounted for 31% of the falls, and heavy construction contractors, 9%.

An important factor may also relate to the duration of each disability resulting from the fall injuries reported. This was estimated by NCHS, dividing the number of days of disability by the number of injuries sustained. While an average duration of bed disability from falls during the July, 1959 to June, 1961 period was reported to be 4.5 days (Wilder, 1964), based upon 1971 and 1972 data, the average duration of bed disability attributed to falls on stairs, steps, or from a height was also 3.4 days, compared to 3.0 days for the previous period for all other falls (Wilder, 1974).

Review of the literature indicates that while the medical literature contains a number of studies relative to fall injuries over the past 25 years in particular, most are based upon a limited number of cases, and many report only a single case. None purport to project findings for other than a restricted population.

Accidental falls involving window cleaners treated at an English hospital over a five-year period were reviewed by Ribeiro (1975). In all 20 patients reported upon, failure to use safety belts and the lack of suitable anchorage points were found to be contributory factors.

Several studies have been concerned with the incidence of falls of patients in hospitals, ranging from pregnant women to the elderly. Falls from hospital beds have been studied by Sehested and Severin-Nielsen (1977), Ballenger and Ramsay (1975), and in 277 cases by Fine (1959). Other studies of falls from hospital beds have been published by Järvinen and Järvinen (1968), as well as falls from the physician's examining table (Anon. 1972). The occurrence of such falls may have stimulated a 1962 article by Sadusk entitled "Malpractice-Analysis of 200 suits reveals practical ways to avoid such troubles," presented at the annual convention of the American College of Physicians (1962). Suggestions related to the prevention of falls of patients included use of extreme care in helping patients off the examining table, ensuring that patients are placed on a table rather than chair for injections, insistence of side rails on beds of patients receiving narcotics or hypnotics especially if elderly, and continuous observation by special nurses for patients who may be confused, mentally disturbed, or critically ill. Several studies have concluded that many falls could have been prevented had closer nursing attendance been available (Ku, 1966; Parrish and Weil, 1958, in a study of 614 hospital patient falls).

Numerous studies have been concerned with fall injuries to children (Elmer, 1977; Smith et al., 1975; Levin, 1972; Bergner, 1971; Kravitz et al., 1969; Marion et al., 1967; Klonoff and Robinson, 1967; Rubbin, 1966; Federer, 1962; Scallones and Corsa, 1961; Jacobzimer et al., 1960; Suchman and Schezer, 1969; Haggerty, 1959; Franzen, 1958; Wheatley, 1956; Dennis and Kaiser, 1954; and Rountree, 1950). Smith et al. (1975) reported on findings on 66 fall-injured children seen at Wyler Children's Hospital in Chicago, while Smid and Logan (1956) studied injured children seen at Mayo Clinic. Falls of children from high chairs were reported by some 25% of 740 parents queried relative to a 1977 study of high chair safety in the U.K. (Anon., Which).

Medical attention has been apparently sparsely focused on fall injuries and fatalities to the elderly (Overstall et al, 1977; Watson, 1976; Naylor, 1970; Bauer, 1960; Sheldon, 1960; Boucher, 1959; DeLargy, 1958; Howell, 1958; Fleetwood, 1958; Futh, 1957; Howell, 1955; Droller, 1955; and Scott, 1954). Only three studies were found to directly address this problem in the past 27 years.

Droller (1955) found that various pathologic infirmities of the aged contributed to the incidence of falls, such as arthritis, cerebrovascular lesions, weakness, and sudden loss of muscle tone, with legs giving way unexpectedly with no ascertainable reason. He found defective vision an insignificant factor, in contrast to other researchers. Firth (1957) emphasized the role that adequately designed housing and accommodations for the elderly should play in the prevention of falls.

DeLargy (1958) found that falls by the elderly at home were often a combination of a shuffling gait with frequent tumbles, especially when there are rickety bannisters, uneven floors strewn with loose rugs or mats, or bits of frayed carpet. This is often made more hazardous where illumination is poor. He also reported another type of injury from falls by the elderly, resulting from a change in posture and dizziness, related to such activities as rising from a chair, getting up from a lavatory seat, getting out of the bath, or even getting out of bed.

Most falls by the elderly were identified by Howell (1958) as due to failure of, or deterioration of, the proprioceptive portion of the central nervous system.

Sheldon, surveying the "meager" literature of fall injury to the elderly in 1959, found only nine medical citations at that time. He analyzed 500 falls to 202 individuals in England, finding that one-third of falls sustained by the elderly in his sample were home accidents, with falls from stairs accounting for the major category. This emphasizes the contrast between the small amount of time spent at risk and the great hazard stairs present to the elderly.

Although dated, this is one of the more instructive studies found in the medical literature.

Several studies have noted an association of alcohol with fall injuries. A recent study in Finland found that the most common cause of injury in 1012 accident victims was falling, and that the 447 falls recorded were much more often alcohol-involved ($p > 0.001$) than the 172 other non-traffic accidents in their study (38% v. 24%) (Honkanen and Visuri, 1976).

Other than broad listings related to accident injuries in general found in the NCHS analyses, practically no investigation of sexual differences in falls has been located. Isprant and Sullivan included sex and age as factors but no breakdown of data (1960). John (1977) presented trends in sex mortality, but without specific breakdown relative to fall accidents. Similarly Broussard (1958) examined sexual differences in childhood accidents in a limited Florida population, but without definitive fall data.

Free-falls, which are defined as any unimpeded fall, jump, or dive (excluding falls to the same level, falls down stairs, or tumbling falls down hillsides) have been studied as a technique in establishing human tolerance to injurious or lethal impacts. The influence of numerous biophysical factors in the fall environment have been identified and described relative to such parameters as body orientation, material fallen upon, height (velocity) of fall, sex, age, physical condition, rate of onset, deformation distance, time, and clothing worn. A technique pioneered by DeHaven (1942), has been utilized in several extensive studies by Snyder (1977; 1971; 1970; 1966; 1965; 1963; 1963; 1962), and in one additional DeHaven case by Hasbrook (1959) as well as a study of mountaineering falls by Stech (1963), and bridge falls in Australia by Penfold et al. (1966). An objective of most of these studies was to determine the limits of human impact tolerance in falls. More recently a study of children and females

was undertaken (Snyder et al, 1977) since the only previous fall tolerance data available consisted of a clinical study by Smith (1975), and Snyder's previous analysis of falls of 34 children aged 8 months to 12 years (1970). An additional technique of mathematical simulation of falls and use of instrumented dummy drops was also reported (Foust et al, 1975) in relation to the 1977 study. Previously an Australian stunt man had been instrumented to provide fall data (Hearn et al., 1970), and General Motors Corporation also utilized a stunt man to determine forces under limited conditions in which an instrumented 75-year old stunt man jumped in the prone position 35 feet (10.7m) into a shallow pool of water (National Safety News, 1976).

There is a growing literature related to sports injuries. However, few studies have isolated fall data to athletes. Examples include Haddon et al. (1969), Thorndike (1959) and Gonzales (1951), on injuries to skiers of interest. Similarly, there is an extensive literature related to injuries to both sport and military parachutists, but no attempt has been made to include this material here. Prominent studies involving parachutist injuries have been reported by Kiel (1965), and an early study of 300 cases by Ciccone (1948). A classic study of injuries to high divers was published by Schneider et al. (1962).

A recent interesting study by Eyer in the International Journal of Health Services (1977) theorizes the role of prosperity relative to the rising death rate during business booms, the role of social stress, overwork, and fragmentation of the community as casual factors, but does not identify a relationship with falls specifically.

The history of occupational injuries has been recently reviewed by Howard (1977), but addresses the overall injury trends and influence of occupational legislation rather than providing specific data on falls. Another recent paper by Eyer (1977), published in the International Journal of Health Statistics, has examined the thesis of "prosperity" as a cause of death, but does not

specifically address influence upon the incidence of falls nor occupational relationships.

Isolated studies have considered the problem of falls relative to a specific industry or work environment. For example, McCormick (1967) studied fall injuries and causes in the dairy industry, Wilson (1961) in the fruit and vegetable canning industry, and Whitfield examined coal mine injuries. A masters thesis by Foerder (1963, l.c. unpublished) studied flat surface fall accidents in the food manufacturing business. Surry (1974) has published a comprehensive booklet on industrial accident research for the Ontario Ministry of Labour, and earlier (1969) had compiled a useful annotated bibliography.

Accidental falls in the home environment have been the subject of a number of studies particularly in the 1950's, but fewer more recent studies have been identified. Examples include Stallones, 1963; Gowings, 1961; Chalke and Watson, 1959; Haggerty, 1959; Lossing and Goyette, 1957; Barlow, 1954; Cook, 1954; Seiler and Ramsay, 1954; DeCosse, 1953; Droller and Pemberton, 1953; Castle and Lamb, 1950; and Taylor, 1950. An early study by Rupp and Battery was published in 1936. The nature and causes of 100 home stairway falls was studied by Miller and Esmay (1958) in Ingham County, Michigan, and on 409 stairways in a 1953 University of Michigan study (Velz and Hemphill).

In 1960 a committee of the National Safety Council explored stair design factors and accident experience, based upon a survey of 1974 stairways (744 exterior, 930 interior) in 440 dwellings, representing 6% of property owners in Warren County, Pa. An epidemiologic follow-up of accident falls was made. It was found that about half the exterior stairs had no rails at all, with 36% of the interior stairs having no rail protection (Gowings, 1961).

Baker (1972) has provided an excellent discussion of accident prevention approaches to injury reduction, distinguishing between actual injury-producing agents and their vectors or vehicles. She notes that in the agent-vector-host

relationship, changing the vector can be important. For example, since mechanical force is the causation of most injuries such as in a fall, the probability of injury in a fall can be reduced by decreasing the potential energy of falling people by lowering beds, cribs, and high chairs (p. 16). Yet she finds "little evidence that injury counter-measures have been chosen on the basis of which will have the greatest payoff, per dollar, in terms of reducing injuries and death." (p. 26) Baker cites Wakeland (1971) to indicate that other considerations besides cost-effectiveness may be important. Individuals who are not capable of protecting themselves (such as children and the aged) deserve additional protection. This includes those at risk for the benefit of the rest of us. such as those who live along gas pipelines or work in a hazardous occupation.

A recent study of personal fall-safety equipment by Steinberg (1976) of the National Bureau of Standards was directed toward establishing a basis for a comprehensive occupational Safety and Health Administration (OSHA) performance standard for fall-safety systems with major emphasis upon fall-arrest systems. In contacting more than 100 possible sources of fall-related injury data, including military and government agencies, industrial organizations, safety associations, mountain climbing and skydiving clubs, workmen's compensation organizations, and foreign groups, Steinberg reported that little pertinent information was found, and data on occupational fall injuries was not presented.

As reviewed in the foregoing examination of the literature, national fatality and injury data resulting from falls has had spotty and somewhat limited attention in the past. For many areas, fall data appears to be almost non-existent, and detailed information has apparently not been published related to comparative data regarding sex, age, race or ethnic affiliation, geographic location, socio-economic, or specific occupational environments.

III. METHODS

1. Literature Review

In order to identify previous studies and sources of occupational fall data not known to us, an initial task involved information retrieval. This was accomplished through both computerized facilities of the University of Michigan library system and personal literature searching techniques. Initially an off-line bibliographic citation list was generated by a MEDLARS II National Library of Medicine national interactive retrieval service, conducted through the University of Michigan Medical Center Library. Data bases included BIOSIS (biological sciences), SCISEARCH (biological and applied science), SSIE (research in progress), ISMEC (Mechanical engineering and engineering management), COMPENDIX (engineering), NTIS (government research), FEDERAL INDEX (U.S. government publications), COMPREHENSIVE DISSERTATION ABSTRACTS (Doctoral dissertations), FOUNDATION GRANTS INDEX (grant records), GRANT INFORMATION INDEX (grants), and SOCIAL SCISEARCH (social sciences) back to 1966. Since the results did not appear satisfactory, a separate library search was initiated, based upon the most likely journals publishing fall data, as well as subject indexes. However, the primary source for reference material was found to be the Biomedical Department's own fall file, which was originally based in part upon a six-year search of the world literature conducted by the author in a joint U.S. Air Force-Federal Aviation Agency biomedical literature retrieval program which included free-falls as a subject. and which has since been periodically updated. Further information and materials were obtained in contacts with the National Center for Health Statistics, PHS, the National Safety Council, and the State of California, Division of Labor Statistics and Research. A listing of pertinent references is provided in Appendix A, and a separate list from the National Safety Council Computer search is given in Appendix B.

2. Data Source

The basis of this study was the extensive collection of free-fall materials available at HSRI. This consists of approximately 32,000 cases of free-falls which were collected during two separate studies of free-fall over the past 15 years. During 1962-1964 a two year study was conducted (Snyder, 1962---1971) at the Civil Aeromedical Research Institute of the Federal Aviation Agency in Oklahoma City, with a primary objective of obtaining data on human tolerance survival of extreme impact. The technique of studying accidental free-falls, pioneered by DeHaven's (1942) study of 7 cases, had been found to produce valuable new tolerance data particularly at the upper levels of human tolerance, since it offered several advantages over the restrictions imposed by laboratory testing of human subjects, which must be conducted at low non-injurious subjective levels of force. While most of these data were from 1962-64, some were obtained in 1961, and 3 months' of 1965 falls were also collected. A clipping service provided about 96% of any free-falls printed in U.S. newspapers, and from this notification service selected cases were then investigated in-depth at the scene for biophysical measurements, interviews conducted, and x-rays, medical, and police records obtained.

In 1975 a second free-fall study was initiated at HSRI, sponsored by the Insurance Institute for Highway Safety (Snyder et al., 1977; Foust et al., 1977). This study differed from the earlier one in that an attempt was made to study free-fall tolerance for children, females, and the elderly, for which practically no tolerance data are known. Rather than extremes of survival, emphasis was on the range of onset of injury. This study was supplemented by instrumented anthropomorphic dummy free-fall impact drops, and mathematical modeling based upon case studies to attempt prediction of onset of head injury. In an 18 month period during 1975-1976, 2100 cases were collected, of which 110 were intensively investigated.

The combined studies thus consisted of approximately 32,000 dated, mounted, and numbered clippings, for which each had a special McBee rim punch card filed. The primary material worked with in this study were the McBee card files. However, the clipping files were also referred to for additional information. Specially designed, the 5" x 8" McBee card contained both typed information on the face related to the fall and coded data punched on the 4 sides. At the time that this system was selected it was not realized how many cases would accrue. One of the major problems involved in this study was the necessity to tediously hand sort and tabulate each of the 32,000 cards, since the information has never been transferred to a computerized system. For small numbers, the coded cards are extremely useful since they can be sorted by needle and hand read.

This study was understood to be exploratory since, while it was believed that the data represented perhaps the largest collection of individual cases of falls available in the United States, the degree of application to occupational falls was unknown. Several limitations were known to exist which would influence the quality and quantity of data which could be extracted. In the first place, both of the data collection studies were focused on "free-falls," rather than "falls" in general, thus only a portion of the actual number occurring during those periods were collected. For the purposes of both basic studies a free-fall was defined as any unimpeded fall of over 10 feet (3.048m) although many cases were of less height of fall. Falls down stairs, on the same level, or under 10 feet (3.048m)--major categories of falls--were generally not included. A second limitation was that only 350 to 500 cases had been intensively investigated where the fall distance, injuries, and other data were verified; the remainder were based upon news accounts. A third limitation, and one which proved most frustrating and time-consuming, was that since occupational

information was only of incidental importance in the basic data collection studies, many cases did not provide any information on occupation, or the inference was not sufficient to utilize. However, within these limitations if was believed that the data source could provide significant information.

It should be noted that while approximately 32,000 cases were reviewed for this study, the final total shown in the analysis tables is 14,870. A primary reason for this is that only falls involving ages 14-75 were included, as considered the occupational population. Further excluded were a large number of individuals for whom age was not given (approximately 1000 cards).

3. Occupational Classification

Each fall case was examined for the occupation and environmental conditions of the fall, and if these were not evident from the coded card (occupations were not coded), the original clipping was referred to. In order to uniformly list occupations the occupational classification system of the U.S. Bureau of Census Alphabetical Index of Industries and Occupations was utilized (Appendix B). Since there are 461 occupational listings, and information is not available to make many distinctions (e.g., 11 types of engineers, 30 classifications for teachers, 16 classifications for mechanics and repairmen), the major categories of the occupational classification system were used as a basis for classifying.

Fall cases were thus classified by 13 occupational groups, which included (1) Professional/Technical, (2) Administrators, non-farm, (3) Sales, (4) Clerical, (5) Craftsmen, (6) Operatives/not transport (7) Transport Equipment Operatives, (8) Laborers/not farm, (9) Farmers and Farm Managers, (10) Farm Laborers and Foremen, (11) Service Workers, (12) Non-Specified Occupational. In addition three other categorical distinctions were made: (1) Home, (2) Other, and (3) Not Specified.

Injury classifications, such as the ERDA Guide to the Classification of Occupational Injuries and Illnesses developed by the Division of Safety, Standards,

and Compliance, of the U.S. Energy Research and Development Administration, or 1972 Revision of the Standard Industrial Classification Manual, published by the Bureau of the Budget, Executive Office of the President, were considered to be beyond the scope of this study.

4. Definitions

Since even these occupational classifications involve a number of considerations, some detail will be provided in the following to explain a number of problems encountered in utilizing this classification system and the guidelines which were utilized.

The "not specified" occupational category was used for any employee falling at the job, but for which information was insufficient to determine his occupation. In some cases the extent of information available was simply that "employee fell." In an estimated 98% of cases the implication is that the employee would fall into the category of craftsmen, operatives, or laborer; however, when it could not be precisely determined the "not specified category" was used.

"Home" categories included a home, house, balcony of apartment, apartment, house porch, dormitory, friend's home, relative's home, window of home. An estimated 98% of falls recorded under the "home" category had the word "home" specifically identified on the card location code. Others recorded in this category mentioned a "home environment" including those listed above. However, if a fall was listed as a fall from a window, balcony, or porch, but did not indicate specifically house, apartment, or home, the case would be recorded in the "not specified" category. Hotels, and dormitories were recorded as "homes", if they were listed as the individuals' residence. On the other hand, old age homes and convalescent homes were regarded as hospital environments and not included in home falls. Falls occurring in such environments were recorded in the "other" category.

An indoor/outdoor distinction was made only for "home", "other", and "not specified" categories. For instance, a fall outside a home was determined if the home was specified as environment but the fall originated outside the physical confines of the structure. Examples include: ladder in yard, tree in yard, sidewalk before house, or well behind home. The origin of the fall was established as determining the definition. Thus an individual might be inside (such as on porch, balcony, or bedroom) when fall initiated, but might impact external to the structure.

The use of "other" category also requires some detailed explanation of criteria employed in this study. Many distinctions may seem arbitrary but were necessary for uniformity and lack of further guidelines in the use of the Bureau of Census Index of Industries and Occupations.

Falls from barns, silos, and corncribs were recorded as "other" rather than "home." An indoor "other" classification was made when the environment included church, YMCA, hospital, convent, tavern, hotel (non-residence), club, store, museum, library, business (patrons), silo, stable, barn, coops, escalator, and garage. On the other hand, outdoor "other" classifications included falls from mountains, cliffs, dams, bridges, trestles, trees, horses, sidewalk (walking on public sidewalk), freeways, ramps, television, water or communication towers, docks, ski lifts, hay wagons, trains, railroad cars, vehicles, oil derricks, boats, swings, flag poles, parking lots (not parking structures), or diving boards. Attention was paid to the details of the description in assigning an indoor/outdoor distinction. For example, bleachers are primarily outdoors, but stadiums, especially where domed, were viewed as indoors. Also, in amusement parks a roller coaster or ferris wheel is outside, but a fun house would be regarded as inside. Similarly, at a race track a clubhouse fall would be indoors while a fall on the track or bleachers would be outdoors. Falls at railroad stations also required close attention to determine whether they are an indoor or outdoor fall. Overhead els, subways, cargo trains in yards, from train

yards, or a fall from tracks or jump from overhead tracks were classed as outdoor, while a fall from a station platform (originated inside structure) or fall down steps of station to tracks of subway was viewed as an indoor fall.

Falls were listed in the "not-specified" category if there was no indication of the type of structure or fall environment, or if the case card read "subject fell," "subject fell down steps," "subject fell from window," or "non-specified." Where possible an attempt was made to double-check addresses on the clipping to see if could be identified as a residence.

The "Farmer" classification was also not always easy to determine. If the card or clipping did not specifically say "farmer," the information given must clearly state that the person was working in such an environment. A farmer was listed under "Farmers and Farm Managers," while siblings, paid help and relatives were listed under "Farm Laborers and Foreman." Some examples may be useful relative to these distinctions. If the information said the farmer fell in his barn, he would be listed as "Farmer and Farm Manager." But if the data card or clipping indicated the individual "fell while working with livestock," "fell at father's ranch while fixing shed," or "fell from ladder while pruning orchard at the J.B. Smith Farm," or "fell from tractor while working in field," the case would be listed under "Farm Laborer" classification. When the data indicated only that the individual "fell in barn," "fell from corn crib," or "fell from haywagon," it would be classified as "other."

Falls of non-citizens (if known) and falls occurring in foreign countries or aboard foreign vessels were not included in the recorded information. If the subject age was unspecified, undetermined, or loosely determined (e.g., teenager, adult, child) the case was excluded. Occasionally the month or state of a fall occurrence was not reported. These few instances were accommodated by listing as "non-specified" as appropriate. Also not included in this report are some scattered fall cases, particularly from the 1950's and from 1966 or later, perhaps 1000 cases in all, which were not part of either basic free-fall stu

In tabulating the results, each case had to be individually examined, and judgments as indicated above made relative to occupation, and environmental and other factors considered. Tabulations were made using a set of two data sheets for each age and sex, one listing month of year when the fall occurred by occupation, and the other providing geographic tabulations. Thus there would be a separate set of tabulation data sheets for 14 year old females, etc. While tedious, this hand-sort technique was required since occupational information had not been coded in the basis data set, and therefore neither computer nor McBee Key sort techniques could be utilized.

IV. RESULTS AND DISCUSSION

The occupational relationships, age and sex distributions, seasonal geographic variables, and comparisons between the 1962-63 and 1975-76 free-fall populations are described in the following. Although it was estimated that the total population searched was approximately 32,000 cases, data from 14,870 cases within the occupational age range of 14-75 years are provided. Due to the fact that occupation was not originally coded, this information was found to be unknown for a large proportion of the cases. Thus the tabulated results reported in most comparisons reflect only those cases for which these data could be determined. While these populations do provide an excellent source for free-falls, most other types of falls were excluded from the original data, as well as falls under 10 feet height in most cases.

1. Occupational Relationship

As noted in the previous section, and detailed in Appendix B, occupations of individuals were classified when possible utilizing the U.S. Bureau of the Census Alphabetical Index of Industries and Occupations. Table II summarizes the occupational falls by sex for the 1962-63 and 1975-76 groups. Of 14,870 total free-falls listed, 38% (5655) were job-related and 19.5% (2904) occurred in the home, while 32.2% (4784) were identified as not job-related, and in 10.3% (1527) of the cases information provided was insufficient to determine whether job-related.

Males in both the 1962-63 and 1975-76 studies were found to have very similar proportions of job-related falls 43.2% (5031) in 1962-63, and 42.5% (575) in the 1975-76 study. A difference in home falls for these males was noted, with 16.2% (1891) occurring in 1962-63 but only 9.4% (127) occurring in the home in 1975-76. Another trend is that while 29.8% (3466) of the free-falls involving males in 1962-63 were not job-related, by 1975-76 41.9% (567) were not job-related,

although it should be noted that the 1962-63 study sample contains 8.6 times as many male subjects.

A comparison of the 1962-63 data with 1975-76 for females shows few occupational-related falls, only 2.7% (46) in 1962-63, and 1.5% (3) in 1975-76. However, these figures increase considerably when falls in the home are examined. In 1962-63 50.4% (842) of the female free-falls occurred in the home, and although it was not possible to distinguish the occupation of homemaker in these falls it may be a significant proportion. However, in contrast, the 1975-76 study produced only 21.6% (44) free-falls in the home; this difference may reflect a much smaller sample size. Similarly a major difference between the 1962-63 females and 1975-76 females is noted in the category of non-job related falls, with 36.9% (617) in the earlier study, but 65.7% (134) in the recent data.

The sexual differences in falls is more uniform for both sets of data in that males apparently have a considerably greater incidence of occupationally related free-falls, averaging 42.9% versus 21.7% for women.

TABLE II. A Summary Comparison of Occupationally Related Falls
by Sex for Both 1962-63 and 1975-76 Data.

Group	Job-Related Falls	Home Falls	Not Job-(1) Related	Non-(2) Specified	Total Falls
1962-63 females	46 (2.7%)	842(50.4%)	617(36.9%)	167(10.0%)	1962 (100%)
1962-63 males	5031 (43.2%)	1891(16.2%)	3466(29.8%)	1252(10.0%)	11,640 (100%)
1975-76 females	3 (1.5%)	44(21.6%)	134(65.7%)	23(11.2%)	204 (100%)
1975-76 males	575 (42.5%)	127(9.42%)	567(41.9%)	85(6.2%)	1354 (100%)
Totals	5655 (38.0%)	2904(19.5%)	4784(32.2%)	1527(10.3%)	14,870 (100%)

(1) fall other than the home, not job-related
(2) information insufficient to determine whether job-related

Reproduced from
best available copy.



TABLE III. Occupational Falls, Detailed Breakdown and Comparison by Occupations for Males, 1975-76 and 1962-63

Occupational Codes		1975-76 Males	1962-63 Males	Occupational Codes		1975-76 Males	1962-63 Males
	<u>Professional</u>	17	89		<u>Craftsmen</u>	155	1696
173	.technicians	2	2	410/411	.brick masons,stone masons & tuckpointers	1	69
194	.writers,artists,entertainers,circus performers	6	20	R415/416	.carpenters & apprentices	1	186
	.engineering & science technicians	1		421	.cement & concrete finishers	5	23
161	.surveyors	1	1	424	.cranemen	4	22
124	.coaches & physical education teachers	1		433	.electric power linesmen & cablemen	9	108
082	.health record technologists & technicians	2		436	.excavating,grading,road machine operators	3	14
	.teachers	1		456	.(locomotive) firemen	11	69
031	.lawyers (legislators)	1		503	.molders:plastic/metal	1	2
101	.recreation workers	1	5	510	.painters	49	427
042	.agricultural scientists	1	3	512	.paper hangers & window hangers	1	8
025	.foresters & conservationists		7	522/523	.plumbers & pipefitters & apprentices	2	41
	.engineers		14	534	.roofers & slaters	16	167
	.engineering & science technicians		4	543	.sign painters,letterers,sign installation	7	47
086	.clergymen		7	546	.stone cutters & carvers	1	1
090	.religious workers		3	550	.structural metal craftsmen(steel & iron workers)	6	109
191	.photographers		2	554	.telephone linesmen & splicers	4	42
160	.athletes & kindred workers		1	560	.tile setters	1	
163	.airplane pilots		2	572	.not specified:installing aluminum siding	5	7
185	.musicians & composers		1	580	.armed forces	4	45
175	.actors		1	470	.air conditioning,heating,refrigeration mechanics	4	17
	.religious worker:monk		1	471	.aircraft	1	3
144	.secondary school teacher		1	481	.heavy equipment mechanics	1	6
100	.social worker		1	485	.radio & television mechanics	1	10
053	.physicists & astronomers		1	492	.misc. mechanics	8	9
011	.civil engineers		1	495	.not specified:mechanics,steepjacks	2	40
	social & recreation worker		1		.utilities personnel:not specified whether phone/electric	7	9
195	.research worker,not specified		1	403	.blacksmith		1
021	petroleum engineer		1	404	.boilermakers		5
	technician,except health,engineering,science		1				2
	physicians,dentists,related practitioners		2	412	.bulldozer operators		5
006	aeronautical & astronautical engineers		1	430/431	.electricians & apprentices		78
002	architects		2	441	.foremen		58
065	physicians,medical & osteopathic		2	445	.glaziers		4
				461	.machinists		7
				501	.millers		2
				502	.millwrights		2
				520	.plasterers		17
				530	.pressmen & printers		1
				535	.sheetmetal workers & tinsmith		30
				563	.upholsters		1

TABLE III. Occupational Falls, Detailed Breakdown and Comparison by Occupations for Males, 1975-76 and 1962-63

Occupational Codes		1975-76 Males	1962-63 Males	Occupational Codes		1975-76 Males	1962-63 Males
	<u>Operators.....</u>	22	151		<u>Sales.....</u>	2	19
601	.asbestos & insulation workers	1	1	270	.real estate agents & brokers	2	2
T602	.assemblers	1	1	266	.newsboys		2
603	.blasters & powdermen	1		262	.demonstrators		1
614	.drillers	11	70	280	.salesmen & sales clerks		14
615	.dry wall installers & lathers	1			<u>Clerical.....</u>	2	9
620	.dyers	1			.meter reader,utilities	1	
622	.furnacemen,smeltermen,pourers	1		334	.postal clerks	1	1
640	.mine operators	1	26	361	.statistical clerks		1
680	.welders & frame cutters	4	41	375	.mail carriers,post office		1
623	.garage workers & gas station attendants		7	331	.stock clerks & store keepers		6
642	.oilers & greasers		1	381			
662	.sawyers		1		<u>Administrative.....</u>	17	90
660	.riveters & fasteners		1		.managers & administrators	9	27
	.industrial worker(unknown)		2	245	.officers,pilots & pursers(ship)	2	6
	<u>Transport Equipment Operators.....</u>	13	116	213	.construction inspectors	2	10
701	.boatmen & canalmen(barge,dredger,seamen)	7	34	216	.managers & superintendents,building	1	17
706	.forklift & tow motor operatives	4	3	220	.office managers	1	3
712/713	.railroad brakemen & switchmen	1	17	222	.officials & administrators	1	3
	.railroad;others	1	29	230	.restaurant,cafeteria,bar managers	1	5
704	.conductors & motormen		3	201	.assessors,controllers,treasurers		2
705	.deliverymen & routemen		9	202	.bank officers & financial managers		1
711	.parking attendants		4	205	.buyers, wholesale & retail		1
714	.taxicab drivers & chauffers		1	215	.inspectors,except construction,public administration		11
U715	.truck drivers		1	231	.sales managers and department heads,retail trade		3
				233	.sales managers,except retail trade		4
	<u>Laborers.....</u>	94	819		<u>Service Workers.....</u>	9	111
V751	.construction laborers	47	512		.cleaning service workers	1	1
	demolition		31	X903	.janitors & sextons	5	67
	remodeling	6	7	910	.bartenders		1
	construction: (55)	2	(550)	912	.cooks (chefs)		4
753	.freight & material handlers	5	11		.food service workers		1
754	.garbage collectors	1	4		.personal service worker		1
755	.gardeners & groundskeepers	15	72	934	.baggage porters & bellhops		3
760	.longshoremen & stevedores	1	30	943	.elevator operators		7
761	.lumbermen,raftsmen	2	10	960	.crossing guards & bridgetenders		1
764	.vehicle washers & equipment cleaners, window washers/sand blasters	13	91		.protective service worker		1
770	.warehousemen	1	3	962	.guards & watchmen	1	10
785	.not specified	1	39	964	.policemen & detectives	2	7
752	.fishermen & oystermen		2	965	.sheriffs & bailiffs		4
780	.misc. laborers(riggers)		7		.steward		1
	<u>Farming.....</u>	41	139	954	.welfare service aides		1
	.farmers & farm managers	9	43	935	.barbers		1
	.farm laborers	33	96				

For both 1962-63 and 1975-76 groups the occupational category incurring significantly more falls than any other is craftsmen, with 27% (155) in 1975-76 and 33.7% (1696) in 1962-63. Laborers (not farm) have the second largest incidence of falls with 16.3% (94 in 1975-76; 819 in 1962-63) of all male occupational falls for both groups. Construction Workers appear to be the most prone to falls (55 in 1975-76; 550 in 1962-63), followed closely by painters (49; and 427), carpenters (1; and 186), roofers & slaters (16; and 167), electric power linesmen and cablemen (9; and 108), structural metal craftsmen (steel and iron workers) (6; and 109), and farm laborers (33; and 96), and window washers (13; and 91). On the other hand, clerical categories have the least falls.

Among professional classifications entertainers (circus performers) and engineers have the most falls. In the Operator classification, driller, mine operators, and welders have the highest incidence of falls. Among transport workers, boatmen and railroad workers stand out; among sales categories salesmen fall most, and among administrative categories managers and administrators, building managers and superintendents, and construction inspectors have the highest incidence of falls for the sample population analyzed.

The following histograms in Figures 1-4 provide a more generalized comparison of occupational relationships in falls, to illustrate the differences in hazard incidence.

Figure 1 compares fall fatalities by occupational classification. The high proportions of fatal cases are probably due more to reporting bias in the original data rather than actual percentages. That is, fatal falls are more apt to be reported by the news media, while falls resulting in minor injury may not be reported at all. Nevertheless, since the same guidelines apply to each category, comparisons can be made between them. Craftsmen and laborers show a high proportion of fatal falls; while transportation equipment operators, sales, and

clerical do not have a large number of total falls, there is a higher than average proportion of reported fatal falls in these categories.

Summary relationships between occupational falls and incidence of fatality are shown in Figures 1-4.

A comparison of fatalities reported with occupational related falls for 1975-76 females is provided in Figure 2. For this group 33% of "occupational" falls, 45% of "home" falls, 46% of "other" falls, and 45% of "all" falls reported were fatal. Of the occupational falls reported, 100% were free-falls.

A review of 1962-63 females (Figure 3) shows that 34% of all falls reported were fatal, while 17% of "occupational," 35% of "home," and 38% of "other" falls were fatal. For these data 79% of the occupational falls were free-fall, and 71% of all of the falls reported were free-falls.

FIG. 1. Occupational Falls of Males in the 1975-76
Population by Major Job Classifications

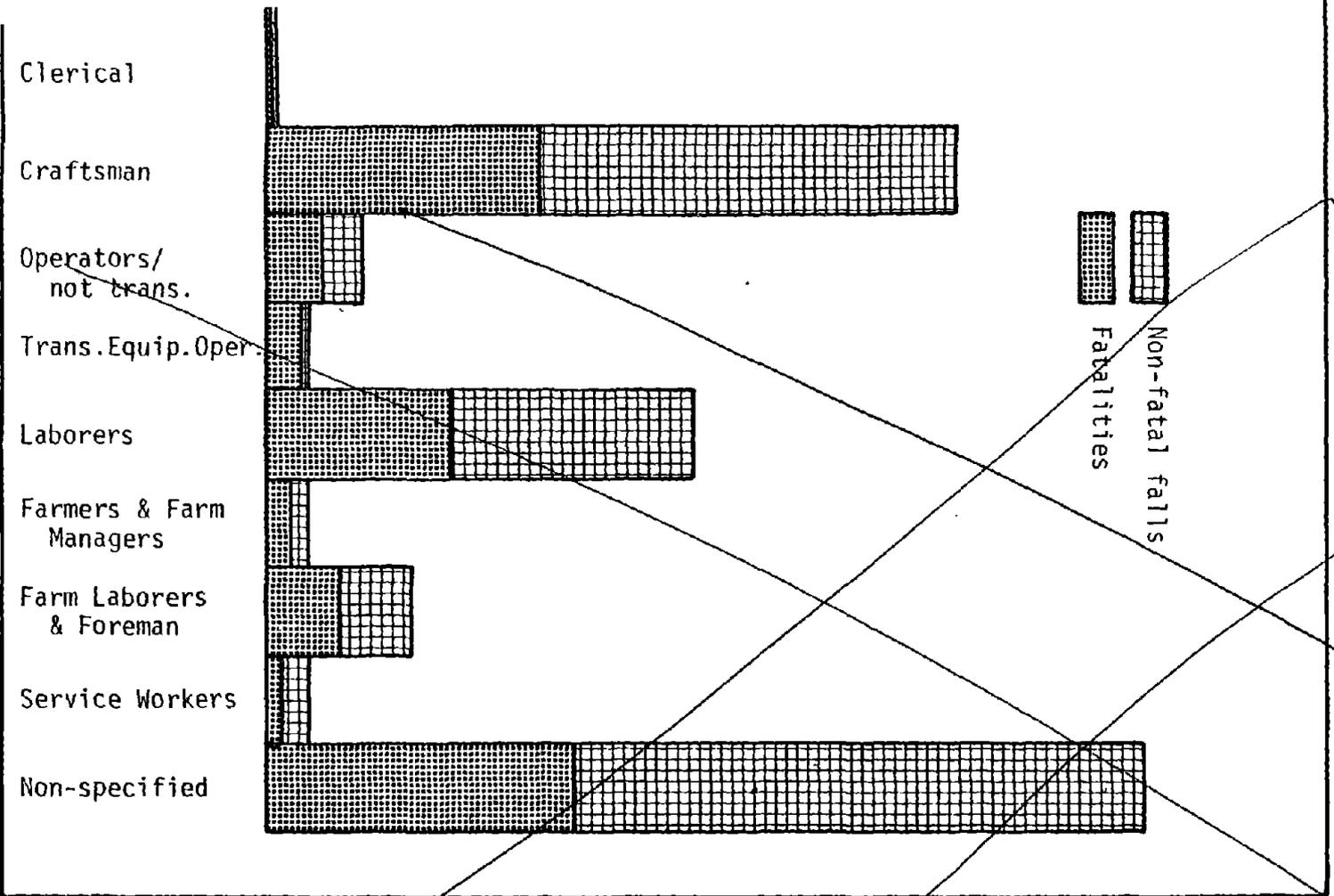


FIGURE 1. Occupational Falls of Males in the 1975-76 Population by Major Job Classifications

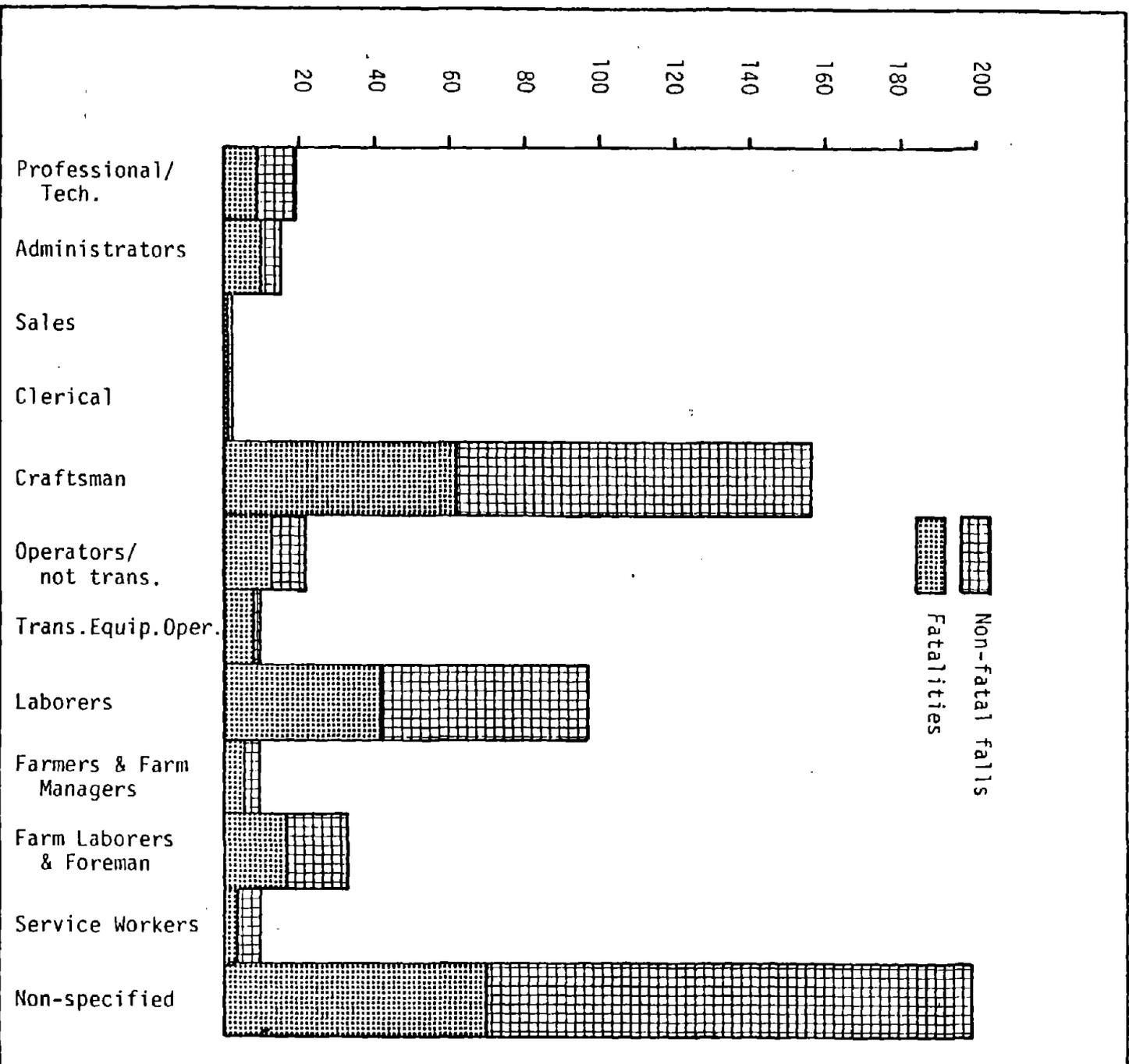


FIGURE 2. Summary Statistics for 1976-1976 Males Comparing Fatalities in Occupational Falls Reported

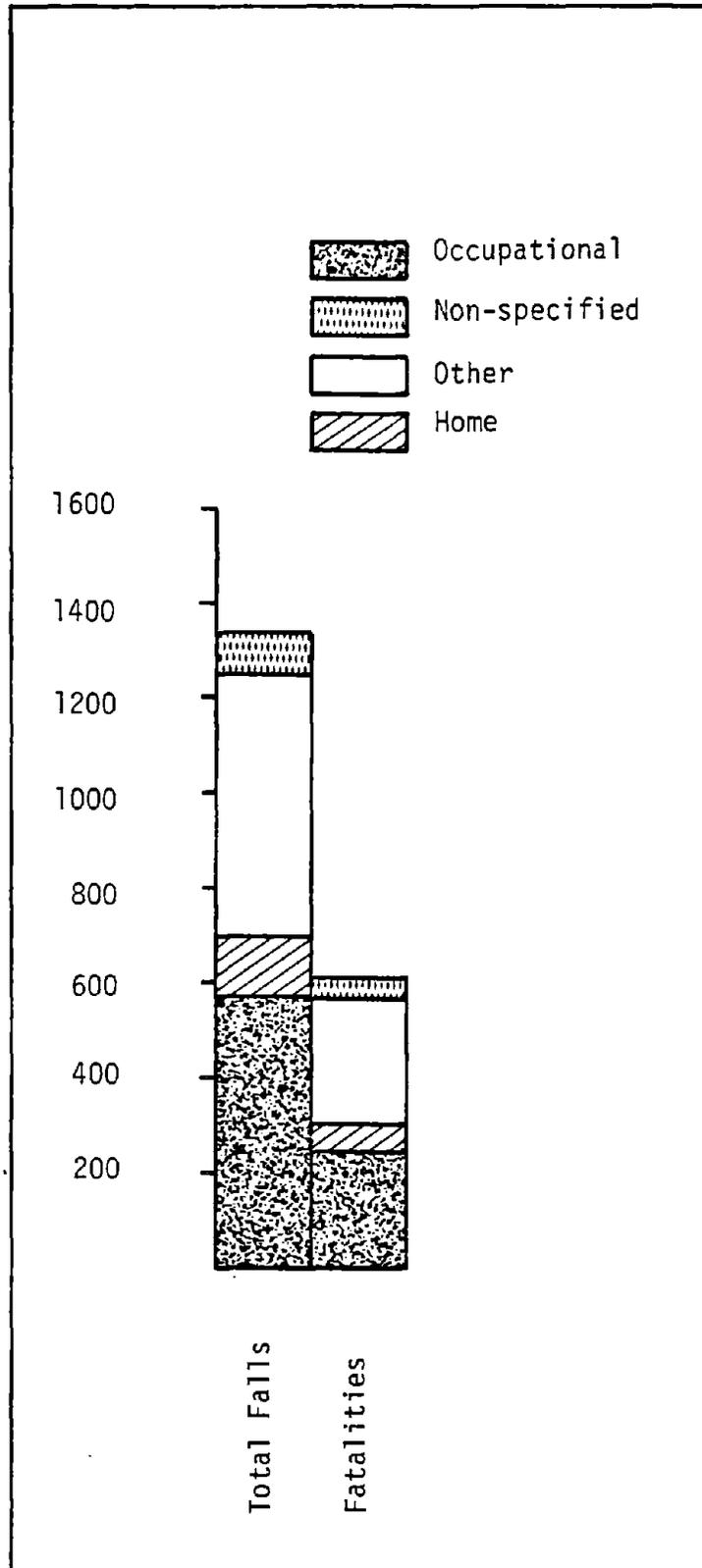


FIGURE 3. Summary Statistics for 1975-1976 Females Comparing Fatalities in Occupational Falls Reported

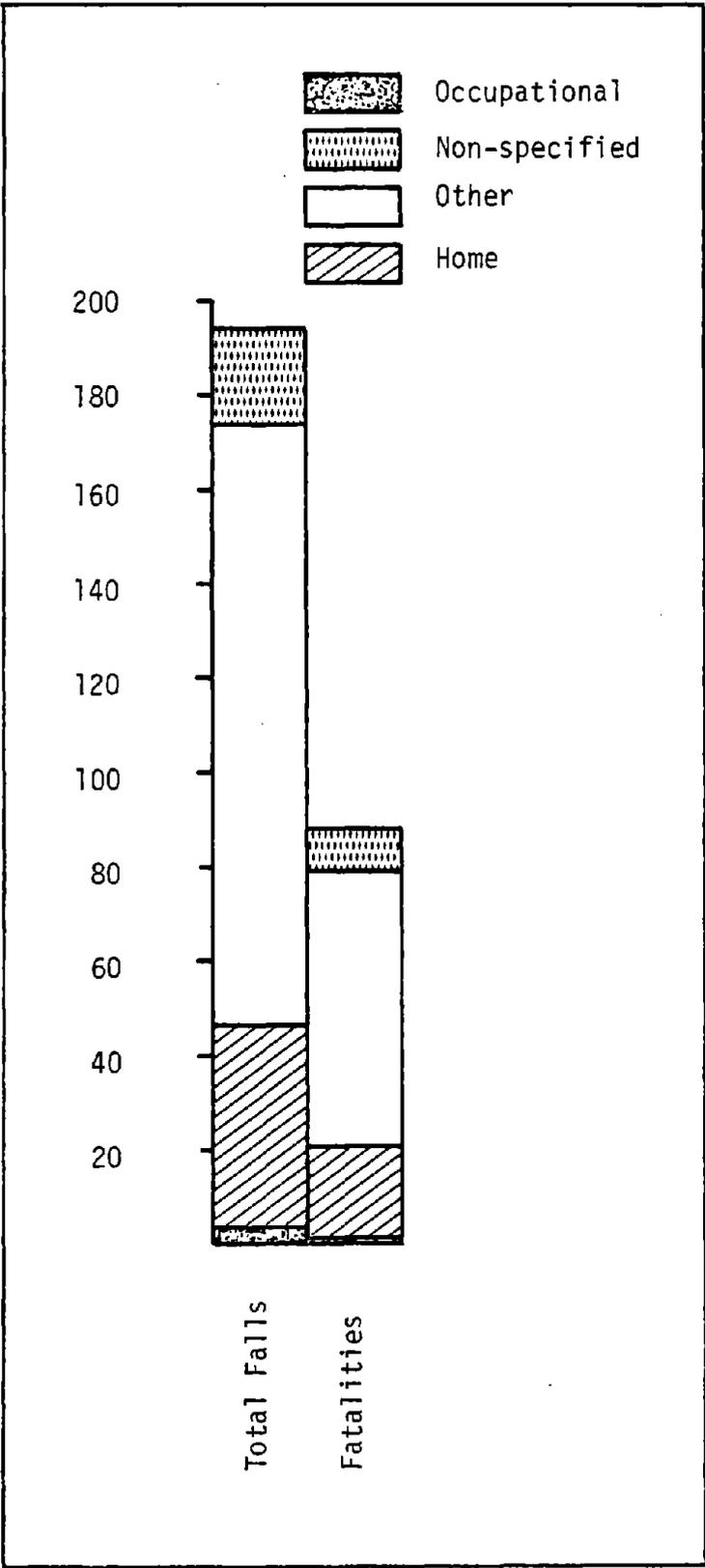


FIGURE 4. Summary Statistics for 1962-1963 Females Comparing Fatalities in Occupational Falls Reported

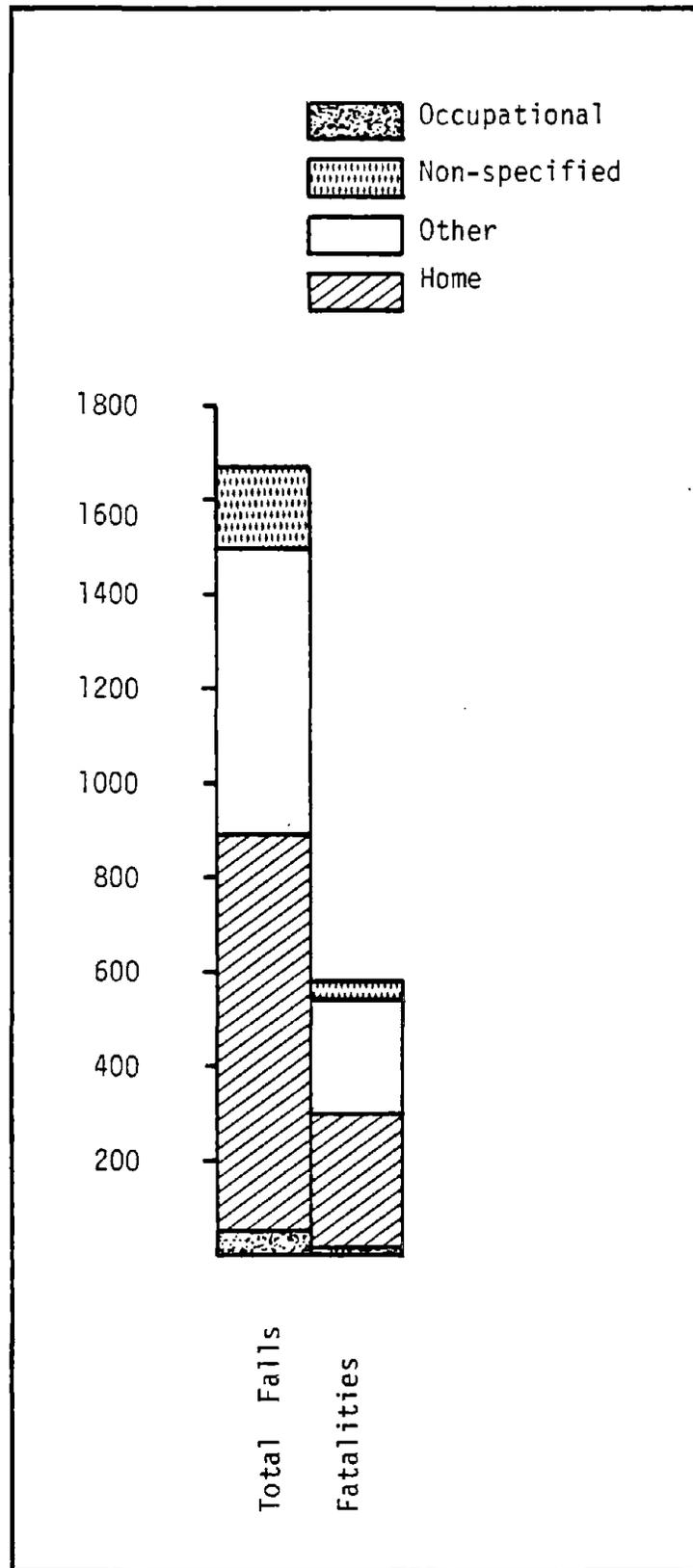
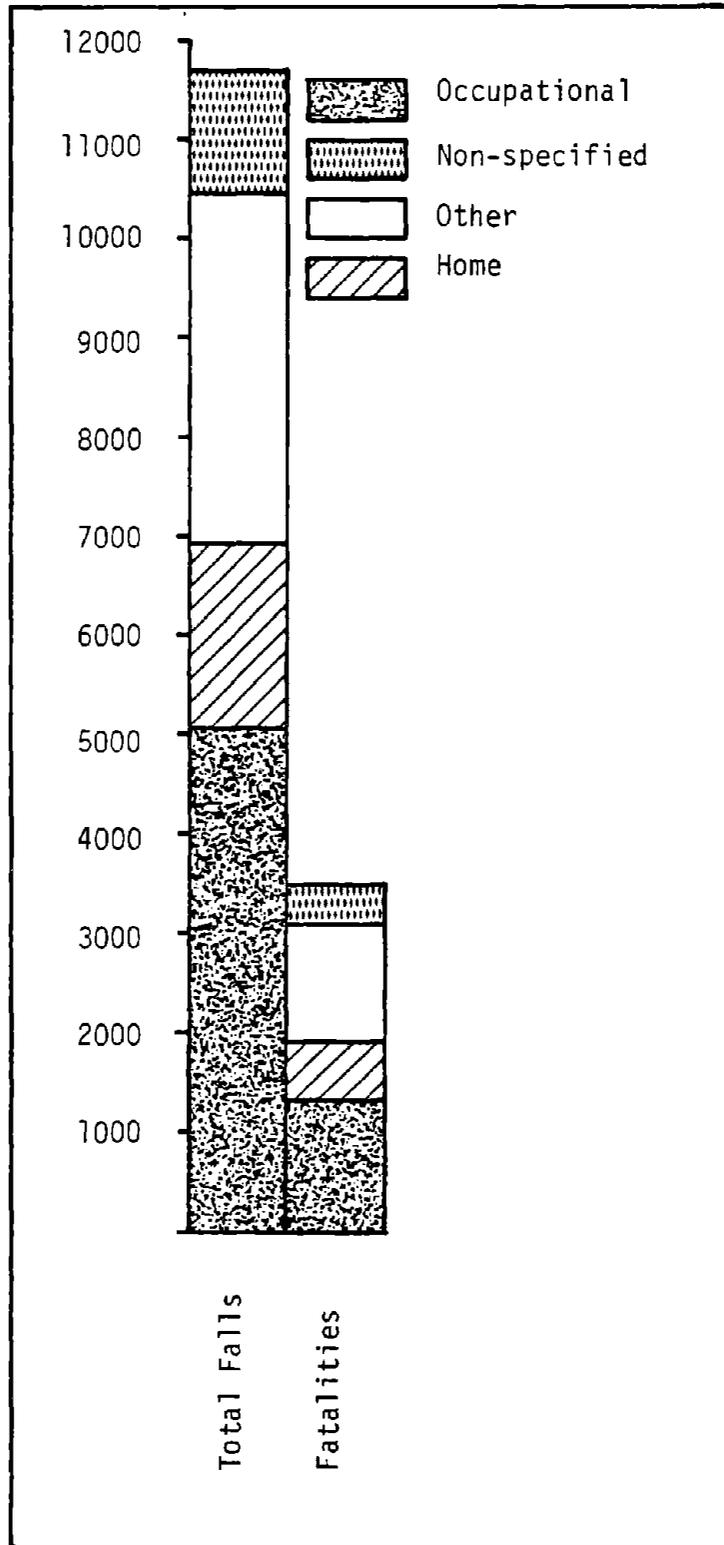


FIGURE 5. Summary Statistics for 1962-63 Males
Comparing Fatalities in Occupational Falls Reported



For 1975-76 males, 42.6% of "occupational" falls, 54.3% of "home" falls, 45.6% of "other" falls, and 45.2% of "all" falls reported were fatal. Note that 99.3% of the occupational falls for this group involved free-falls.

2. Age Distribution

Age has generally been associated with fall incidence as well as fatalities. A breakdown of 14,828 individuals from the 1962-63 and 1975-76 studies is provided in Table IV, relative to age distribution. When the males and females are lumped it is apparent that the highest incidence of falls, 50.8%, for these population samples occurs between ages 29-59 years. For ages under 29 years one-third of the falls occurred, and for fall ages 59 or over, only 15.9% occurred. Half of the total falls occurred in the 30 year period of life between 29 and 59 years, and as has been indicated previously there appears to be a strong occupational relationship.

TABLE IV. Age Distribution in Falls

Age in Years	1962-63 Males		1975-76 Males		1962-63 Females		1975-76 Females		Totals	
	No.	%	No.	%	No.	%	No.	%	No.	%
14-19	1152	9.9	200	15.2	257	15.4	57	27.9	1676	11.3
19-24	1274	10.9	305	23.2	163	9.7	50	24.5	1792	12.1
24-29	1090	9.4	195	14.9	138	8.3	28	13.7	1451	9.8
29-34	1039	8.9	101	7.7	139	8.3	15	7.4	1294	8.7
34-39	1150	9.9	93	7.1	117	7.0	7	3.4	1367	9.2
39-44	1146	9.8	93	7.1	120	7.2	7	3.4	1366	9.2
44-49	1022	8.8	74	5.6	130	7.8	11	5.4	1237	8.3
49-54	1005	8.6	77	5.9	122	7.3	4	2.0	1208	8.1
54-59	893	7.7	50	3.8	126	7.5	11	5.4	1080	7.3
59-64	789	6.8	54	4.1	114	6.8	5	2.5	962	6.5
64-69	546	4.7	31	2.4	92	5.5	2	1.0	671	4.5
69-74	402	3.5	26	2.0	101	6.0	5	2.5	534	3.6
74-75	122	1.0	13	1.0	53	3.2	2	1.0	190	1.3
Totals	11,640		1,312		1,672		204		14,828	

However, some age differences in fall incidence appear when falls incurred by males are compared with female falls. There are also differences between the 1962-63 and 1975-76 populations, although the earlier population is a much larger group. Among females 45.1% of falls occurred in the middle-aged (29-59) for the 1962-63 population; however, only 26.9% occurred during these years for the 1975-76 females; while 66.1% of the 1975-76 female falls occurred under age 29. Similarly, while 21.5% of the falls of 1962-63 females involved those aged 59 or over, only 7.0% of the 1975-76 female falls were in this older age bracket.

These differences between the 1962-63 and 1975-76 females are also observed in comparison of males for these two groups, 53.8% of the 1962-63 male falls occurring to those aged between 29 and 59 years, against only 37.2% in this age range for the 1975-76 males. While 30.2% of the 1962-63 males were under age 29, 53.3% of the 1975-76 males were in this age range. Of interest also is the finding that 16.0% of the 1962-63 males were over age 59 at the time of the fall, compared to only 9.5% in the 1975-76 group. While the explanation may be accounted for by a difference in sample size between the two groups, these data indicate substantial differences between fall age distribution in the two time periods sampled and could suggest trend changes.

The relationship between age and fatality is shown in Table V. Data for both males and females in the 1962-63 population indicate that fatalities increase with age. For example, of the 1962-63 males falling at ages 14-19, 15.4% of the reported falls were fatal; yet this steadily increased to 54.1% fatalities for 74-75 year olds. The pattern for 1975-76 females was unclear and this is attributed to the relatively small (91) sample number. The 1975-76 males, in contrast to the earlier group, started out with 98% fatalities reported at ages 14-19, generally decreasing to 38.1% at ages 39-44, and then increasing to 61.5% at ages 74-75. Thus there is a significant difference between the two groups as well as between the sexes.

TABLE V. Fatality by Age Group

Age in Years	1962-63 males		1975-76 males		1962-63 females		1975-76 females	
	fatalities	% fatal	fatalities	% fatal	fatalities	% fatal	fatalities	% fatal
14-19	179	15.4	59	98.0	30	11.7	12	21.0
19-24	296	23.2	140	96.1	37	22.7	28	56.0
24-29	262	24.0	90	99.0	41	29.7	11	39.0
29-34	248	23.9	48	45.7	61	43.9	6	40.0
34-39	296	25.7	41	42.7	47	40.2	5	71.4
39-44	337	29.3	37	38.1	43	35.8	4	57.1
44-49	303	29.6	34	43.6	54	41.5	4	36.4
49-54	324	32.2	43	55.8	50	41.0	2	50.0
54-59	360	40.3	36	61.0	55	43.7	7	63.6
59-64	342	43.4	38	66.7	55	48.2	5	100.0
64-69	241	44.1	19	61.3	44	47.8	2	100.0
69-74	197	49.0	19	73.0	41	40.6	3	60.0
74-75	66	54.1	8	61.5	22	41.5	2	100.0
Totals	3451		612		580		91	

Comparison of occupationally related falls by sex and age groups for both the 1962-63 and 1975-76 data bases are shown in the following Figures (6 - 9).

FIGURE 6. Relationship of Falls by Age Group and Occupation for 1962-63 Females

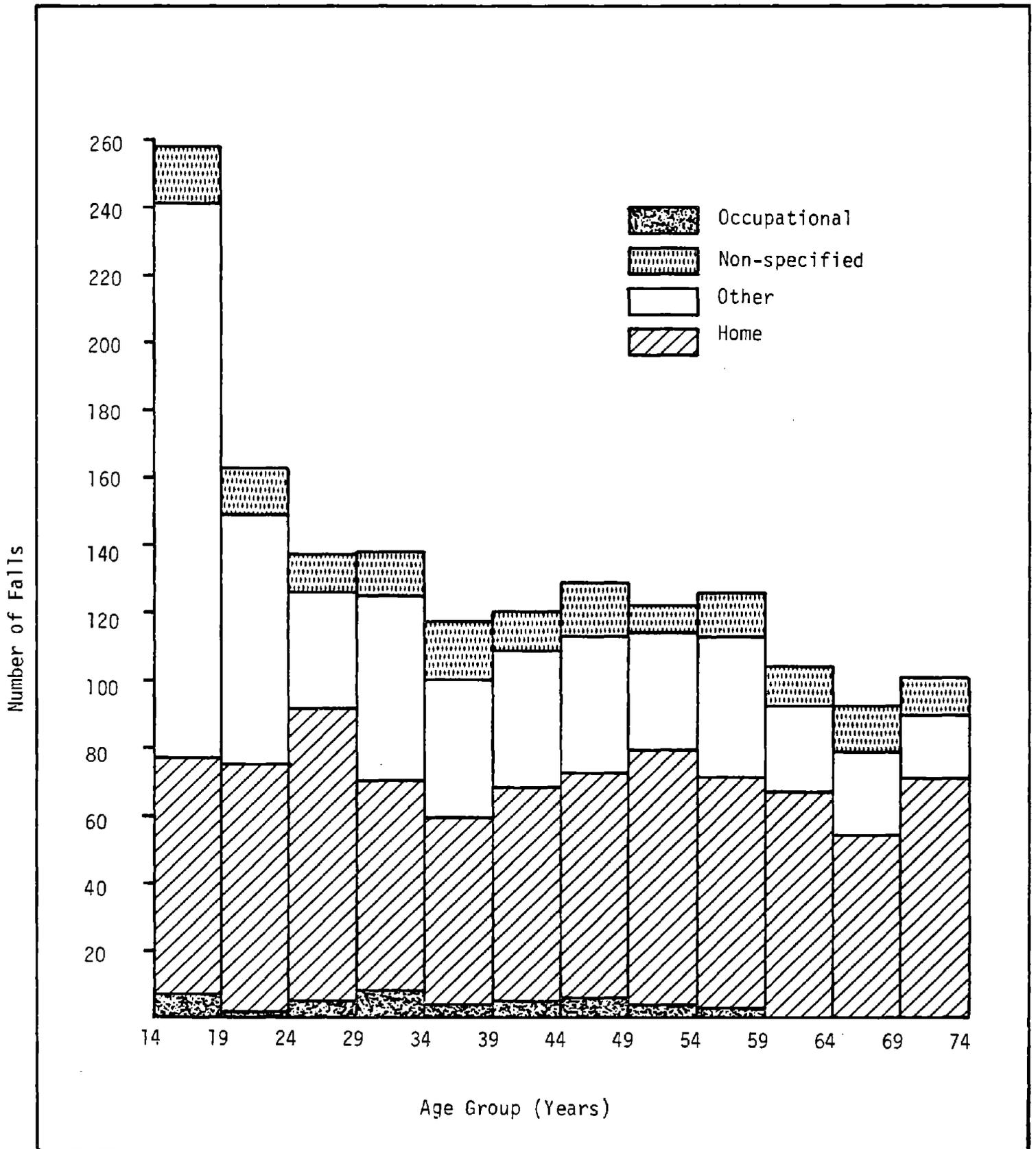


FIGURE 7. Relationship of Falls by Age Group and Occupation for 1962-63 Males

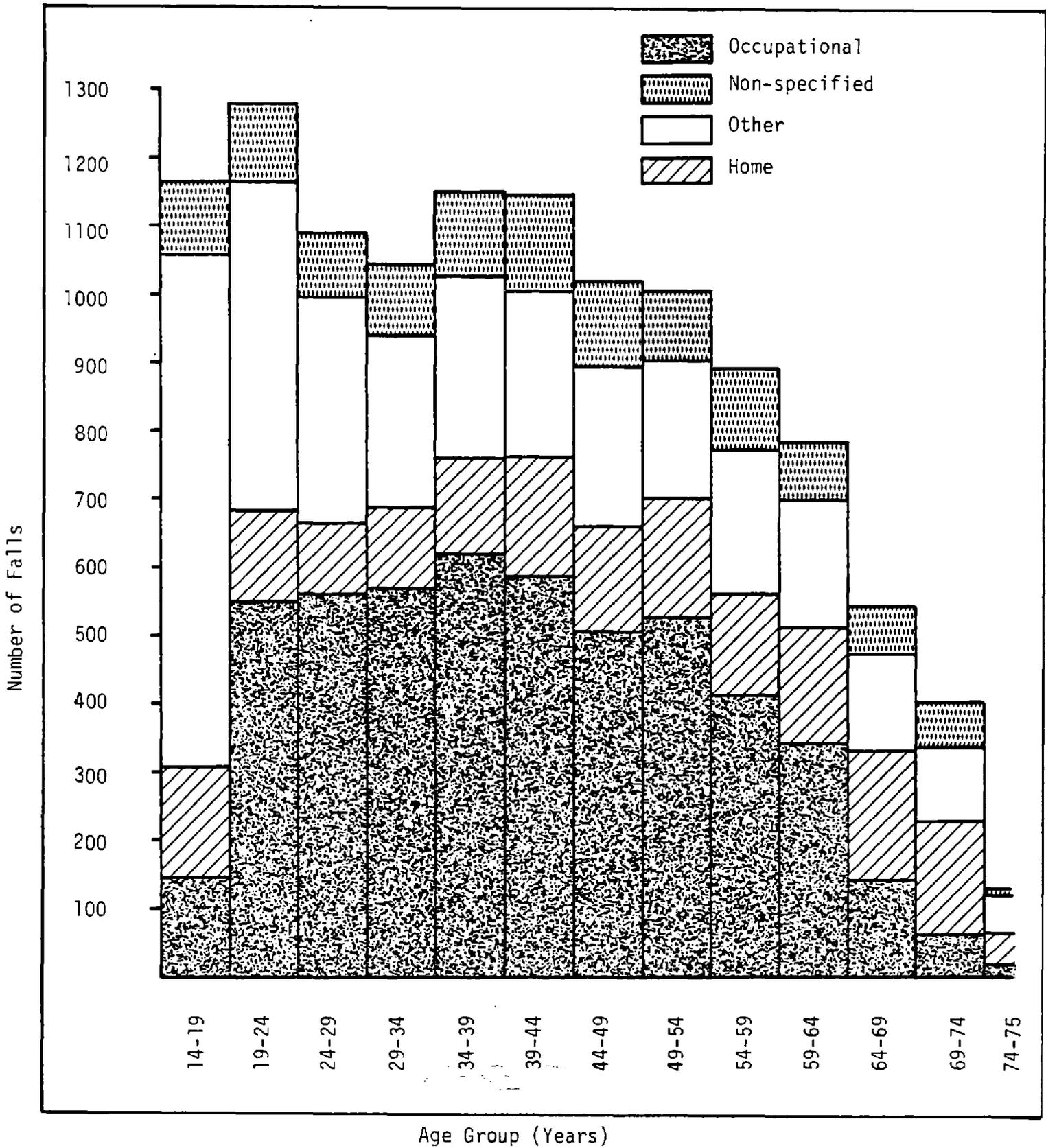


FIGURE 8. Relationship of Falls by Age Group and Occupation for 1975-76 Females

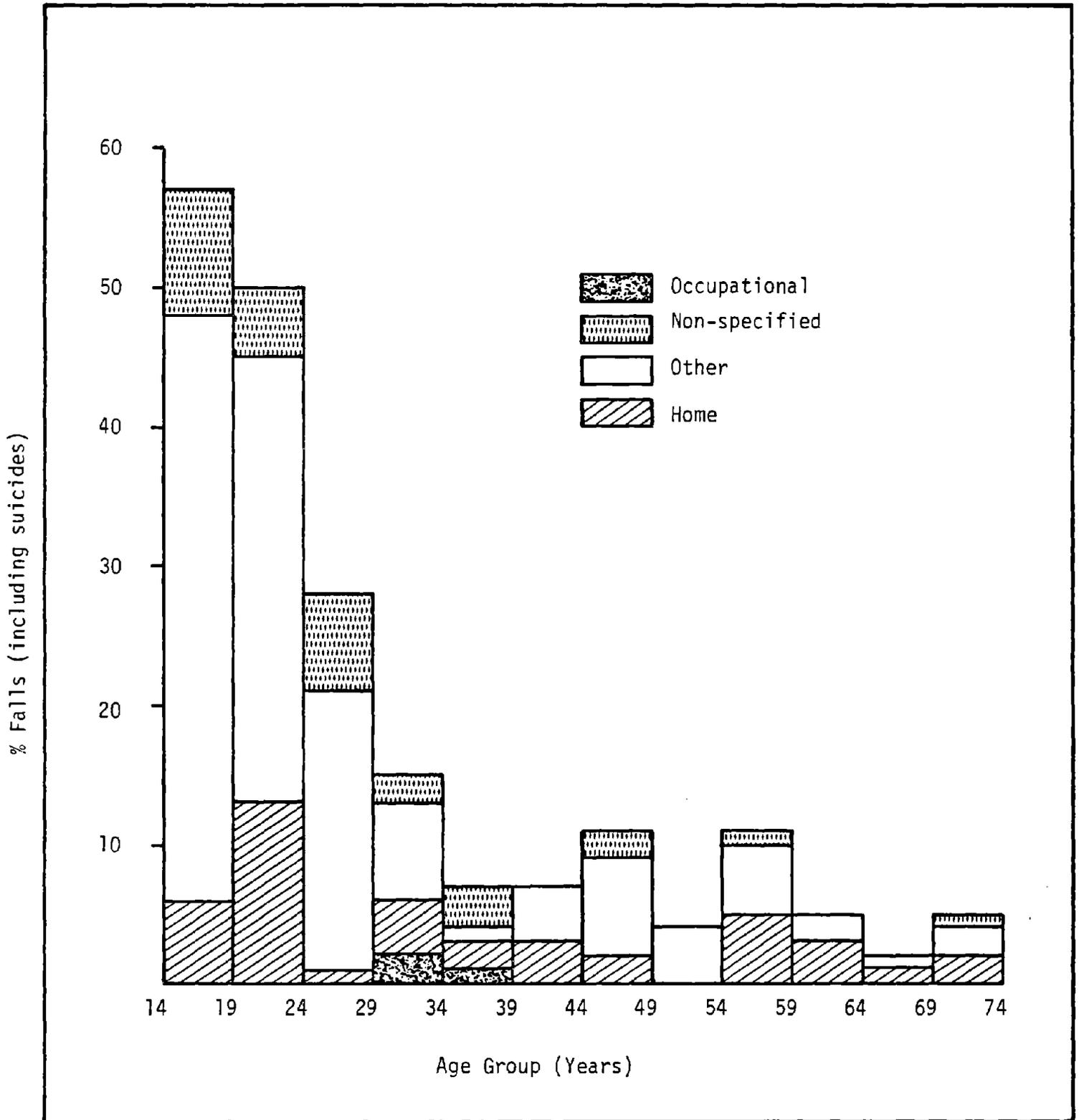
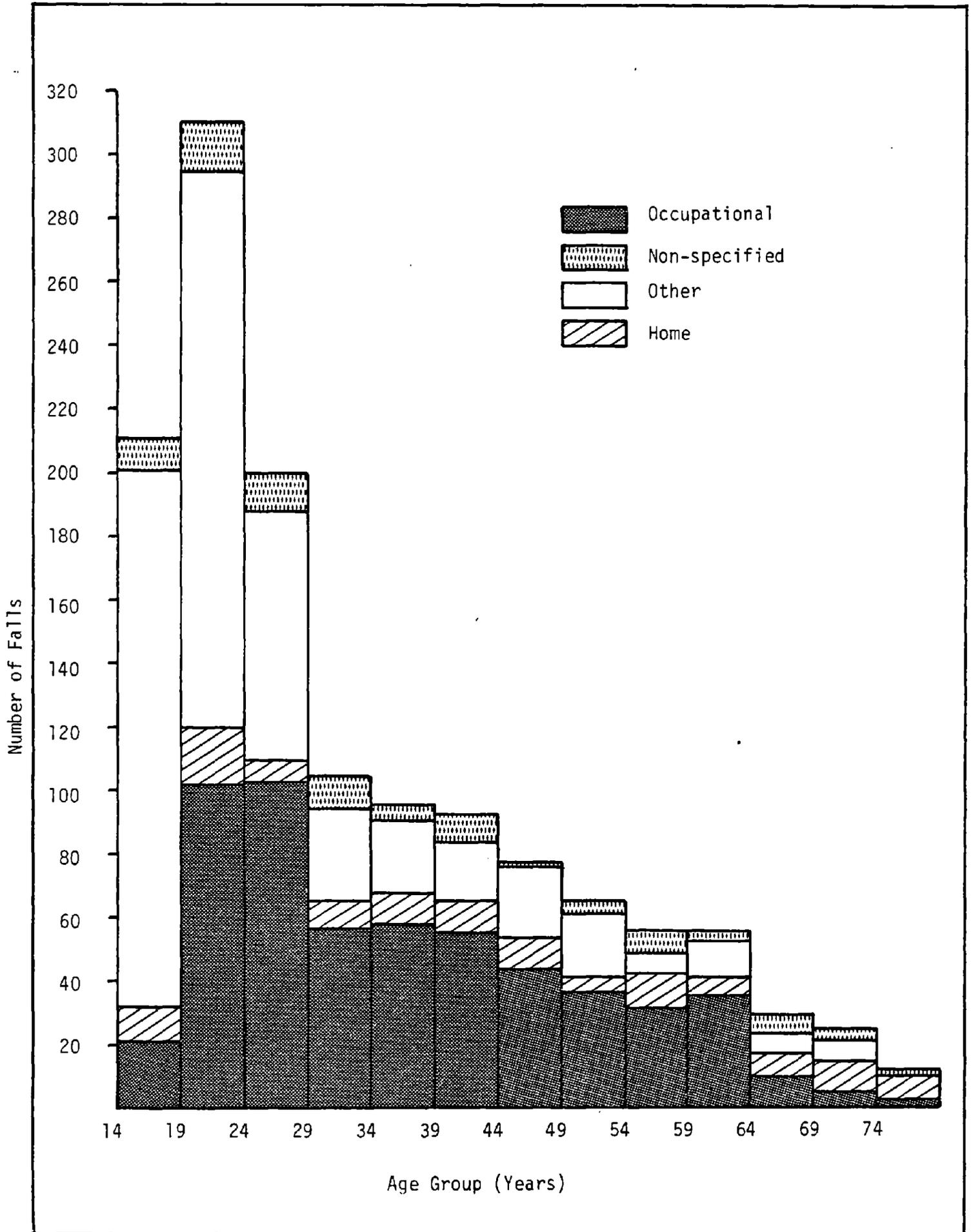


FIGURE 9. Relationship of Falls by Age Group and Occupation for 1975-76 Males



Occupationally related falls for women appear to be a relatively minor proportion of the total falls for each age group, while falls in the home appear to be a significant factor. Again the 1975-76 female data base appears to be too small for meaningful comparison.

On the other hand, Occupationally related falls incurred by males are of major importance and form a significant proportion of the falls in both the 1962-63 and 1975-76 populations. From ages 19 to 44, the 1962-63 population shows a leveling off (with a peak at ages 34-39 years), a slow decline to age 64, and a more rapid decline thereafter, reflecting that many males are working well past age 65 and often into the 70's and 80's. Note the contrast with 1962-63 females, where no occupationally related falls are shown past age 60. A somewhat different relationship between occupation and age of males who fall is shown in the 1975-76 population, with a more rapid drop-off from age 29.

3. Geographic Comparisons

The fall cases were tabulated by nine geographic regions, after the system utilized by the HEW in Vital Statistics of the United States, 1973.

Geographic distribution of these falls was found to be very similar for both males and females in the 1962-63 population, with a significantly greater number of falls occurring in the Middle Atlantic states (New York, New Jersey, Pennsylvania), followed by East North Central (Ohio, Indiana, Illinois, Michigan, Wisconsin) and Pacific (California, Washington, Oregon, Alaska, and Hawaii). The fewest falls were reported in the East South Central (Kentucky, Tennessee, Alabama, and Mississippi) area. These data are detailed in the histograms in the following Figures (10 - 13).

The 1975-76 population, as shown in Figures 11 and 13 showed some geographic changes in incidence of reported falls. While the female data were relatively the same as for 1962-63 females (Figure 10), there was a significant rise in the number of falls reported in the Pacific region. When the 1962-63 male data are examined (Figure 12) even greater differences are noted, with the Mid-Atlantic states being challenged by both the East North Central and Pacific regions for greatest number of falls in the 1975-76 data.

FIGURE 10. Falls of Females By Geographic Region in 1962-63

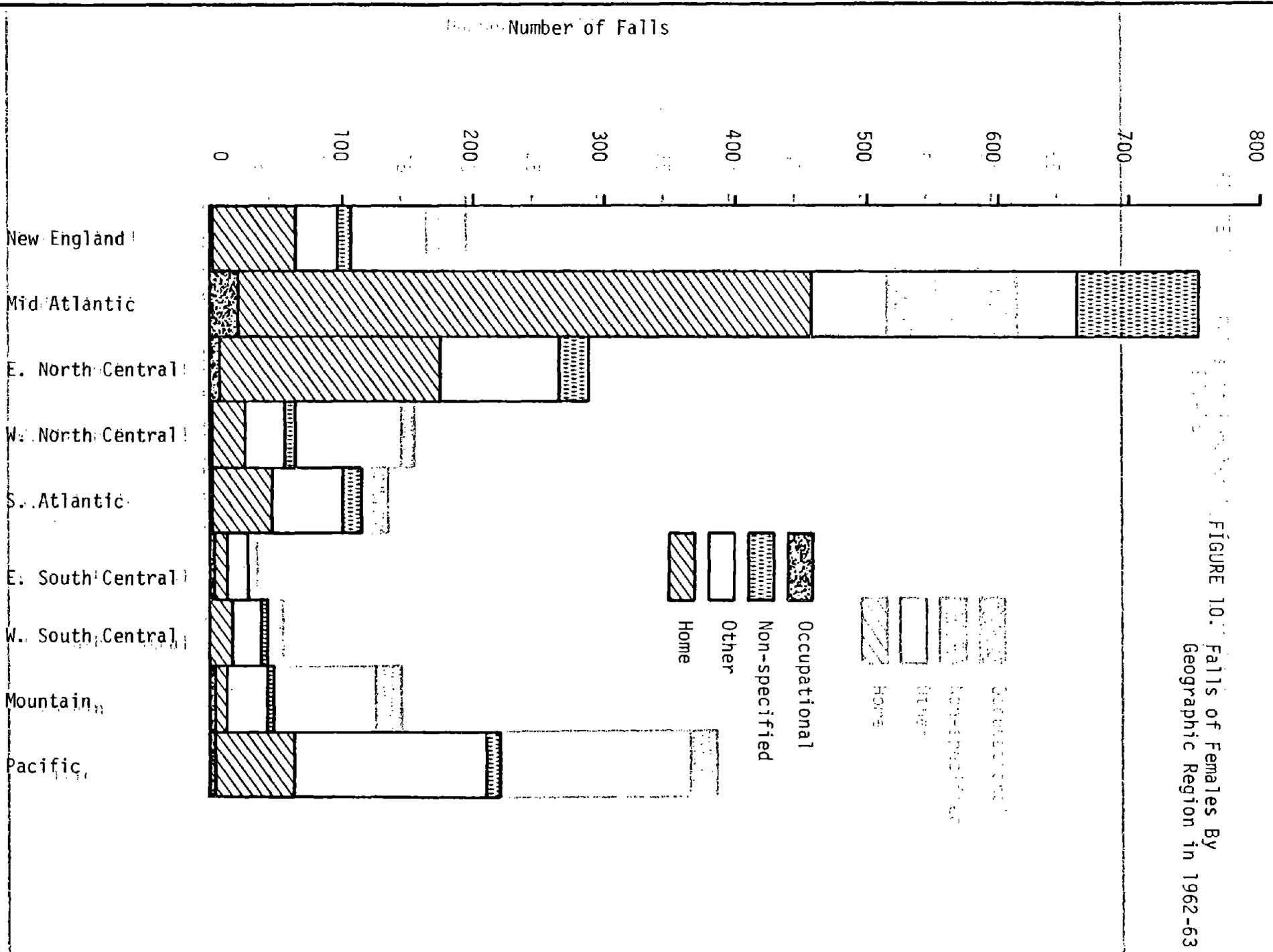


FIGURE 11. Falls of Females By Geographic Region in 1975-76

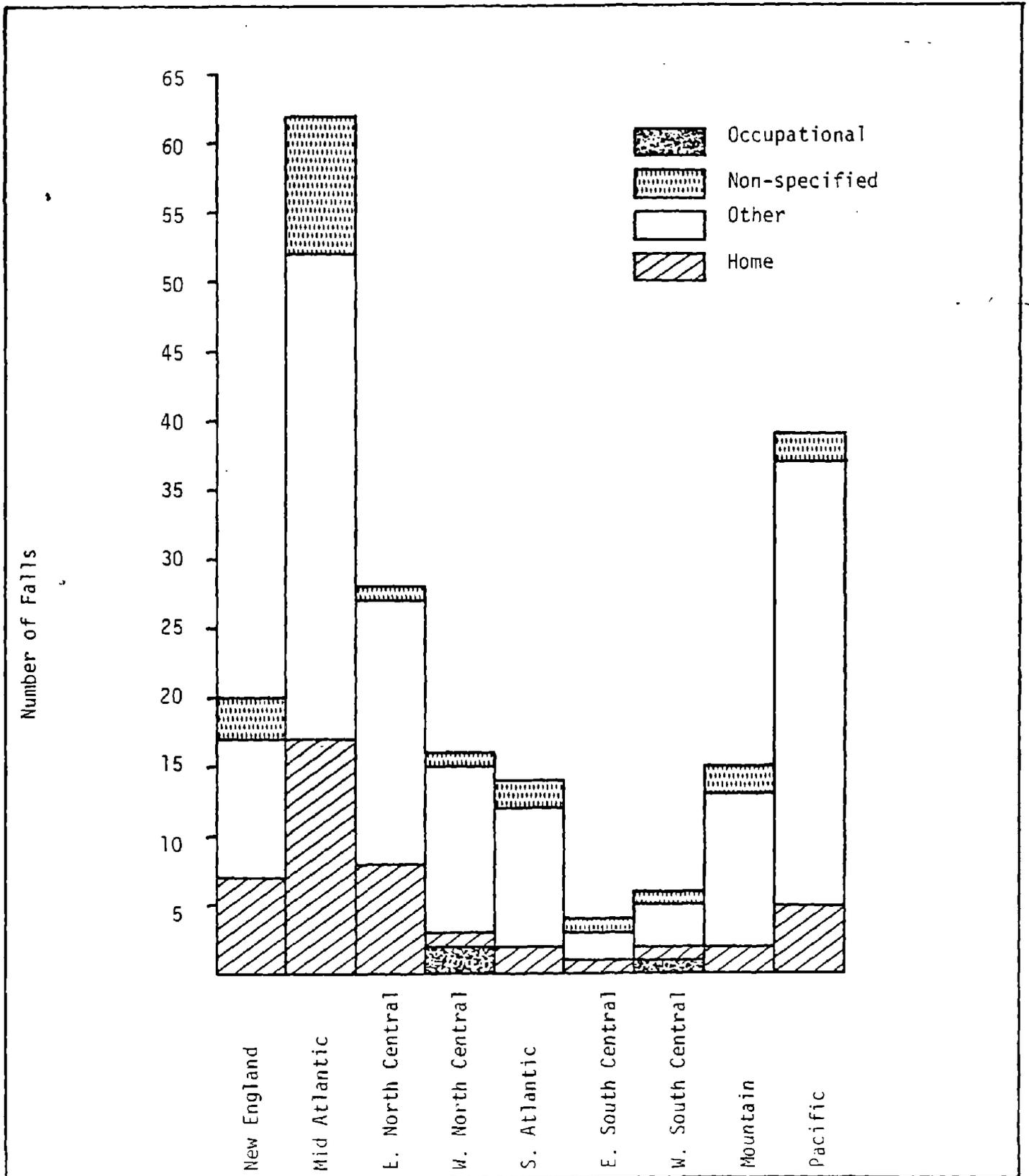


FIGURE 12. Falls of Males by Geographic Region in 1962-63

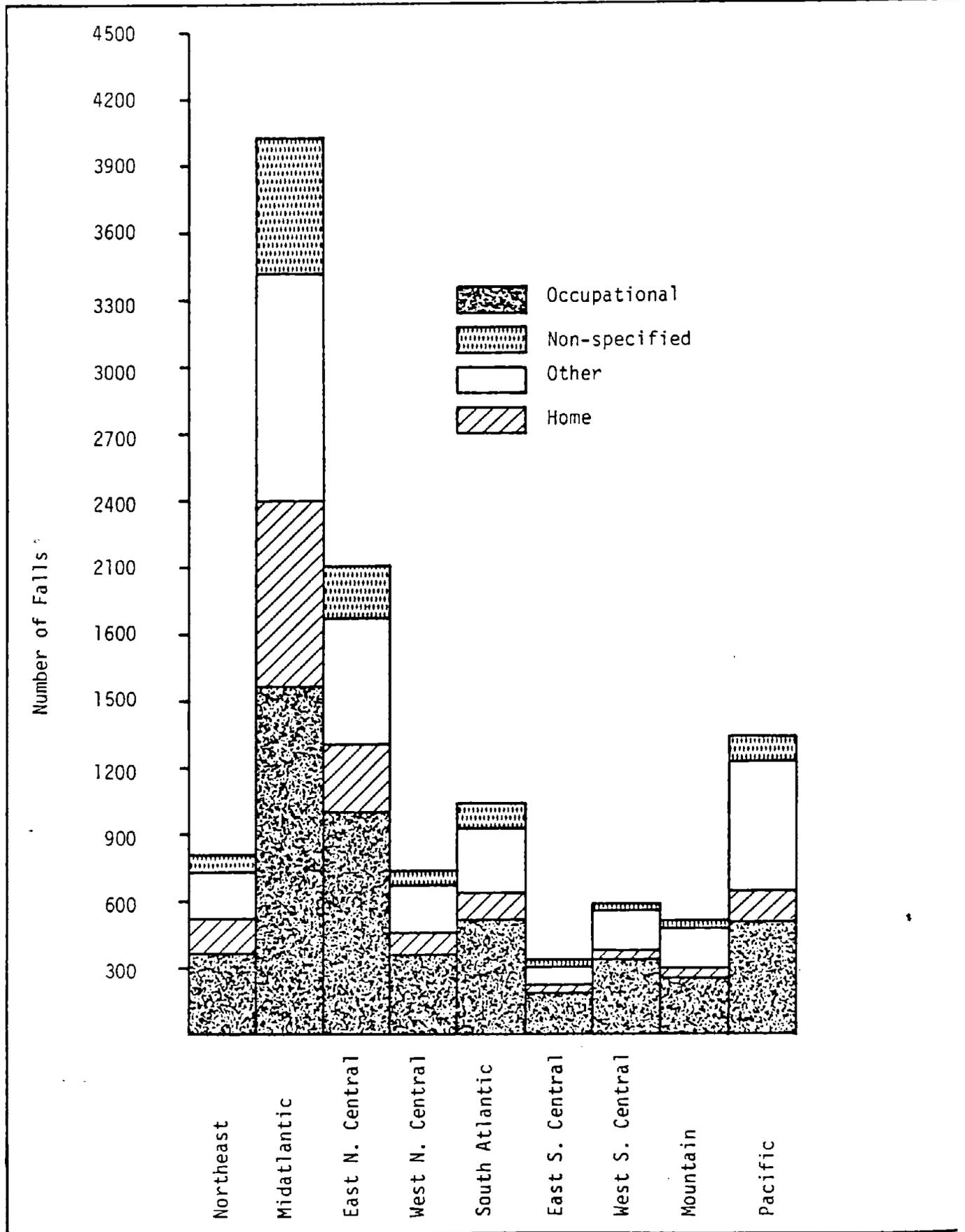
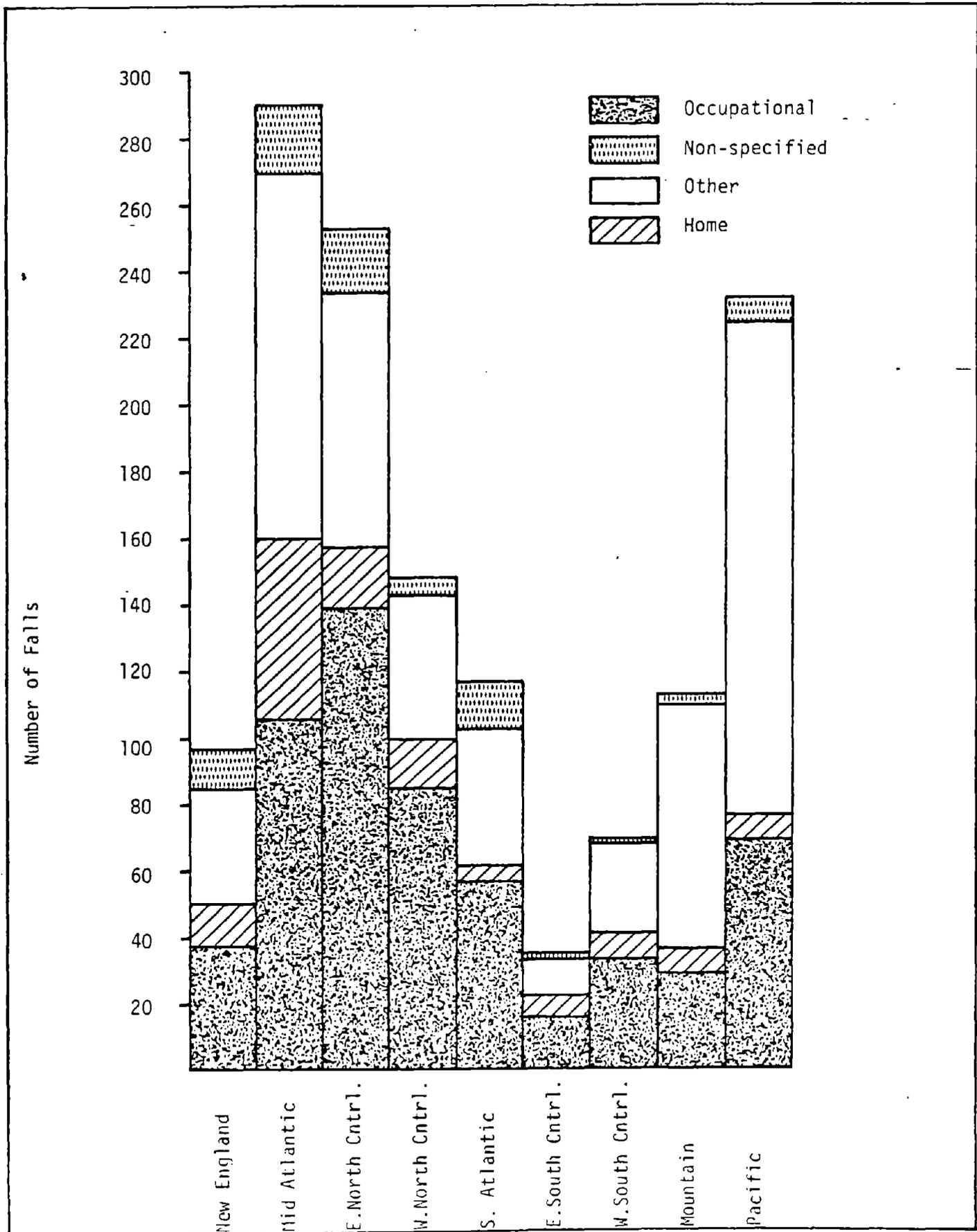


FIGURE 13. Falls of Males By Geographic Region For 1975-76



Tables VI and VII provide comparison of the 1962-63 fall data by geographic region and also in reference to incidence which could be identified as job-related falls.

TABLE VI. Comparison of 1962-63 Female Falls By Geographic Region as Related to Occupation

Region	Occupational	Home	Other	Non-Specified	Total
New England	3	62	31	12	108
Mid Atlantic	21	438	201	93	753
E. North Central	8	167	90	24	289
W. North Central	2	26	29	6	63
S. Atlantic	2	47	52	14	115
E. South Central	3	11	15	0	29
W. South Central	0	19	20	4	43
Mountain	3	10	32	5	50
Pacific	4	62	147	9	222
Totals	46	842	617	167	1672

TABLE VII. Comparison of 1962-63 Male Falls By Geographic Region as Related to Occupation

Region	Occupational	Home	Other	Non-Specified	Total
New England	344	153	212	95	804
Mid Atlantic	1541	883	1082	580	4086
E. North Central	986	350	562	208	2106
W. North Central	378	99	221	61	759
S. Atlantic	503	143	319	115	1080
E. South Central	196	30	90	20	336
W. South Central	337	44	161	34	576
Mountain	238	44	188	31	501
Pacific	508	145	631	108	1392
Totals	5031	1891	3466	1252	11,640

TABLE VIII. Comparison of 1975-76 Female Falls by Geographic Region as Related to Occupation

Region	Occupational	Home	Other	Non-Specified	Total
New England	0	7	10	3	20
Mid Atlantic	0	17	35	10	62
E. North Central	0	7	20	1	28
W. North Central	2	1	12	1	16
S. Atlantic	0	2	10	2	14
E. South Central	0	0	3	1	4
W. South Central	1	1	3	1	6
Mountain	0	2	11	2	15
Pacific	0	7	30	2	39
Totals	3	44	134	23	204

TABLE IX. Comparison of 1975-76 Male Falls by Geographic Region as Related to Occupation

Region	Occupational	Home	Other	Non-Specified	Total
New England	38	11	34	13	96
Mid Atlantic	115	52	109	22	298
E. North Central	137	19	76	19	251
W. North Central	83	14	44	5	146
S. Atlantic	53	6	41	14	114
E. South Central	17	5	12	1	35
W. South Central	35	7	28	1	71
Mountain	27	7	71	3	108
Pacific	70	6	152	7	235
Totals	575	127	567	85	1354

4. Seasonal Analysis of Falls

Since it was of interest to determine whether there are seasonal trends to falls this has been broken down by month of occurrence in the following tables. Note that for males and females there are similar trends, with the period April through August being peak fall months. However, the peak month for 1975-76 females was May, for 1962-63 was August, while the peak month for 1975-76 males was July. The least number of falls for both males and females occurred in December for all groups. No breakdown was made of seasonal variation by geographic region, which would be expected to vary somewhat. However, the occupational relationship with seasons is also presented as follows. The occupational-related falls appeared to follow the same general seasonal trends as total falls for each category. (Figures 14 - 17)

FIGURE 14. Seasonal Variation in Falls for 1962-63 Females

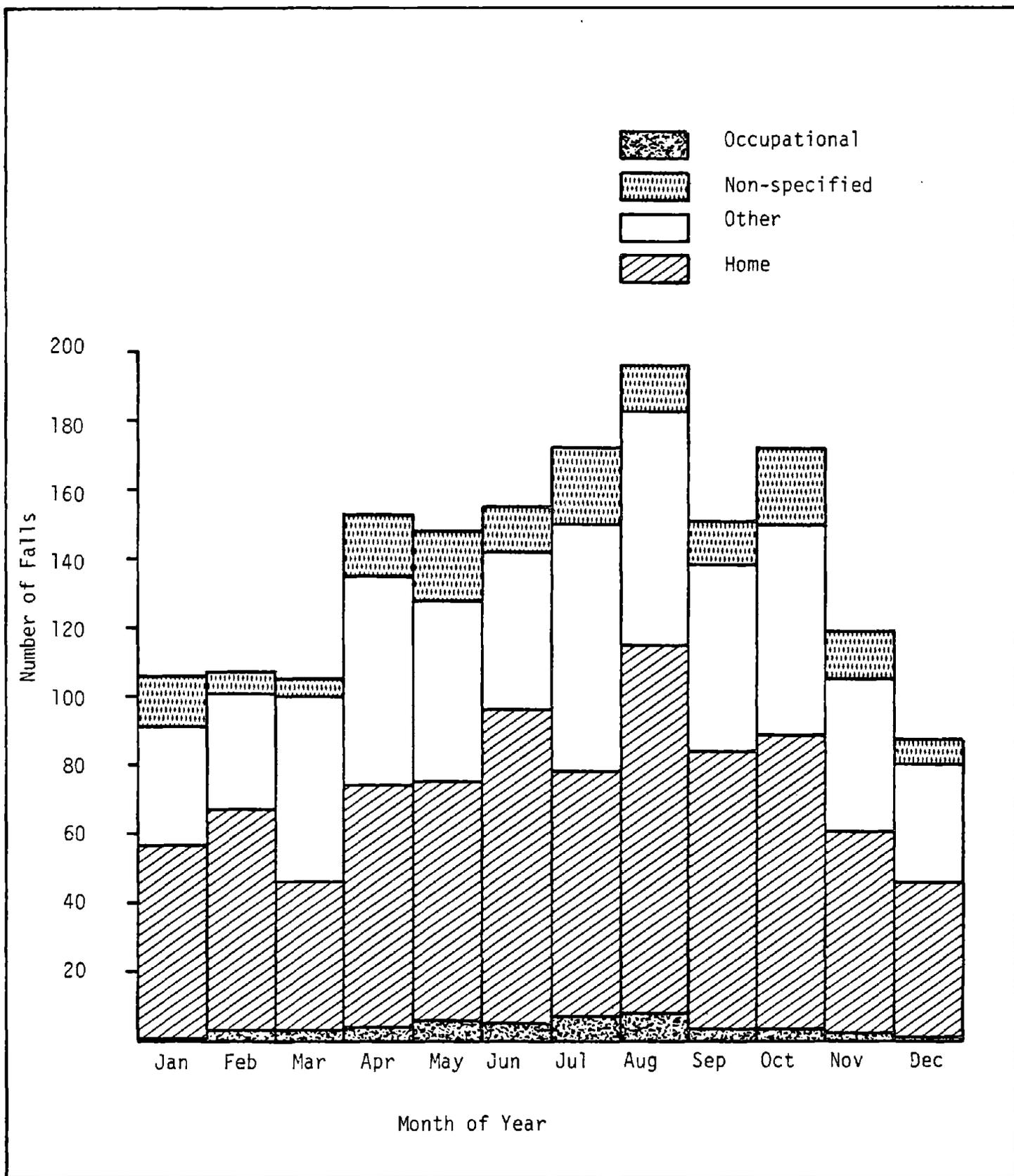


FIGURE 15. Seasonal Variation in Falls for 1962-63 Males

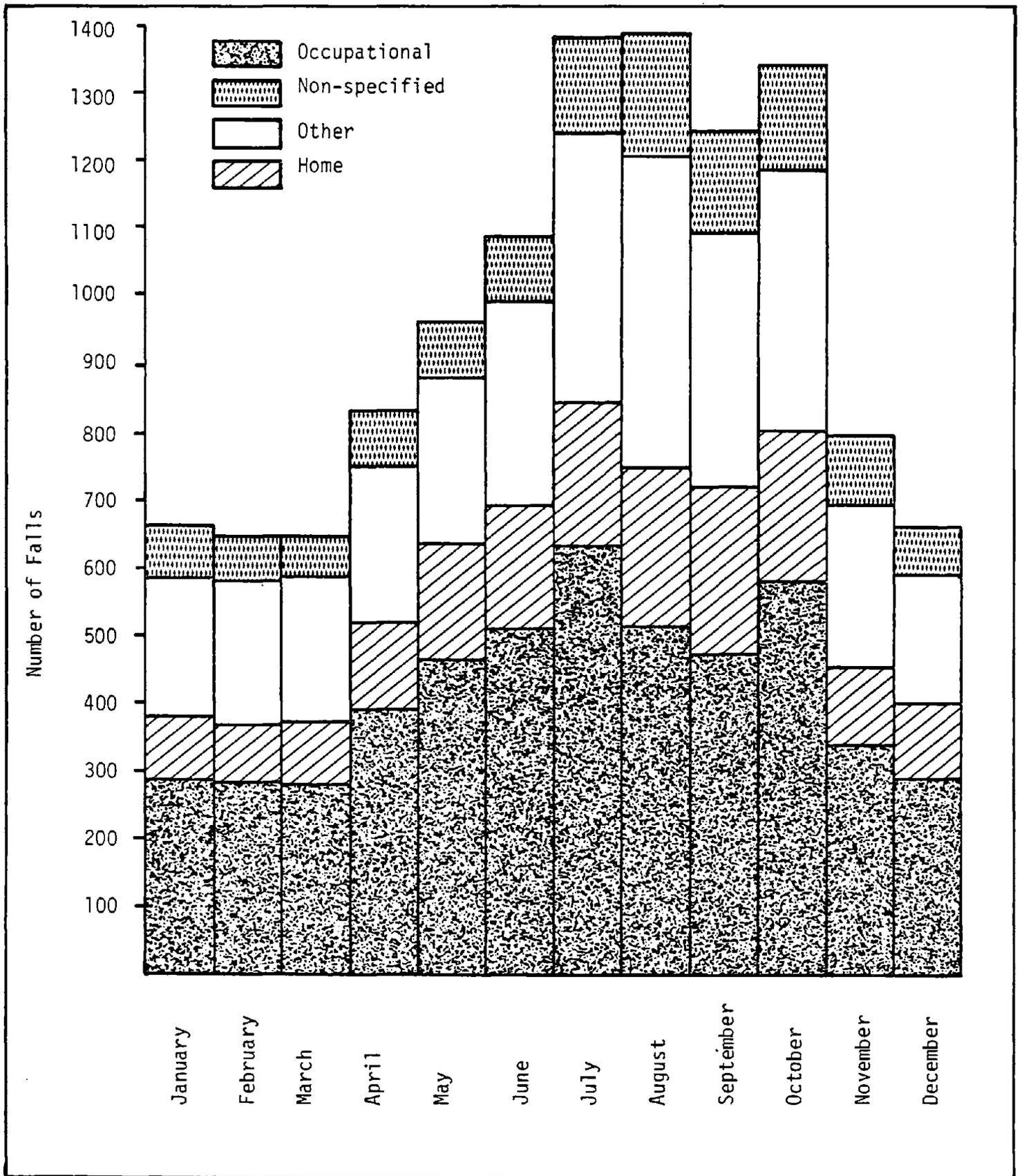


FIGURE 16. Seasonal Variation in Falls for 1975-76 Females

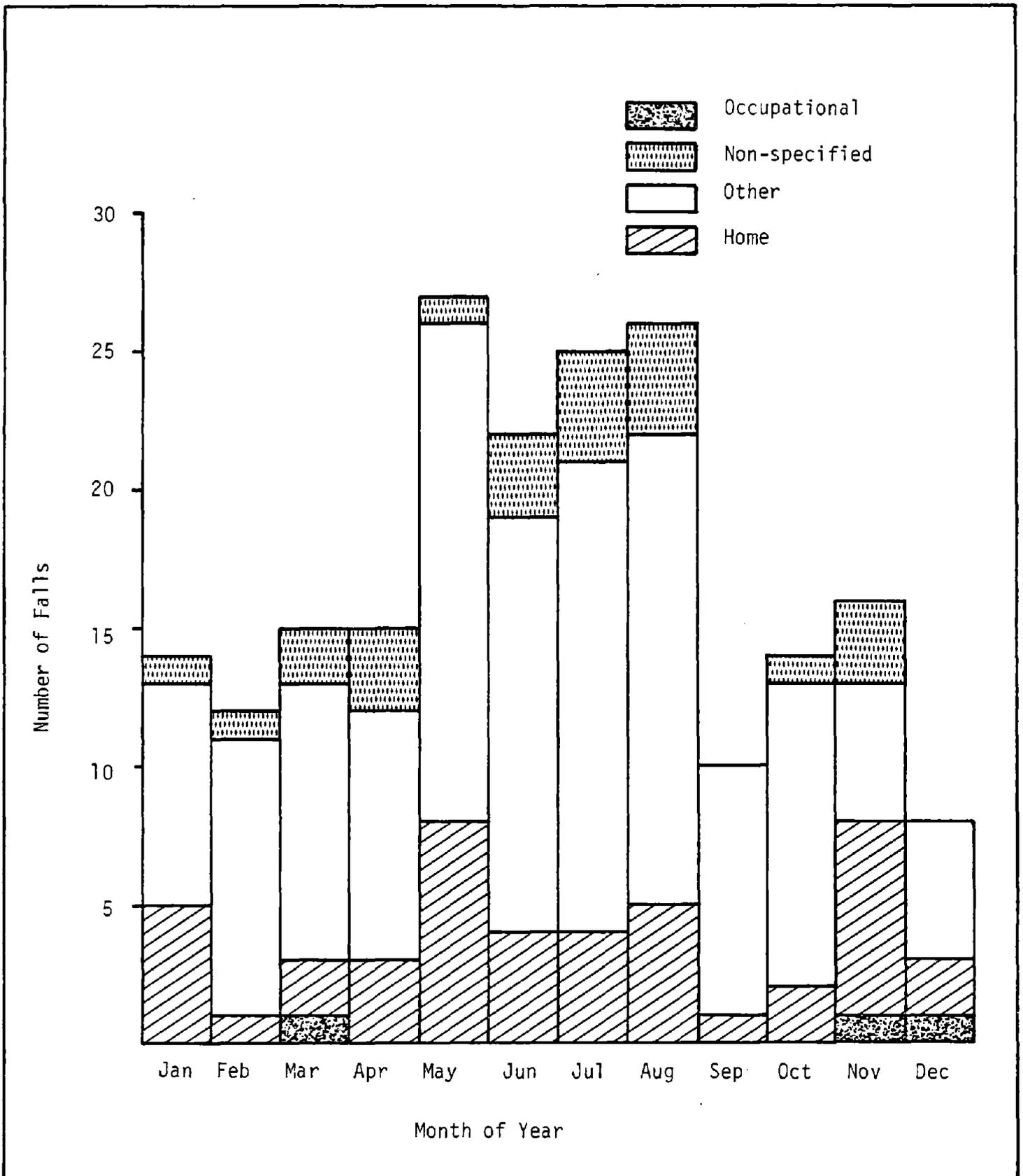


FIGURE 17. Seasonal Variation in Falls for 1975-76 Males

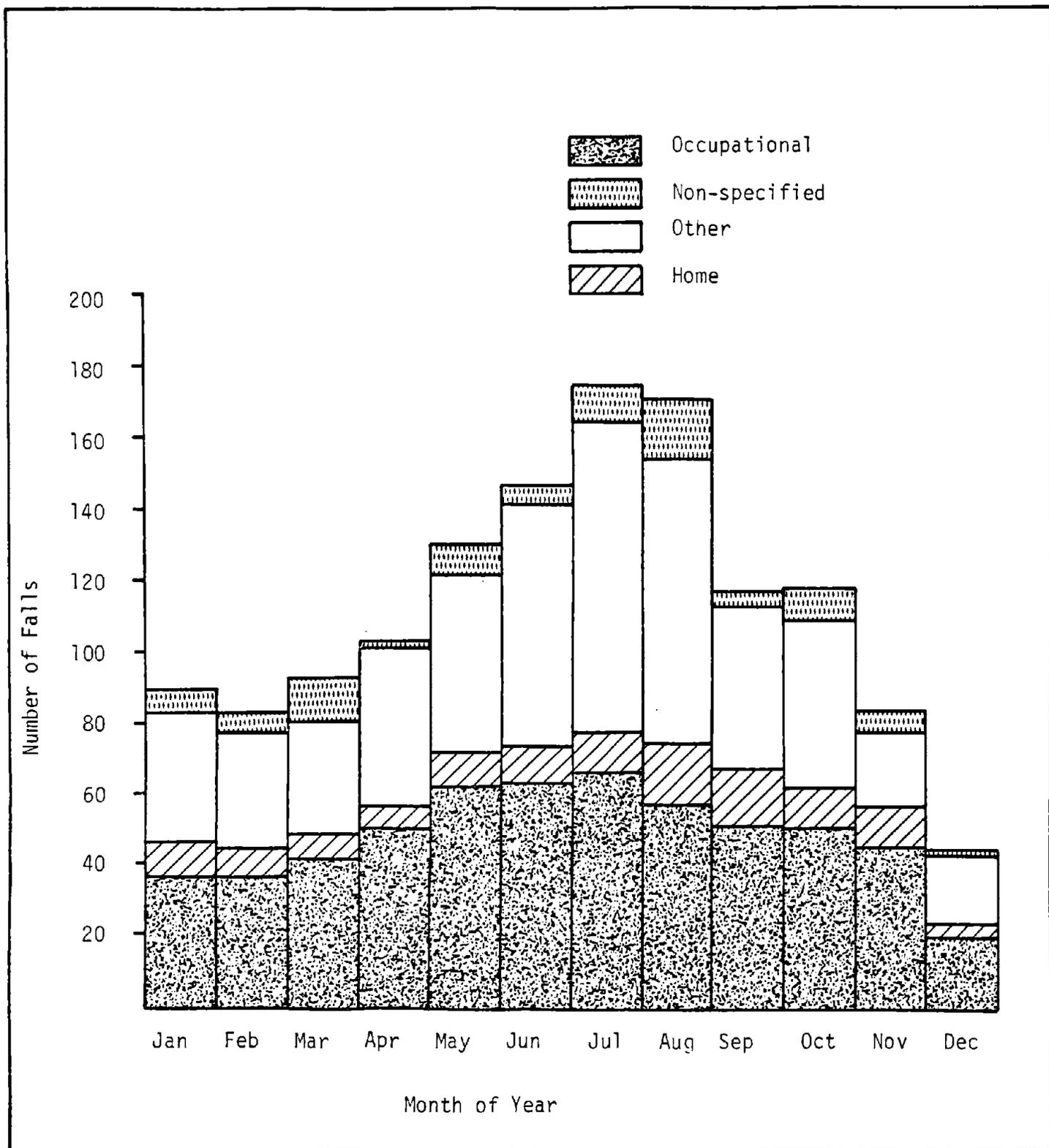


TABLE X. Summary of Occupational Falls by Month for 1962-63 Females

Month	Occupation	Home	Other	Non-Specified	Total
Jan	1	56	34	15	106
Feb	3	64	34	6	107
Mar	3	43	54	5	105
Apr	4	70	61	18	153
May	6	69	53	20	148
Jun	5	91	46	13	155
Jul	7	71	72	22	172
Aug	8	107	68	13	196
Sep	3	81	55	12	151
Oct	3	86	61	22	172
Nov	2	59	44	14	119
Dec	1	45	35	7	80
Totals	46	842	617	167	1672

TABLE XI. Summary of Occupational Falls by Month for 1962-63 Males

Month	Occupation	Home	Other	Non-Specified	Total
Jan	286	93	209	81	699
Feb	285	87	205	69	646
Mar	281	88	221	59	649
Apr	392	128	229	79	828
May	469	167	242	85	963
Jun	513	179	306	83	1081
Jul	628	211	404	138	1381
Aug	511	234	460	182	1387
Sep	472	241	380	149	1242
Oct	573	229	383	149	1334
Nov	334	121	237	107	799
Dec	287	113	190	71	661
Totals	5031	1891	3466	1252	11,640

TABLE XII. Summary of Occupational Falls by Month for
1975-76 Females

Month	Occupation	Home	Other	Non-Specified	Total
Jan	0	5	8	1	14
Feb	0	1	10	1	12
Mar	1	2	10	2	15
Apr	0	3	9	3	15
May	0	8	18	1	27
Jun	0	4	15	3	22
Jul	0	4	17	4	25
Aug	0	5	17	4	26
Sep	0	1	9	0	10
Oct	0	2	11	1	14
Nov	1	7	5	3	16
Dec	1	2	5	0	8
Total	3	44	134	23	204

TABLE XIII. Summary of Occupational Falls by Month for
1975-76 Males

Month	Occupation	Home	Other	Non-Specified	Total
Jan	36	10	36	7	89
Feb	35	8	33	6	82
Mar	41	8	33	12	94
Apr	50	7	45	2	104
May	62	10	50	8	130
Jun	63	11	68	5	147
Jul	66	12	87	10	175
Aug	57	18	80	16	171
Sep	51	17	45	4	117
Oct	50	11	48	9	118
Nov	45	11	22	5	83
Dec	19	4	20	1	44
Totals	575	127	567	85	1354

5. Other Findings: Occupational Falls in Elevators

During the period November, 1960 to July, 1964, (3½ years) 38 separate cases in our clipping files were reported of elevator failures. Since no previous study of such failures is known, the occupational and health hazards from such falls is of interest. Some 146 individuals, including 5 fatalities, were involved in elevator failures during this period. The majority of failures could be identified as occupational job-related accidents. These cases have been detailed in Appendix E by sex, age, description of fall, height of fall, injury, location, date, and file number. Cases 1-24, and 38, were identified by either a general or specific occupational category, while information was too limited in Cases 25-37 to make a distinction.

While the major number of separate elevator falls involved male worker occupants, female office workers were involved in two accidents with the largest number of passengers. In one case 43 female employees were riding in a elevator which reportedly fell slowly 10 feet, then more rapidly when a cable snapped, for a total distance of only 14 feet. Although only two of those injured remained hospitalized for observation at the time, this could have resulted in much more serious consequences had the actual fall distance been greater than the 4-11 feet reported. In a second instance 15 female office employees got aboard a self-service elevator on the 10th floor, but failure and free-fall apparently didn't occur until the 3rd floor, resulting in a fall of about 30 feet, with no injury except shock reported. Other accidents to females chiefly involved failures in department store or hotel elevators.

"Construction" workers and ironworkers had the greatest incidence of elevator falls. In one case 27 construction workers fell 5 stories to a sidewalk when a high-rise construction elevator failed. Three ironworkers in one fall, and six in another were noted. Workers were involved in ten freight elevator, service, or warehouse elevator failures. Elevator repairmen were involved in

three falls, elevator operators in two falls, feed deliverymen in two falls. Other specific occupations included a leatherworker, carpenter, and market owner/operator. Over 30 individuals in three elevator falls involved construction workers, and two falls, one an elevator carrying six, and another three, involved iron workers. However, since the terms "construction worker" or "worker" or "laborer" do not signify the specific occupation, a more detailed breakdown is impossible without further investigation of each case.

Elevator falls in department store, office, business or corporation buildings occurred in six cases, often with multiple occupants. However, it was not specified whether these occupants were "shoppers" or occupied in business at the time. Two elevator falls occurred in hotels. One such fall with 8 passengers aboard involved a well-know singer who was near term pregnancy at the time, but whose fall was broken partly by her husband, with no reported injury despite a 50-foot fall.

The youngest involved in an elevator fall was a 19-year-old male (office building), and the oldest a 71-year-old female (hotel). The fall of greatest reported height was 142' from a wooden elevator at a dam site. Another involved 6 iron workers in a 10-story (100 foot) fall. The hydraulic safety device under this elevator reportedly cushioned the fall, although the elevator reportedly bounced on impact. The iron workers received serious injuries but there were no fatalities.

Fatalities are difficult to assess since in two cases the height of the fall is unknown. Injury data were generally non-verified and some individuals in these cases may have subsequently died from other injuries. It seems evident that some of the falls were either not as high as reported or that the free-fall velocity was influenced by other factors. However, since so little is known concerning the specific environmental factors, the actual distance of the fall and mechanical causation, as well as specific occupations and injury data, it

would seem important to follow up on such cases in greater detail on-site for a specific period in the future.

V. CONCLUSIONS AND SUMMARY:

COMPARISON OF 1962-63 and 1975-76 DATA TRENDS

As discussed in each of the preceding sections differences were found not only between the sexes for occupational-related falls, but also some differences between the 1962-63 and 1975-76 data bases.

Comparison of sexual differences shows a male overall incidence of occupationally related free-falls of 42.9%, compared to only 2.1% for females. Findings in both studies revealed that for females proportionately fewer occupational-related falls result in death or injury (2.7% for 1962-63; 1.5% for 1975-76). Yet falls in the home accounted for 50.4% of all falls reported for females in 1962-63. The 21.6% free-falls in the home reported in the 1975-76 study probably is a result of small sample size. Females also showed an increase in non-job related falls; 36.9% in 1962-63, but 65.7% in 1975-76.

While males in both studies were found to have very similar proportions of job-related falls (e.g., 43.2% in 1962-63, and 42.5% in 1975-76), comparison of "home" falls showed a significant decrease, with 16.2% v. 9.4% occurring in the home in 1975-76. While 29.8% of the falls involving males in the earlier study were not job related, by 1975-76 41.9% were not job related. However, the 1962-63 study contained 8.6 times as many male subjects in the sample population.

In this regard it is of interest to speculate why significantly less falls were reported for the latter period. For both studies the ground-rules were the same for the reporting of data (e.g., free-falls, over 10 feet distance), yet during the 18 month period of the 1975-76 study only 2100 total cases were reported, less than 1/10th the number reported for a similar period some 13 years earlier. Since this trend drops considerably more steeply than national fall data (both injuries and fatalities) estimated by the National Safety Council for this period, it is suspected that the difference is related to coverage by

the news media rather than a significant change in falls.

Analysis of occupational groups showed little change between 1962-63 and 1975-76. For both groups the greatest incidence of falls occurred to craftsmen (33.7% 1962-63, and 27% 1975-76), and laborers. Construction workers, painters, carpenters, roofers and slaters, electric power linesmen and cablemen, structural metal craftsmen (steel and iron workers), farm laborers, and window washers incurred the most falls.

Age differences relative to falls were also evident between the 1962-63 and 1975-76 groups. It was found that 53.8% of the 1962-63 male falls occurred to those aged 29 to 59 years, but in the 1975-76 males only 37.2% were in this age range. While 30.2% of the 1962-63 males were under age 29, 53.3% of the 1975-76 males were in this younger age range. Similarly, while 16% of the 1962-63 males were over age 59 at the time of the fall, this compares to only 9.5% for the 1975-76 males, suggesting temporal trends.

The relationship between age and fatality has shown that fatalities generally increase significantly with age. However, since these data relate specifically to reported free-falls, generally over 10 feet in height, these data are not felt to accurately reflect total fall experience since there is a bias towards injuries and fatalities (non-injury falls, or those not requiring major medical attention were not apt to be reported in these data).

Some indications of changes in the geographic distribution of falls is shown by comparison of the 1962-63 and 1975-76 data, with a significant rise in the number of falls reported for females in the Pacific area, and an increase in falls reported in both East North Central and Pacific regions for males. However, this may also only reflect general population geographic trends.

In general seasonal occurrence of falls has remained the same, with April through August having the greatest number of falls, and the least number in

December. Yet some seasonal differences between males and females fall incidence were observed, with peak months being August for 1962-63 females, May for 1975-76 females, and July for 1975-76 males.

VI. FUTURE RESEARCH NEEDS

The foregoing study has had limited objectives and was exploratory in the sense that the data source (consisting of approximately 32,000 free-fall cases from two previous studies of free-fall impact tolerances) application was uncertain. That is, the conditions under which the data had been collected limited falls to those over 10 feet in height and to free-falls, thus did not include falls on the same surface, down steps, or in multiple contacts. Further, occupations had not been coded nor identified previously for these cases. Despite these limitations this is believed to be a major data source for fall information, and a total of 14,870 falls were analyzed for the occupational ages 14 to 75 years of age.

During the course of this study, and especially in the evaluation phase, several areas have been identified where future work may be of particular importance and usefulness to NIOSH. These are outlined as follows.

Despite estimates that fatalities from falls are exceeded only by motor vehicle accident fatalities in the United States, the literature research for this study has found fall data to be almost non-existent related to nationwide comparative data regarding sex, age, race or ethnic affiliation, geographic location, socio-cultural-economic aspects, or for specific occupational environments, as well as epidemiologic and ergonomic considerations.

A basic program should be established to collect, reduce, and provide a national data base for all fall experience. The limitations of the free-fall data could be overcome by a new study which is designed to obtain all of the information needed (e.g. all falls, not just free-falls; and from all heights), and equipped to obtain follow-up information in several ways. National estimates indicate that there are presently 14,300 fatalities (1976) and some 13,600,000 injuries annually from falls. Yet no nationwide means of identifying those related to occupational safety and health is apparent. A program

could be readily initiated, based upon the HSRI free-fall data collection experience, but expanded to include all falls, to obtain, computerize, and provide more detailed information on a national basis for occupational injury relationships. Such a program should receive high priority, as a basic means to most effectively identify occupational safety problems in this major area of injuries and fatalities due to falls, and thus provide a more objective means of establishing further priorities and cost-effective injury reduction.

. A second, and concurrent, series of studies should include in-situ accident investigation of selected falls patterned after the techniques established by the University of Michigan and others in intensive automotive and aircraft investigation, and more recently by the National Highway Traffic Safety Administration, as well as by the Consumer Product Safety Commission in investigation of swimming pool accidents. Such a study should include intensive investigation on the scene as soon as possible after a selected job-related fall has occurred by a multi-disciplinary team of professionals. Such studies have been demonstrated to result in providing an objective means of better understanding the epidemiology of falls and hence more effective means of prevention and injury reduction. This work should be expanded to include a wider scope of occupational falls than presently exists. (1)

. Craftsmen (painters, carpenters, electricians, linesmen, roofers, iron and steel workers and plumbers) appear to account for a major incidence of occupational falls. While there is some indication of safety causation (lack of helmets, safety harness unhooked momentarily, etc.) more detailed information needs to be obtained on environmental and human factors causes in order to provide better prevention guidelines and answers.

(1) Although NIOSH has already taken initial steps in this direction, with one study aimed at accumulating data on 124 occupational fall injuries within 24 hours of their occurrence, and another continuing in-house study of worker fatalities in the Cincinnati, Ohio area which has analyzed at least 8 worker fatalities (Cohen, 1976), this needs to be expanded.

. Data on the elderly relative to fall accidents is incredibly sparse. With 8,100 deaths in 1976 and a mortality rate of 92.7 per 100,000, individuals aged 75 or over represent a high risk in falls, with a significantly higher incidence of disabling injuries. Future research should be directed toward determination of causes and prevention of falls in the elderly. Several small-scale studies, now outdated, have provided useful clues. Current data needs to be obtained.

. The occurrence of occupationally related elevator falls, an unexpected finding from this study, needs further exploration. A small program could easily obtain current detailed data to assess the safety and health hazard from this source. To our knowledge there has not previously been any attempt to investigate this problem, or bring performance data together on a nation-wide basis. A related problem was evident in a large number of individuals falling into open elevator shafts.

APPENDIX A.

REFERENCES

- American National Standards Institute. Safety Standards for Conveyers and Related Equipment. ANSI Standard B20.1, 1972
- Anon. "High Chairs" Which pp 409-413, July, 1977
- Anon. "Belly Whopping and Chest Injuries" National Safety News, January, 1976
- Anon. "Deaths from Domestic Falls" Lancet 2(791):1351-2, 23 December, 1972
- Anon. "Fatal Fall from the Examining Table" Tidskr. Sver Sjukskot 39(17):37-8, 21 September, 1972
- Anon. "Accidental Falls: Fatal and Nonfatal" Statistical Bulletin pp 4-6, August 1965
- Anon. "Falls & Diagnostic Errors Constitute 44.5% of Most Malpractice Claims" New Medical Material p.30, September, 1962
- Anon. "Stop Slips" Industrial Maintenance and Plant Operations, p.51, October, 1962
- Anon. "Fatal Injuries in Competitive Sports" Statistical Bulletin pp 8-10, May, 1960
- Anon. "Falls - A Major Cause of Death" Statistical Bulletin Metropolitan Life Insurance Company, New York, April, 1959
- Anon. "Floor Safety is No Accident" Institutions Magazine 42(6), 1958
- Baker, Susan P. "Injury Control. Accident Prevention and Other Approaches to Reduction of Injury" Preventive Medicine and Public Health P.E. Sartwell, Ed., Appleton-Century-Crafts, 10th ed. 1972
- Ballinger, B.R., and A.C. Ramsay "Accidents and Drug Treatment in a Psychiatric Hospital" British Journal of Psychiatry 126:462-3, May, 1975
- Barlow, A.L., B. Horne, and I.V. Hiscock "Home Accidents" Connecticut State Medical Journal 18(2): 1954
- Bastos, M.L., and L. Galente "Toxicological Findings in Victims of Traumatic Deaths" Journal of Forensic Science 21(1):176-86, January, 1976
- Bauer, G.C.H. "Epidemiology of Fracture in Aged Persons: A Preliminary Investigation in Fracture Etiology" Clinical Orthopenos 17:219-225, 1960
- Bergner, L., S. Mayer, and D. Harris "Falls from Heights: A Childhood Epidemic in an Urban Area" American Journal of Public Health 61(1):90-6, January, 1971

- Bovches, E.A. "Accidents Among Old Persons" Geriatrics 14:293-300, 1959
- Broussard, E.R. "The Relationship of Sex to Childhood Accidents" Journal of the Florida Medical Association 44:1343-1344, 1958
- Brown, S. "Never Look an Elevator in the Eye, (or Why You'll Never Get Shafted by the Shaft)" Detroit Free Press pp. 7-11, 19 June, 1977
- Burley, J.C. "Testing and Use of Elevator Traveling Cables" Journal of the American Society of Safety Engineers 16(12):32-37, December, 1971
- Castle, O. M., and R. W. Watton, "Home Accidents: A Survey in a Metropolitan Borough" Med. Officer, pp. 225-227, 24 April, 1959
- Christiansen, K.H. "Fractured Hips in Psychotic Patients" Geriatrics pp. 738-743 November, 1958
- Cicccone, R. and R.M. Richman "The Mechanism of Injury and the Distribution of Three Thousand Fractures and Dislocations Caused by Parachute Jumping" Journal of Bone and Joint Surgery 30:77, 1948
- Cohen, H.H. "Causal Factors in Select Work Accidents: Investigation of Worker Fatalities" Proceedings, 6th Congress International Ergonomics Association pp. 240-242, 1976
- Collins, S.D. "Risk of Accident at Home, in Public Places and at Work" Accident Frequency Place of Occurrence and Relation to Chronic Disease Public Health Service, U.S. Department of Health, Education, and Welfare, Bethesda, Md., Public Health Monograph. no 14. PHS Publication no 249. Part II, pp. 23-42 October, 1953
- Collins, S.C., F. Ruth Phillips, and D.S. Oliver "Accident Frequency by Specific Cause and by Nature and Site of Injury as Recorded in a General Morbidity Survey." Accident Frequency, Place of Occurrence and Relation to Chronic Disease Public Health Service, U.S. Department of Health Education, and Welfare. Bethesda, Md. Public Health Monograph no 14. PHS Publication no 249. Part I, pp. 1-21, October, 1953
- Cook, L.P., Home Accidents, School of Hygiene and Public Health, John Hopkins University, M.S. Thesis, May, 1954
- Cummins, B.H., and J.M. Potter "Head Injury Due to Falls from Heights" British Journal of Accident Surgery 2(1):61-64, July, 1970
- DeCosse, J.J., "A Study of 212 Home Accidents", New England Journal of Medicine 248(20):837-842, 1953
- DeHaven, H. "Mechanical Analysis of Survival of Falls from Heights of Fifty to One Hundred and Fifty Feet" War Medicine 2:594-596, 1942
- DeLargy, J. "Accidents in Old People" The Medical Press 239:117-120, 1958

- Della, T.F. "First Statistical Data About Elderly Craftsmen from Salento Urgently Hospitalized in the Space of Two Years Owing to Labour Accidents: Some Suggestions for Precautionary Measures" G. Gerontol. 18(7):589-622, July, 1970
- Dennis, J.M., and A.D. Kaiser, "Are Home Accidents in Children Preventable?" Pediatrics, 13(6):568-575. 1954
- Droller, H. "Falls Among Elderly People Living at Home" Geriatrics 10:239-244, May, 1955
- Droller, H. and J. Pemberton "Vertigo in a Random Sample of Elderly People Living in Their Homes" J. Laryng. & Otol. 67:689-694, 1954
- Dubs, R. "Technic of Falling" A. Unfallmed. Berufskr. 61(2):85-87, 1968
- Duvina, P. L. and M. Moriani "Mortality Due to Poisoning, Falls, and Other Accidental Causes in the First 15 Years of Life" Minerva Pediatr. 22(34):1714-5, 25 August, 1970
- Dy, A.J. "Falling Accidents and Organic Brain Syndrome" New England Journal of Medicine 288(19):1026-7, 10 May, 1973
- Eddy, T.P. "Deaths from Domestic Falls and Fractures" British Journal of Preventative Social Medicine 26(3):173-9, August, 1972
- Eddy, T.P. "Deaths from Falls and Fractures. Comparison of Mortality in Scotland and the United States with that of England and Wales" British Journal of Preventative Social Medicine 27(4):247-54, November, 1973
- El-Assal, G. "A Study on Falling From Heights" Alexandria Medical Journal 1X(1):56-65, 1963
- Elmer, E. "A Follow-up Study of Traumatized Children" Pediatrics 59(2):273-9, February, 1977
- Eyer, J. "Prosperity as a Cause of Death" International Journal of Health Statistics 7(1):125-150, 1977
- Fattal, S.G. and L.E. Cattaneo "Investigation of Guardrails for the Protection of Employees from Occupational Hazards" National Bureau of Standards, Washington, D.C. NOSIR 76-1139, July, 1976
- Federer, S.S., Accident-Avoidance Behavior and Potential Risks in the Play of Pre-School Children, M.S. Thesis, University of Wisconsin, 1962, Mimeographed copy, 77 pp.
- Fine, W. "An Analysis of 277 Falls in Hospitals" Geront. Clin. 1:292-300, 1959
- Firth, S.J. "Falls in the Elderly" The Medical Press 238(15):343-346. 1957
- Fleetwood, J.F. "Old Folk Who Fall" Journal of the Irish Medical Association 43:202-203, 1958

- Foerder, P. A Study of Flat Surface Fall Accidents in the Food Manufacturing Industry. Master's Thesis (unpublished), Fairleigh Dickinson University. January, 1963.
- Foust, D.R., B.M. Bowman, and R.G. Snyder "Study of Human Impact Tolerance Using Investigations and Simulations of Free-Falls" Proceedings, 21st Stapp Car Crash Conference, Society of Automotive Engineers, Inc., Warndale, Pa. Publication P-73, pp. 1-51. October, 1977
- Franzen, L.G. "What Do We Know About Ways in Which Elementary School Children Get Hurt?" National Safety Congress Transactions Vol. 27, 1958
- Gadalla, Saad M., "Selected Environmental Factors Associated with Farm and Farm-home Accidents in Missouri," Research Bull. # 790, University of Missouri, College of Agriculture, 1962
- Gibson, E.J. and R.D. Walk. "The 'Visual Cliff'" Scientific America pp. 64-71, 1960
- Gonzales, T.A. "Fatal Injuries in Competitive Sports" J.A.M.A. 146:1506-1511, 1951
- Gowings, D.D. "Accidental Falls in the Home" Proceedings, Conference on New Building Research, Washington, D.C. pp. 151-158, 1961
- Graham, G.V. Persons Injured and Disability Days Due to Injury. United States - July 1965-June 1967. U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Rockville, Md. PHS Publication no. 100-Series 10 - no 58. March, 1970
- Grech, P. "Falls from Coconut Trees" East African Medical Journal 41(2):64-68, 1964
- Haddon, W., Jr., A.E. Ellison and R.E. Carroll, "Skiing Injuries", Public Health Reports, (77)11:975-991, 1969
- Haggerty, R.J., "Home Accidents in Childhood", New England Journal of Medicine, 260:1322-1331, 1959
- Hasbrook, D.H. Human Impact Survival (in fall) at 162g Aviation Crash Injury Research, Cornell Medical College, New York. Paper AV-CIR-58-0-101, 1959
- Hearn, B.M., S.R. Sarrailhe, and A.P. Vulsan Simulated Free Fall of a Stunt Man Aeronautical Research Labs, Melbourne (Australia). Rept. no. ARL-SM-353., August, 1970
- Helbring, W. "Occupation and Miscarriage" Z. Gesamte Hgz. 21(11):819-821, 1975
- Hirsch, T. "Rescue Devices and Fall Protection" National Safety News pp. 28-30, September, 1956
- Holding, T.A. and B.M. Barraclough "Psychiatric Morbidity in a Sample of Accidents" British Journal of Psychiatry 130:244-52, March, 1977

- Honkanen, R., and T. Visuri "Blood Alcohol Levels in a Series of Injured Patients with Special Reference to Accident and Type of Injury" Annual Chir. Gynaecol. 65(4):287-94, 1976
- Howard, J.M. "The History of Occupational Injuries in the United States (1776-1976)," The Journal of Trauma 17(6):411-418, June, 1977
- Howell, T.H. "Old Folk Who Fall" Practitioner 175:56, 1955
- Howell, T.H. "Analysis of Falls in Old People" American Geriatrics Society Journal 6:522-525. 1958
- Ingham County Medical Society, Home and Surrounding Home Accident Survey, Lansing, Michigan, 1953
- Iskrant, A.P. "Accident Morality Data as Epidemiologic Indicators" American Journal of Public Health 50:2. February, 1960
- Iskrant, A.P., and D.F. Sullivan "Accidental Falls in Public Places" National Safety Congress Transactions Vol. 6, 1960
- Ivanov, V.I., and A.S. Feruz "Mechanogenesis of Traffic Trauma in Motorcycle Drivers after Fall" Ortop. Travmatol. Protez. 9(10):62-4, October, 1974
- Jacobziner, H., H. Rich, and R. Merchant, "A Study of Non-fatal Accidents in Children Under Supervision in Child Health Stations of N.Y. City Dept. of Health," Pediatrics, 26:415-431, 1960
- Järvinen, K.A., and P.H. Järvinen "Falling from Bed as a Complication of Hospital Treatment" Journal of Chronic Diseases 21(5):375-8, August, 1968
- Johnson, A. "Recent Trends in Sex Mortality Differentials in the United States" Journal of Human Stress 3(1):22-32, March, 1977
- Kazarian, K.K., P. Boyle, S.A. Ketchum, 3d, and W.L. Mersheimer "High Flyer Syndrome: Survival after 12-story Fall" N.Y. State Journal of Medicine 76(6): 982-5, June, 1976
- Kiel, F.W. "Hazards of Military Parachuting" Military Medicine 130(5):512-521, 1965
- Klebba, A.J., J.D. Naurer, and E.J. Glass Mortality Trends for Leading Causes of Death: United States 1950-69. Vital and Health Statistics, U.S. Department of Health, Education and Welfare, Public Health Service. National Center for Health Statistics, Rockville, Md. Series 20, Number 16 DHEW Publication no (HRA)76-1853 March, 1974
- Klonoff, H. and G.C. Robinson "Epidemiology of Head Injuries in Children: A Pilot Study" Canadian Medical Association Journal 96:1308-1311, 13 May, 1967
- Koska, W. "Age and Fatal Accidents at Work" Po1 Tyg. Lek. 25(29):1103-5, 20 July, 1970

- Kravitz, H., G. Driessen, R. Gombert, and A. Korach "Accidental Falls from Elevated Surfaces in infants from Birth on One Year of Age" Pediatrics 44(5): Suppl: 869-76, November, 1969
- Ku, N.P. "A Pilot Study of Falling Incidents in Neurological and Neurosurgical Wards" Journal of Nursing (Taipei). 13(1):61-5, April, 1966
- Ku, N.P. "A Study of a Fall Incident in a Medical-Surgical Ward and its Prevention" Journal of Nursing (Taipei) 13(3):57-67, July, 1966
- Larsen, C.H., R.A. Egen, and H.A. Cress Investigation of Requirements on Performance of Safety Catches on Wire-Rope-Suspended, Man-Carrying Conveyances in the United States Coal Mines Batelle Memorial Institute, Long Beach, Calif. Final Report BuMines-OFR-18-73, 1973
- Larsen, L.B., and E.J. Seligman "Many Hospitals Fall Short in Occupational Health Programs, Sample Survey Indicates" Hospitals 43(10):75-79, 16 May 1969
- LaMura, J., S.P. Chung-Fat, and J.A. SanFilippo "Splenoorrhophy for the Treatment of Splenic Rupture in Infants and Children" (Six story fall) Surgery 81(5): 497-520, May, 1977
- Levin, S. "Infant Fall-out" South African Medical Journal 46(19):586-8, 6 May 1971
- Lewis, W.S., A.B. Lee, Jr., and S.A. Grantham "Jumpers Syndrome'. The Trauma of High Free Fall as Seen at Harlem Hospital" Journal of Trauma 5(6):812-8, November, 1965
- Lossing, E.H. and R.B. Goyette, "Review of 1,000 Home Accidents" Canadian Journal of Public Health, pp. 131-140, 1957
- MacLeod, K.I., "Toward Solving the Accident Problem", Public Health Reports, 6(7):606-617, 1961
- Mank, H.M. "Are Your Plant Floors Accident Prone?" Mill and Factory Magazine p. 117, July, 1959
- Marion, J., M. Daudet, and J. Carron "Multiple Fractures in an 8-Year-Old Child Due to a Fall from the Third Floor" Lyon Chir. 63(2):237-9, March, 1967
- McCloy, C.H. "A Study of Landing Shock in Jumping for Women" Arbeitsphysiologie, 5(1):212-242. November, 1931
- McCormack, G.R. Injuries and Accident Causes in the Fluid Milk Industry. Bureau of Labor Statistics, United States Department of Labor, BLS Report no 196. Washington, D.C., 1961
- Melkebeke, A. "Ongevalleerisico's bij het gebruik en het onderhoud van liften" (Accident Hazards in Elevator Usage and Maintenance) Ingenieursblad 41(18):517-521, September 16, 1972
- Metropolitan Life Insurance Company "Rise in Accidental Deaths Among Women" Statistical Bulletin 53:5-8, October, 1972

- Meyer, R.J., Family and Child Factors Associated with Accidental Injury, Department of Pediatrics, Harvard Medical School, Cambridge, April, 1962
- Miller, J.A. and M.L. Esmay "Study Reveals the Whys Hows of Stairway Falls" Home Safety Review pp. 23-25, Winter, 1958
- Monthly Vital Statistics Report. "Part II. Cause of Death" Summary Report Final Mortality Statistics, 1971 from the National Center for Health Statistics. U.S. Department of Health, Education and Welfare, Rockville, Md., (HRA) 74-1120. Vol 23. no. 3, Supplement, 24 May, 1974
- Monthly Vital Statistics Report. "Final Infant, Fetal, and Maternal Mortality, 1969" Final Mortality Statistics, 1969 from the National Center for Health Statistics. U.S. Department of Health, Education and Welfare, Rockville, Md. (HRA) 74-1120. Vol 22 no 10, Supplement, 17 January, 1974
- National Academy of Sciences - National Research Council. Causes and Measurement of Walkway Slipperiness Federal Construction Council Technical Report No 43. Washington, D.C., 1961
- National Institute for Occupational Safety and Health Health and Safety Guide for Grain Mills Cincinnati, Ohio. DHEW/PUB/NIOSH-75/155, April 1975
- National Safety Council "Falling Accidents" National Safety News pp. 55-58, October, 1977
- National Safety Council "Ship Study Suggests Solutions" National Safety News 106(3):58, October, 1977
- National Safety Council "Walking and Working Surfaces" National Safety News pp. 81-83, April, 1977
- National Safety Council Accident Facts Chicago, Ill. 1977 Edition
- National Safety Council "Zero in on Avoiding Falls" Take Aim at Top Targets Zero In. Chicago, 1970
- National Safety Council Don't Fall Down on the Job. Chicago, 1965
- National Safety Council Falls on Floors Data Sheet 495. Chicago, Ill. 1960
- National Safety Council Falls Safety Education Data Sheet No. 5. Chicago, Ill. 1955 (Revised, n.d.), 1977
- National Safety Council Slippery Floors Data Sheet 286 Chicago, Ill. 1956
- Naylor, R., and A.J. Rosin "Falling as a Cause of Admission to a Geriatric Unit" Practitioner 205(227):327-330, September, 1970
- Omura, K. "Latrogenic Incidents in Obstetrics. Accidental Fall of the Patient" Japanese Journal of Midwifery 29(6):318-0, June, 1975
- Oregon State Board of Health, Analysis of the Josephine County Home Accident Survey, July 1951-June, 1952

- O'Rourke, E., An Epidemiological Study of Home Injuries, Paper presented at conference sponsored by University of Michigan, School of Public Health, USPHS, National Safety Council, Ann Arbor, January, 1953
- Overstall, P.W., A.N. Exton-Smith, F.J. Imms, and A.L. Johnson "Falls in the Elderly Related to Postural Imbalance" British Medical Journal 1(6056):261-4, 29 January, 1977
- Parrish, H.M., and T.P. Weil, "Patient Accidents Occurring in Hospitals: Epidemiologic Study of 614 Accidents", N.Y. Journal Medicine 58:838-846, 1958
- Partridge, B.W.M. "A Survey of Cliff Falls and Related Accidents in the Torbay Area, 1971-1973" Practitioner 213(1274):217-222, August, 1974
- Penfold, M.F., J. Laing, and J.C. Lane "Tolerance of the Human Body to Abrupt Deceleration. An Analysis of Free-falls Impacting onto Water from the Sydney Harbour Bridge." Proceedings, International Meeting on Aerospace Medicine, Sydney, Australia, 1966
- Polson, C.J. "'Battered Baby': Accidental Death Due to a Fall. Subdural Hemorrhage: Severe Congenital Skeletal Malformation" Med. Sci. Law 6(3):163-4, July, 1966
- Powers, J.H., and J.F. Lincoln, "Accidents During Infancy and Childhood", N.Y. State Journal of Medicine, 53:2957-2461, 1953
- Public Health Service. Impairments Due to Injury by Class and Type of Accident. United States - July, 1959-June 1961. U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Rockville, Md. PHS Publication no. 1000-Series 10-no. 6, January, 1964
- Reynolds, B.M., N.A. Balsano, and F.X. Reynolds "Falls from Heights" A Surgical Experience of 200 Consecutive Cases" Annals of Surgery 174(2):304-8, August, 197
- Ribeiro, B.F. Occupational Hazards in Window Cleaning" British Medical Journal 3(5982):530-2, 30 August, 1975
- Rodstein, M. "Accidents Among the Aged" Safety. Summer, 1963
- Rosegger, H. and V. Enauat "Modes of Occurrence of Accidental Scalds and Burns in Infancy and Childhood" Wien Klin Wochenschr. 87(13):418-22, 27 June, 1975
- Rowntree, G. "Accidents Among Children Under 2-Years of Age in Great Britain" Journal of Hygiene 48:323-337, 1950
- Rubbin, G.E. "Falling from Heights of an Infant During the First Months of Life" Sud. Med. Ekspert 9(1):43-4, January-March, 1966
- Rupp, F., and A.D. Battey, "Hurt at Home" Public Safety (Public Safety is old NSC periodical; now Traffic Safety), 1936
- Rutherford, W.H. "Seguelae of Concussion Caused by Minor Head Injuries" Lancet 1(8001):1-4 1 January, 1977
- Sadusk, J.S., Jr. "Falls-Malpractice" New Medical Material 4(9):30-32, September, 1962

- Samele Acguaviva, E. "Acute Poisoning Caused by a Accidental Fall into a Cad-
mixture Bath" Minerva Anesthesiol. 34(10):1171, October, 1968
- Scallones, R.A., and L. Corsa, Jr., "Epidemiology of Childhood Accidents in Two
California Counties", Public Health Reports, 76:25-38, 1961
- Schneider, R.G., M. Papo, and C.S. Alvarez "The Effects of Chronic Recurrent Spinal
Trauma in High Diving: A Study of Acapulco's Divers" Journal of Bone and Joint
Surgery 44-A(4):648-656, 1962
- Scott, R. "Accidents to Old People" Practitioner 172:642-649, 1954
- Sehested, P. and T. Severin - Nielsen "Falls by Hospitalized Elderly Patients:
Causes, Prevention" Geriatrics 32(4):101-8, April, 1977
- Weiler, H.E. and C.B. Ramsay "Home Accidents" Practitioner 172:628-637, 1954
- Shaber, C.R., J.P. Byrom, D.K. Chandler, and R.W. Eicher ERDA Guide to the Classi-
fication of Occupational Injuries and Illnesses. United States Energy Research
and Development Administration. Publication ERDA-76145-7; SSDC-7; VC-41,
October 1975
- Sheldon, J.H. "On the National History of Falls in Old Age" British Medical
Journal 5214:1685-1690, 10 December, 1960
- Shipley, S.B. "Lets Not Let Them Fall" RN 38(11):57-8, November, 1975
- Sigler, P.A., M.N. Geib, and T.H. Boone "Measurement of the Slipperiness of
Walkway Surfaces" Journal of Research 10:339-346, May, 1948
- Smid, A.C. and G.B. Logan, "Accidents of Children : A Study of Accidents of Injured
Children Seen at the Mayo Clinic in 1954" Minnesota Medicine 39(6):392-399, 1956
- Smith, M.D., J.D. Burrington, and A.D. Woolf "Injuries in Children Sustained in
Free Falls: An Analysis of 66 Cases" The Journal of Trauma 15(11):987-989,
November, 1975
- Snyder, R.G., D.R. Foust, and B.M. Bowman Study of Impact Tolerance Through Free-
Fall Investigations. Insurance Institute for Highway Safety, Washington, D.C.
Final Report (in Press), November, 1977
- Snyder, R.G., and D.R. Foust "Homicide, Suicide, or Accident? Forensic Consider-
ations in Human Free-fall Investigations" Proceedings, American Academy of
Forensic Sciences, February, 1977
- Snyder, R.G. "Man's Survivability of Extreme Forces in Free-fall Impact" Linear
Acceleration (Impact Type), AGARD Conference Pre-print No. 88, pp. 4-1 to 4-13,
1971
- Snyder, R.G. "Impact Injury Tolerance of Infants and Children in Free-Fall"
Proceedings, American Association for Automotive Medicine, The University of
Minnesota. Published by Highway Safety Research Institute, The University of
Michigan, pp. 131-164, May, 1970
- Snyder, R.G. "Terminal Velocity Impacts into Snow" Military Medicine 131(10):
1290-1298, October, 1966

- Snyder, R.G. Survival of High-Velocity Free-falls in Water Civil Aeromedical Research Institute, Federal Aviation Agency, Oklahoma City. Rept. No. CARI-65-12, 1965
- Snyder, R.G. "Human Tolerance Limits in Water Impact" Aerospace Medicine 36(10): 940-947, 1965
- Snyder, R.G. Human Survivability of Extreme Impact in Free-Fall, Civil Aeromedical Research Institute, Federal Aviation Agency, Oklahoma City. Rept. no. CARI-63-15. August, 1963
- Snyder, R.G. "Human Tolerances to Extreme Impacts in Free-Fall" Aerospace Medicine 34(8):695-709, 1963
- Snyder, R.G. A Case of Survival of Extreme Vertical Impact in Seated Position. Civil Aeromedical Research Institute, Federal Aviation Agency, Oklahoma City, Rept. CARI-62-19, October, 1962
- Statistical Bulletin, Fatal Injuries in Competitive Sports, Metropolitan Life Insurance Co., New York, 41:8-10, 1960
- Statistical Bulletin, Falls - A Major Cause of Death, Metropolitan Life Insurance Co., April, 1959
- Stallones, R.A., "Theory and Methods of Epidemiologic Study of Home Accidents", Annals N.Y. Academy of Science, 108(2):647-658, 1963
- State of California "Falls from Elevators in Construction in California" 1976 California Work Injuries and Illnesses, Division of Labor Statistics and Research, Department of Industrial Relations, Agriculture and Services Agency, San Francisco, pp. 2-3, (in publication) 1977
- State of California "Analysis of Disabling Falls from Elevations in Construction. California, 1975" 1976 California Work Injuries and Illnesses, Division of Labor Statistics and Research, Department of Industrial Relations, Agriculture and Services Agency, San Francisco, pp. 3-10, (in publication), 1977
- State of California 1975 California Work Injuries and Illnesses Division of Labor Statistics and Research, Department of Industrial Relations, Agriculture and Services Agency, San Francisco, August, 1977
- State of California California Work Injuries 1973 Division of Labor Statistics and Research, Department of Industrial Relations, Agriculture and Services Agency, San Francisco, December, 1974
- State of California Work Injuries in California. Department of Industrial Relations, Division of Labor Statistics and Research, San Francisco. 1975
- Statistical Abstract of the United States "Experienced Aviation Labor Force, by Sex and Occupation, 1960 and 1970, and by Selected Characteristics, 1970" 1976
- Stech, E.L. An Analysis of Free-Falls Accident Data Involving the Human Body in the Transverse Direction First Engineering Development Corporation, 1963

- Stinberg, H.L. A Study of Personal Fall-Safety Equipment. Product Systems Analysis Division, Institute for Applied Technology, National Bureau of Standards, Washington, D.C. Report no. NBSIR 76-1146, June, 1976
- Suchman, E.A., and A.L. Scherzer Current Research in Childhood Accidents, Association for Crippled Children, New York 1960
- Surry, J. Industrial Accident Research. A Human Engineering Appraisal. Ontario Ministry of Labour, Ontario, June, 1974
- Surry, J. An Annotated Bibliography for Industrial Accident Research and Related Fields Ontario Department of Labour, Toronto, April, 1969
- Taylor, C.N.D., "Accidents in the Home: A Study of Patients Admitted to Auckland Hospital", New Zealand, Medical Journal 49:229-235, 1950
- Thomson, L.G. "Some Comments on Nontransport Accidents". Part III. Selected Bibliography, pp. 24-36. 1963
- Thorndike, A. "Frequency and Nature of Sports Injuries" American Journal of Surgery 98:316-324, September, 1959
- Tiboni, E.A. "Accident Prevention in a Large Urban Community" American Journal of Public Health 49(12):1653-1657, 1959
- Treier, P. "The Working Place of the Disabled as a Social, Ergonomic and Safety Problem" Rehabilitation (Stuttgart) 16(1):31-37, February, 1977
- Veltz, C.J. and F.M. Hemphill Investigation and Application of Home Injury Survey Data. School of Public Health, The University of Michigan, Ann Arbor, 1953
- Urban-Rural Differences in Mortality, 1950-1970 World Health Statistics Report. 29(56), 1976
- U.S. Bureau of the Census U.S. Census of Population: 1970, Detailed Characteristics Final Report PC(1)D1, United States Summary (1970)
- Waldman, E. and B.J. McEaddy "Where Women Work - An Analysis by Industry and Occupation" Monthly Labor Review, U.S. Bureau of Labor Statistics. 97(5):3-13, May, 1974
- Watson, N. "Pattern of Spinal Cord Injury in the Elderly" Paraplegia 14(1):36-40, May, 1976
- Weiler, G. "Traumatology of the Fatal Fall from a High Point" Montatsschr. Unfallheilkd. 76(7):293-9, July, 1973
- Wheatley, G.M. Accidents in Childhood, Metropolitan Life Insurance Company, New York, 1 February 1956
- Wheatley, G.M. "Prevention of Accidents in Childhood" Adv. Pediat. 8:191-215, 1956
- Whitfield, J.W. "Individual Difference in Accident Susceptibility Among Coal Miners" British Journal of Industrial Medicine 11:126-140, 1954

- Wilder, C.S. Persons Injured and Disability Days by Detailed Type and Class of Accident United States-1971-1972. U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Rockville, Md. PHS Publication no (HRA) 76-1532, January, 1976
- Wilder, C.S. Types of Injuries, Incidence and Associated Disability. United States July 1965-June 1967. Vital and Health Statistics, U.S. Department of Health, Education and Welfare, Public Health Service. National Center for Health Statistics, Rockville, Md., DHEW Publication no. 100 - Series 10 - no. 57. October, 1969
- Wilder, C.S. Types of Injuries, Incidence and Associated Disability, United States July 1957- June 1961. Public Health Service. U.S. Department of Health, Education and Welfare, National Center for Health Statistics, Rockville, Md., PHS Publication no. 100 - Series 10 - no. 8, April, 1964
- Wilkov, H.R. "Air-fluid Levels in the Left Lower Thorax Following a Fall" Chest 62(5):621-2, November, 1972
- Wilson, J.A. Injuries and Accident Causes in the Canning of Fruits and Vegetables. Bureau of Labor Statistics, United States Department of Labor, BLS Report no. 183. Washington, 1961

APPENDIX B.

NATIONAL SAFETY COUNCIL REFERENCES- COMPUTER SEARCH RESULTS

This appendix, obtained from the National Safety Council Literature Search, contains copies of a computer printout of occupational and job related accident references which may be related to falls. Above each citation on the printout is a "quality number" which was assigned by the indexer to rate the treatment of the keyword in each document. The numbers 0, 1 and 2 refer to those documents presenting an informative, non-statistical treatment of the keyword:

- #1 indicates a substantial informative treatment of the keyword;
- #2 indicates a moderate treatment;
- #0 indicates a passing reference to the keyword, but no in-depth treatment of it.

The numbers 5, 6 and 7 refer to a statistical handling of the keyword in the documents:

- #6 indicates a heavily statistical treatment of the keyword;
- #7 indicates a moderately statistical handling;
- #5 indicates a passing statistical reference to the keyword.

DOCUMENT NO.

FALLS PEOPLE

PERSONNEL

Reproduced from
best available copy.

DOCUMENT NO.	FALLS PEOPLE	PERSONNEL	
65 1493	5	5	
ACCIDENT FACTS 1965 NATIONAL SAFETY COUNCIL 97P			
66 0217	0	0	
HOME ACCIDENTS AMONG THE AGES PORTFOLIO 57 77P			
66 0289	5	5	
DISABLING WORK INJURIES TO OFFICE EMPLOYEES OF CALIFORNIA CAL DIV OF LABOR STATISTICS & RES AG 63 45P			
66 0377	5	5	
FOURTH ANNUAL REPORT 64 65 CALIFORNIA CAL DEP OF MENTAL HYGIENE NP UNP			
66 0519	0	0	
A CHALLENGE TO MANAGEMENT NATIONAL SAFETY COUNCIL ND 10P			
66 0564	5	5	
SAFETY IN THE 60'S BASIC PROGRAM PLANS U S DEP OF INTERIOR ND 27P			
66 0566	0	0	
REPORT OF SIXTH SAFETY PLANNING COMMITTEE MEETING U S DEP OF INTERIOR O 22-26 64 124P			
66 0700	5	5	
FEDERAL WORK INJURIES SUSTAINED DURING 1964 FED EMPL COMP ACT U S DEP OF LABOR S 65 27P			
66 0885	5	5	
SAFETY PROGRESS REPORT - THE PACESETTER FOR SAFETY U S BUREAU OF INDIAN AFFAIRS 65 59P			
66 1351	5	5	
FEDERAL WORK INJURIES 1965 U S BUREAU OF EMPLOYEES COMP S 66 28P			
66 1694	0	0	
MINUTES EXECUTIVE COMMITTEE CONSTRUCTION SECTION 1966 PORTFOLIO NATIONAL SAFETY COUNCIL 66 UNP			
66 1802	5	5	
WORK ACCIDENTS SURVEY 1965 CHICAGO CITY BD OF EDUCATION 65 60P			
66 1860	5	5	
HOW ARE ACCTS PREV WHAT KIND OF ACCTS HAPPEN HOW MUCH DO THEY COST U S SCHOOL BUSINESS AFFAIRS F 66 P41-42			

TUNNY JAMES C JR

WILLIS BENJAMIN C

OOSTING BERNARD R

DOCUMENT NO.

FALLS PEOPLE

PERSONNEL

DOCUMENT NO.	FALLS PEOPLE	PERSONNEL
67 0620	5	5
OFF THE JOB SAFETY PROGRAMMING FOR FEDERAL AGENCIES FEDERAL SAFETY COUNCIL ND VP		
67 0986	5	5
SECRETARY CHAIR ACCIDENTS SAF & IND HYGIENE ND 3P		
67 6965	5	5
DISABLING WORK INJURIES EMPLOYEES LATHING & PLASTERING CONTRACTORS CAL DEP OF IND RELATIONS 63 7P		
67 7320	2	1
WORK INJURIES IN CALIFORNIA CALIFORNIA DEP IND RELATIONS 67 5P		
67 7494	2	2
DEV & OPERATION ACCT CONTROL PROG THROUGH HEALTH DEP UNIV OF MICHIGAN 67 205P		
67 7522	2	1
OCCUPATIONAL SAFETY AIDS U S BUREAU OF LABOR STANDARDS 67 1P		
67 7800	2	2
PROCEEDING 4TH WORLD CONG ON PREVENTION OF OCCUPATIONAL ACCT ROSPA JL 64 301P		
67 7837	5	5
FEDERAL WORK INJURIES DURING CALENDAR YEAR 1966 U S DEP OF LABOR S 67 28P		
67 7889	5	5
REPORT OF PUPIL & EMPLOYEE ACCT 6 YEAR COMPARATIVE STUDY LOS ANGELES CITY SCHOOLS 67 61P		
68 0190	5	5
ANNUAL SAFETY REPORT NATL PARK SERVICE 66 22P		
68 0369	5	5
WORK INJURIES IN A MEDICAL ORGANIZATION ARCH ENVIRON HEALTH N 67 P554-61		
68 0686	0	2
NIGHTS SPECIAL HAZARDS CREATE HOSPITAL LIABILITIES MODERN HOSPITAL JA 68 P48 50 54		
68 1362	0	1
NSC TRANSACTIONS MARINE SAFETY 1967 NATIONAL SAFETY COUNCIL 68 50P		

STONE H J

TIBONI EMIL A

MANN K J

HORTY JOHN F

DOCUMENT NO. FALLS PEOPLE PERSONNEL

68 1403 5 0
 NSC HD OF DIRECTORS EXECUTIVE COMMITTEE MINUTES PORTFOLIO
 NATIONAL SAFETY COUNCIL 1968 VP

68 1645 2 2
 HOSPITAL SAFETY MANUAL
 AMERICAN HOSPITAL ASSOCIATION JL 68 116P

68 2583 5 5
 ACCIDENT FACTS
 NATIONAL SAFETY COUNCIL 67 96P

68 2584 5 5
 ACCIDENT FACTS
 NATIONAL SAFETY COUNCIL 68 96P

68 3076 5 7
 ANNUAL REPORT OF RAILROAD ACCIDENTS REPORTED FOR YEAR 1967
 CALIF PUBLIC UTILITIES COMM JF 30 68 74P

69 0831 1 2
 WATER SKIING
 AMERICAN WATER SKI ASSOCIATION D 1 68 15P

CLIFFORD WILLIAM D

69 1504 2 1
 READY MIX CONCRETE TRUCKS DATA SHEET 617
 NATIONAL SAFETY NEWS AG 68 P67-72

69 2378 5 7
 COAST GUARD BOATING STATISTICS 1967
 U S COAST GUARD MY 68 68P

69 3170 7 7
 SCHOOL COLLEGE ACCIDENTS
 N S C 68 7P

69 3408 5 6
 FEDERAL WORK INJURIES SUSTAINED DURING CALENDAR YEAR 1968
 US BUREAU OF EMPLOYEE COMPENSATION S 69 28P

69 4577 0 0
 ABSTRACTS AND LISTING OF IN PROCESS RESEARCH
 JOURNAL OF SAFETY RESEARCH MR 69 P42-48

70 0157 2 2
 FALLS IN THE HOME OFF THE JOB MONTHLY DEPARTMENT
 NATIONAL SAFETY NEWS MY 69 P60 64

BELKNAP ROBERT G

70 0559 0 0
 NSC WEEKLY MANAGEMENT REPORTS PORTFOLIO
 NSC 1970 VP

DOCUMENT NO.	FALLS PEOPLE	PERSONNEL	
70 1205	5	1	
	AGE OF MAN PART TWO WORKERS IN THEIR PRIME NATIONAL SAFETY NEWS D 69 P87-89		
70 2203	2	2	
	PROTECTION OF WORKMEN ON BUILDINGS TEXAS BUREAU OF LABOR STATISTICS NO UNP		
70 2212	5	7	
	COAST GUARD BOATING STATISTICS 1968 U S COAST GUARD 69 79P		
70 2345	2	2	
	GUIDE TO INSPECTION FOR SUPERVISORS PART 2 WHAT TO LOOK FOR INDUSTRIAL SUPERVISOR JE 70 P3-5		MARKER SHERMAN T
70 2804	5	7	
	STATISTICAL SUMMARY OF CASUALTIES TO COMMERCIAL VESSELS PROC OF MERCHANT MARINE COUNCIL D 69 P240-245		
70 2834	5	2	
	SAFETYBRIEFS NATIONAL SAFETY NEWS MY 70 P10 14-17		
70 3372	7	5	
	ACCIDENT FACTS 1969 EDITION NSC 69 96P		
70 3851	0	2	
	SAFETYBRIEFS NATIONAL SAFETY NEWS JE 70 P11-20		
70 3993	7	5	
	ACCIDENT FACTS 1970 EDITION NSC 70 96P		
70 4204	5	7	
	ANNUAL REPORT OF RAILROAD ACCIDENTS REPORTED FOR YEAR 1969 CALIF PUBLIC UTILITIES COMM JL 31 70 VP		
70 4251	5	7	
	BOATING STATISTICS 1969 US COAST GUARD 70 79P		
70 6038	7	7	
	ACCIDENTAL INJURIES DISABILITY BY TYPE STATISTICAL BULLETIN AG 70 P6-8		
71 0272	6	6	
	SEVENTY SEVEN POINT FOUR PER CENT FALLS COST PD 1 400 000 ANNUALLY INDUSTRIAL SUPERVISOR P O EDITION JA 71 P8-9		THUNE HARTFORD P

DOCUMENT NO.

FALLS PEOPLE

PERSONNEL

DOCUMENT NO.	FALLS PEOPLE	PERSONNEL
71 0528	2	2
OFF THE JOB YARD AND GARDEN SAFETY AND WINTER WEATHER HAZARDS NATIONAL SAFETY NEWS F 71 P70-71		
71 0869	5	5
ANNUAL REPORT PERSONNEL BOARD JEFFERSON COUNTY ALABAMA 1968 JEFFERSON COUNTY ALA PERSONNEL BD N 19 68 29P		
71 1586	2	2
PATTERN FOR PROGRESS 1971 SUPERVISORS DISCUSSION GUIDE INDUSTRIAL COMMISSION OF OHIO 71 43P		
71 3030	1	2
SLIPS TRIPS AND FALLS G ESO KIT JL/AG 71 VP		
71 4055	2	0
TWENTY THIRD WORKER FALLS TO DEATH FROM SWINGING SCAFFOLD FLORIDA DEP OF COMMERCE MY 71 1P		
71 4989	5	5
ACCIDENT FACTS 1971 EDITION NSC 71 96P		
72 1789	5	0
SAFETYBRIEFS NATIONAL SAFETY NEWS MR 72 P12 14 16 18 20		
72 4344	5	6
ACCIDENT RATE RELATED TO AGE OF EMPLOYEE AUSTRALIAN SAFETY NEWS MY/JE 72 P38-39		
73 0066	6	2
UNUSUAL INCIDENT TELL THE COMPUTER HOSPITALS JAMA D 1 72 P56-57 100		
73 3259	2	2
STATISTICS CAN SAVE LIVES JOB SAFETY & HEALTH S 73 P9-11		
74 1045	2	1
HOSPITAL HAZARDOUS HAVEN JOB SAFETY AND HEALTH F 74 P5-10		
74 1714	2	2
IDEAS FOR PROMOTING SAFETY AMERICAN MANAGEMENT ASSOC 67 56P		
74 1899	0	1
SAFETY A SECURITY RESPONSIBILITY NATIONAL SAFETY NEWS JE 74 P85-86		
		BELKNAP ROBERT G
		LEJEUNE S M
		RANDALL CAROL E
		SARTWELL FRANK
		PERSILY LARRY
		STROBL WALTER M

DOCUMENT NO.	FALLS PEOPLE	PERSONNEL	
74 2868	5	5	
	ACCIDENT FACTS 1974 EDITION NATIONAL SAFETY COUNCIL 1974 96P		
74 3379	5	5	
	JAPAN INDUSTRIAL SAFETY ASSOCIATION 1973 ANNUAL REPORT JAPAN IND SFTY ASSOC AG 74 52P		
74 3834	2	2	
	INJURY CONTROL PROGRAM FOR SMALL BUSINESS MONTHLY PLANNING GUIDE NATIONAL SAFETY COUNCIL 74 44P		
74 3871	5	5	
	INJURIES AT SAND AND GRAVEL PLANTS ANNUAL MESA 0 74 21P		
75 1736	1	1	ANTENSON RALPH
	RESTAURANT SAFETY SLIPS AND FALLS NSC TRANSACTIONS VOL 10 74 P5-7		
75 1742	1	2	REILLY T J
	FIGHTING SLIPS AND FALLS NSC TRANSACTIONS VOL 10 74 P25-28		
75 3234	2	1	WENER SIDNEY D
	MAKING REFUSE COLLECTION SAFER NATIONS CITIES 5 75 P28-31		
75 3587	6	1	
	HOW SAFE IS YOUR OFFICE NATIONAL SAFETY NEWS 0 75 P90-97		
75 3891	2	2	
	LAKE SUPERIOR MINES SAFETY COUNCIL PROC 51ST ANNUAL CONFERENCE 1975 LAKE SUPERIOR MINES SAFETY COUNCIL ND 103P		
75 4006	2	2	
	ANNUAL REPORT RAILROAD ACCIDENTS REPORTED CALENDAR YEAR 1974 CALIFORNIA PUBLIC UTILITIES COMM JE 30 75 VP		
76 2237	7	7	
	ANNUAL STATISTICS OF CASUALTIES PROCEEDINGS MARINE SAFETY COUNCIL JA 76 P8-13		
76 3456	5	5	
	ACCIDENT FACTS 1976 EDITION NATIONAL SAFETY COUNCIL 76 96P		
76 3689	5	5	
	ANNUAL REPORT RAILROAD ACCIDENTS REPORTED CALENDAR YEAR 1975 CALIFORNIA PUBLIC UTILITIES COMM JE 30 76 VP		

DOCUMENT NO.	FALLS PEOPLE	PERSONNEL	
76-3740	0	2	
	WIRE FROM WASHINGTON		ROSENFELD HARRY N
	NATIONAL SAFETY NEWS Q 76 P84-97		
77-0114	2	2	
	IRONWORKERS REACH FOR SAFETY		ODLIN WILLIAM S
	JOB SAFETY AND HEALTH D 76 P6-13		
77-0252	2	1	
	WHITE COLLAR NO GUARANTEE OF SAFETY		
	JOURNAL OF AMERICAN INSURANCE FALL 76 P22-24		
77-1440	2	2	
	TITLE INFORMATION NOT AVAILABLE		
77-1665	2	1	
	TITLE INFORMATION NOT AVAILABLE		
77-1808	7	7	
	TITLE INFORMATION NOT AVAILABLE		
77-2360	2	2	
	TITLE INFORMATION NOT AVAILABLE		

Reproduced from
best available copy.



DOCUMENT NO.

ACCONTS INDSTR

FALLS PEOPLE

DOCUMENT NO.	ACCONTS INDSTR	FALLS PEOPLE	
65 0649	0	5	
ACCIDENTS AND THE NATIONS HEALTH ACCIDENTAL DEATHS IN THE U S U S DEP HEALTH EDUCATION & WELFARE 65 35P			
65 0685	0	0	
ACCIDENT PREVENTION MANUAL 2ND EDITION DUNLOP GROUP OF COMPANIES JE 64 94P			
66 0068	5	5	
DOMESTIC ACCIDENTS WORLD HEALTH ORGAIZATION 65 137P			
67 6248	5	5	
FARM CONFERENCE COMM AND MINUTES PORTFOLIO NATIONAL SAFETY COUNCIL 67 UNP			
67 7522	1	2	
OCCUPATIONAL SAFETY AIDS U S BUREAU OF LABOR STANDARDS 67 1P			
68 1160	1	0	
MAIN CAUSES OF ACCIDENTS IN CONSTRUCTION WORLD CONSTRUCTION F 68 P26-29			
68 1403	7	5	
NSC BD OF DIRECTORS EXECUTIVE COMMITTEE MINUTES PORTFOLIO NATIONAL SAFETY COUNCIL 1968 VP			
68 1433	5	5	
NSC BOARD OF DIRECTORS EXECUTIVE COMMITTEE MINUTES PORTFOLIO NATIONAL SAFETY COUNCIL 1967 VP			
68 2253	0	0	
SAFEGUARDING THE ELDERLY HOSPITAL PATIENT SAFETY SPRING 68 P2-4 12-13 15			
68 2408	1	2	
THE HIDDEN COSTS OF ACCIDENTS TRAFFIC SAFETY AP 68 P6-8 34-35			
69 1224	5	5	
NSC BOARD OF DIRECTORS EXECUTIVE COMMITTEE MINUTES PORTFOLIO NSC 69 VP			
69 4026	5	7	
ALCOHOL AND HOME ACCIDENTS NSC TRANSACTIONS VOL 28 68 P5-8			
70 1205	6	5	
AGE OF MAN PART TWO WORKERS IN THEIR PRIME NATIONAL SAFETY NEWS D 69 P87-89			

BACKETT E M

RODSTEIN MANUEL

SCHOOLCRAFT C D

KASEY ELIZABETH

DOCUMENT NO.	ACCDNTS	INDSTR.	FALLS	PEOPLE
70 1340	1		2	
	HUMAN FACTORS OCCUPATIONAL SAFETY LABOUR SAFETY COUNCIL ONTARIO ND 72P			BALES DALTON
70 1805	1		2	
	INDUSTRIAL ACCIDENT RESEARCH HUMAN ENGINEERING APPRAISAL TORONTO UNIVERSITY JE 69 203P			SURRY JEAN
70 2345	1		2	
	GUIDE TO INSPECTION FOR SUPERVISORS PART 2 WHAT TO LOOK FOR INDUSTRIAL SUPERVISOR JE 70 P3-5			MARKER SHERMAN T
70 6356	2		2	
	ARE IN STORE ACCIDENTS IN STORE FOR YOU TRAVELERS INSURANCE COMPANIES ND UNP			
71 3256	1		0	
	SAFETY UNCENSORED TRANSWORLD PUBLISHERS 71 159P			TYE JAMES
71 4989	6		5	
	ACCIDENT FACTS 1971 EDITION NSC 71 96P			
71 5046	5		5	
	MORTALITY FROM ACCIDENTS BY AGE AND SEX STATISTICAL BULLETIN MY 71 P6-9			
71 5111	6		5	
	PROCEEDINGS OF THE 47TH ANNUAL CONFERENCE MAY 27 28 1971 LAKE SUPERIOR MINES SAFETY CONFERENCE 71 103P			
72 1322	2		2	
	PREVENTING OFFICE ACCIDENTS OCCUPATIONAL SAFETY AID US BUREAU OF LABOR STANDARDS MY 70 11P			
72 3867	7		5	
	ACCIDENT FACTS 1972 ED NSC 72 96P			
72 5442	6		5	
	ANNUAL REPORT 1971 JAPAN JAPAN INDUSTRIAL SAFETY ASSOC JL 72 42P			
72 5747	2		1	
	FALL FROM POLE ACCIDENT NSC PUB UTIL SECT NEWSLETTER JL 72 P3			
73 0036	1		5	
	CAUSE AND EFFECT INVES ASPECTS INDUSTRIAL ACCIDENTS UNITED KINGDOM INTERNATIONAL LABOR REVIEW 71 P99-115			CRONIN J B

DOCUMENT NO. ACCONTS INDSTR FALLS PEOPLE

73 0408	5	0	
NSC WEEKLY MANAGEMENT REPORTS NSC 1973 VP			
73 2933	2	5	
ASPECTS OF SAFETY INST GAS ENGINEERS J F 72 P44-56			
73 3192	6	5	
OPERATIONAL ACCIDENTS AND RADIATION EXPOSURE WITHIN ATOMIC ENERGY COMM ATOMIC ENERGY COMMISSION 71 126P			
73 3820	6	5	
ANNUAL REPORT 1972 JAPAN INDUSTRIAL SAFETY ASSOCIATION JAPAN INDUSTRIAL SAFETY ASSOC 73 40P			
73 3950	2	2	
SAFEGUARDING THE ELDERLY HOSPITAL PATIENT NSC HOSP SF SER SEC NEWSLETTER JE 73 P1-3			
74 0483	6	5	
ANNUAL REPORT 1973 INDIANA INDIANA STATE HIGHWAY COMMISSION ND 6P			
74 1641	0	0	
SAFETY GUIDELINES MOTOR FLEET PREVENTIVE MAINTENANCE PROGRAM NATIONAL SAFETY NEWS MY 74 P59-64			
74 1730	5	5	
ACCIDENT FATALITIES CANADA 1972 CANADA SAFETY COUNCIL ND 23P			
74 3072	5	5	
FLORIDA VITAL STATISTICS 1973 FLORIDA DEPT HEALTH & REHAB 73 87P			
74 3379	6	5	
JAPAN INDUSTRIAL SAFETY ASSOCIATION 1973 ANNUAL REPORT JAPAN IND SFTY ASSOC AG 74 52P			
75 0152	1	1	
WORK FATALITIES INVOLVING SCAFFOLDS CALIFORNIA 1970 1972 CALIFORNIA SAFETY NEWS D 74 P1-2			
75 0428	5	5	
COAL MINING INDUSTRY FATALITIES IN 1974 MESA SAFETY REVIEWS JA 75 9P			
75 0488	0	0	
WEEKLY MANAGEMENT REPORTS PORTFOLIO NSC 75 VP			

RODSTEIN M

HUELKE DONALD F

DOCUMENT NO. ACCDNTS INDSTR FALLS PEOPLE

75 0913	5	5	UPDATE ON THE FEDERAL METAL AND NONMETALLIC MINE SAFETY ACT NSC TRANSACTIONS VOL 16 74 P9-13	DAY JAMES M
75 1229	1	2	HUMAN FACTORS IN FOUR CANADIAN CASE STUDIES ACCDNTS ON PUNCH PRESSES ASSE JOURNAL D 70 P25-30	JONES DONALD F
75 2635	5	5	NINETEEN SEVENTY THREE WAS A DISAPPOINTING YEAR OCCUPATIONAL SAFETY AND HEALTH D 74 P14-16	HAMILTON MARGARET
75 3084	5	5	STATISTICAL REPORT NEBRASKA DEPARTMENT OF HEALTH 1974 NEBRASKA STATE DEPT OF HEALTH ND P60-67	
75 3159	5	5	MANAGERS SAFETY COMMITMENT NATIONAL SAFETY NEWS S 75 P77-80	UNDERWOOD H CLARK
75 3588	2	5	WIRE FROM WASHINGTON NATIONAL SAFETY NEWS O 75 P99-112 119-123	ROSENFELD HARRY N
75 3891	5	2	LAKE SUPERIOR MINES SAFETY COUNCIL PROC 51ST ANNUAL CONFERENCE 1975 LAKE SUPERIOR MINES SAFETY COUNCIL ND 103P	
75 3897	2	2	ANNUAL REPORT OF THE CHIEF SAFETY ENGINEER FOR 1973 74 NATIONAL COAL BOARD GREAT BRITAIN S 74 38P	
75 3903	5	5	FLORIDA VITAL STATISTICS 1974 FLORIDA DEP HLTH & REHAB SERV ND 110P	
76 0251	6	5	SUMMARY OF MINING ACCIDENT STATISTICS AND EMPLOYMENT 1974 ONTARIO CAN MINISTRY NATURAL RESOURCES 75 12P	
76 0318	1	2	SAFETY IN THE SHOP OCCUPATIONAL SAFETY AND HEALTH D 75 P14-15	
76 0321	5	5	COAL MINING INDUSTRY FATALITIES IN 1975 MINING ENFORCEMENT SAFETY ADMIN JA 76 7P	
76 1618	1	2	FREQUENTLY OCCURRING ACCIDENTS CAN BE PREVENTED HOSPITALS NY 1 76 P86 88-90	ELLIS BARBARA

DOCUMENT NO.	ACCDNTS	INDSTR.	FALLS	PEOPLE	
76 2449	1		2		MATEYKA JAMES A
		CAUSE AND PREVENTION OF ON BOARD ACCIDENTS NSC TRANSACTIONS VOL.17 75 P41-45			
76 2846	1		2		HICKEY JAMES A
		REDUCE WORK HAZARDS VIA ACCIDENT REVIEWS PIT AND QUARRY S 76 P87-89 96			
76 3096	5		5		
		STATISTICAL REPORT NEBRASKA DEPARTMENT OF HEALTH 1975 NEBRASKA STATE DEPT OF HEALTH JL 1 76 105P			
76 3639	6		5		
		SUMMARY OF MINING ACCIDENT STATISTICS AND EMPLOYMENT 1975 BULLETIN 175 ONTARIO CAN MINISTRY NATURAL RESOURCES 76 12P			
76 3847	6		5		
		JAPAN INDUSTRIAL SAFETY ASSOCIATION 1974 ANNUAL REPORT JAPAN IND SFTY ASSOC JL 75 51P			
77 1157	5		5		
		TITLE INFORMATION NOT AVAILABLE			

DOCUMENT NO.	FALLS PEOPLE	WORK	
65 0054	5	5	
	OKLAHOMA ACCIDENT FACTS OKLAHOMA SAFETY COUNCIL 64 13P		
65 0159	5	5	
	MEDICAL EXAMINERS DIGEST DADE COUNTY FLORIDA 63 41P		DAVIS JOSEPH H
65 0696	5	5	
	CALIFORNIA WORK INJURIES 1962 CAL DEP OF INDUSTRIAL RELATIONS 64 47P		
65 0845	5	5	
	ANNUAL REPORT COMPENSABLE WORK INJURIES REPORTED PART I 1963 ILLINOIS DEP OF LABOR MR 65 VP		
65 1336	5	5	
	REGIONAL SAFETY CONFERENCE FOR CIVIC LEADERS NEW ORLEANS LA PF NATIONAL SAFETY COUNCIL 65 VP		
65 1435	5	5	
	DONT FALL DOWN ON THE JOB NATIONAL SAFETY COUNCIL 65 7P		
65 1493	5	5	
	ACCIDENT FACTS 1965 NATIONAL SAFETY COUNCIL 97P		
65 1514	5	5	
	PROCEEDINGS FARM SAFETY CONFERENCE WEST CA FARM SAFETY CONF F 65 71P		
65 1558	5	5	
	KANSAS AGRICULTURAL ACCIDENTAL DEATH REPORT 1964 KANSAS DEP OF HEALTH ND 21P		
65 1783	5	5	
	SAFETY WISE ACCIDENTS TO THE AGING LOS ANGELES CAL COMM ON AGING 64 33P		
65 0068	5	5	
	DOMESTIC ACCIDENTS WORLD HEALTH ORGAIZATION 65 137P		BACKETT E M
66 0079	0	0	
	INDUSTRIAL CONFERENCE MINUTES AND COMMITTEES PORTFOLIO NATIONAL SAFETY COUNCIL 65 UNP		
66 0285	5	5	
	ACCIDENTAL DEATH REPORT KANSAS DEP OF HEALTH 63-64 93P		

DOCUMENT NO.

FALLS PEOPLE

WORK

66 1802	5	5	WORK ACCIDENTS SURVEY 1965 CHICAGO CITY BD OF EDUCATION 65 60P	WILLIS BENJAMIN C
66 1840	5	5	INJURY EXPERIENCE IN COAL MINING 1963 U S BUREAU OF MINES 66 86P	MOYER FORREST T
67 0464	5	5	MINUTES MEETING BOARD OF DIRECTORS NEW YORK CITY EXFC COMM NSC JA 17 67 UNP	
67 0620	5	5	OFF THE JOB SAFETY PROGRAMMING FOR FEDERAL AGENCIES FEDERAL SAFETY COUNCIL ND VP	
67 0844	5	5	WORK FATALITIES IN AGRICULTURE CALIFORNIA 1966 CAL DIV LABOR STATISTICS & RES F 66 4P	
67 0867	5	5	WORK INJURIES IN CALIFORNIA CAL DIV LABOR STATISTICS & RES D 66 8P	
67 6432	0	5	WORK INJURIES IN CALIFORNIA CAL DEP INDUSTRIAL RELATIONS JA 67 5P	
67 670A	6	1	PROCEEDINGS 3RD AMA CONGRESS ON ENVIRONMENTAL HEALTH PROBLEMS AMA 66 122P	
67 7320	2	1	WORK INJURIES IN CALIFORNIA CALIFORNIA DEP IND RELATIONS 67 5P	
67 7478	2	1	SAF IN INDUSTRY INSTRUCTOR OUTLINE SAFE WORKING SURFACES U S DEP OF LABOR 67 32P	
67 7494	2	2	DEV & OPERATION ACDT CONTROL PROG THROUGH HEALTH DEP UNIV OF MICHIGAN 67 205P	TIBONI EMIL A
67 7800	2	2	PROCEEDING 4TH WORLD CONG ON PREVENTION OF OCCUPATIONAL ACDT ROSPA JL 64 301P	
67 7837	5	5	FEDERAL WORK INJURIES DURING CALENDAR YEAR 1966 U S DEP OF LABOR S 67 28P	

88

3



DOCUMENT NO.	FALLS PEOPLE	WORK	
68 0167	5	0	
OCCUPATIONAL HEALTH OF AGRICULTURAL WORKERS IN CALIFORNIA CAL DEP OF PUB HEALTH D 65 34P			
68 0168	5	5	
WORK INJURIES IN CALIFORNIA AGRICULTURE 1963 CAL DEP INDUSTRIAL RELATIONS 65 18P			
68 0369	5	5	
WORK INJURIES IN A MEDICAL ORGANIZATION ARCH ENVIRON HEALTH N 67 P554-61			
			MANN K J
68 1645	2	2	
HOSPITAL SAFETY MANUAL AMERICAN HOSPITAL ASSOCIATION JL 68 116P			
68 2583	5	5	
ACCIDENT FACTS NATIONAL SAFETY COUNCIL 67 96P			
68 2584	5	5	
ACCIDENT FACTS NATIONAL SAFETY COUNCIL 68 96P			
69 0679	5	6	
AGRICULTURAL ACCIDENTAL DEATH REPORT KANSAS KANSAS STATE DEPARTMENT OF HEALTH 67 21P			
			FRANZEN IRVIN G
69 1224	5	5	
NSC BOARD OF DIRECTORS EXECUTIVE COMMITTEE MINUTES PORTFOLIO NSC 69 VP			
69 1648	7	2	
OFFICE SAFETY NATIONAL SAFETY NEWS O 68 P45-50			
			POWERS THOMAS
69 1729	5	7	
KANSAS AGRICULTURAL ACCIDENTAL DEATH REPORT 1966 KANSAS DEPARTMENT OF HEALTH ND 21P			
69 2020	5	6	
KANSAS AGRUCULTURAL ACCIDENTAL DEATH REPORT 1968 KANSAS STATE DEPARTMENT OF HEALTH 68 23P			
			FRANZEN IRVIN G
69 3170	7	7	
SCHOOL COLLEGE ACCIDENTS N S C 68 7P			
69 3448	5	6	
FEDERAL WORK INJURIES SUSTAINED DURING CALENDAR YEAR 1968 US BUREAU OF EMPLOYEE COMPENSATION S 69 28P			

DOCUMENT NO. FALLS PEOPLE WORK

68 0167	5	0	
			PUBLIC ACCIDENT FACTS EDITION 1969 NATIONAL SAFETY COUNCIL 69 6P
69 4837	2	1	
			SEVEN DAYS OF SAFETY NATIONAL FARM SAFETY WEEK FARM SAFETY REVIEW JL-AG 67 P12-13
70 0048	0	0	
			TAKING A BELT FOR SAFETY NATIONAL SAFETY NEWS MR 69 P159-160
70 0559	0	5	
			NSC WEEKLY MANAGEMENT REPORTS PORTFOLIO NSC 1970 VP
70 1340	2	1	
			HUMAN FACTORS OCCUPATIONAL SAFETY LABOUR SAFETY COUNCIL ONTARIO ND 72P
70 1805	2	2	
			INDUSTRIAL ACCIDENT RESEARCH HUMAN ENGINEERING APPRAISAL TORONTO UNIVERSITY JE 69 203P
70 2257	7	6	
			WORK ACCIDENTS SURVEY 1963 CHICAGO ILL BOARD OF EDUCATION 63 57P
70 2555	5	5	
			KANSAS ACCIDENTAL DEATH REPORT KANSAS STATE DEPARTMENT OF HEALTH 68 80P
70 3171	7	5	
			SOME FACTS ABOUT ACCIDENTS 7 ARTICLES FROM STATISTICAL BULLETIN METROPOLITAN LIFE INSURANCE CO ND 18P
70 3372	7	6	
			ACCIDENT FACTS 1969 EDITION NSC 69 96P
70 3431	5	5	
			INJURY EXP NONMETALLIC MINERAL INDUS EXCEPT STONE COAL 1964 65 IC 8481 US BUREAU OF MINES AG 70 131P
70 3477	2	1	
			SAFETY IN CONSTRUCTION WORK GENERAL SITE SAFETY PRACTICE HER MAJESTYS STATIONERY OFFICE JL 66 23P
70 3993	7	6	
			ACCIDENT FACTS 1970 EDITION NSC 70 96P

BALES DALTON

SURRY JEAN

FRANZEN IRVIN

MOYER FORREST

DOCUMENT NO.	FALLS PEOPLE	WORK	
71 0528	2	2	
	OFF THE JOB YARD AND GARDEN SAFETY AND WINTER WEATHER HAZARDS NATIONAL SAFETY NEWS F 71 P70-71		BELKNAP ROBERT G
71 2235	5	5	
	DISABLING INJURIES BY TYPE OF ACCIDENT STATISTICAL BULLETIN D 70 P10-11		
71 3703	5	7	
	SAFETY FOR MAN MADE STRUCTURES NSC D 3 70 6P		FLETCHER WILLIAM J
71 4989	5	7	
	ACCIDENT FACTS 1971 EDITION NSC 71 96P		
72 0772	5	6	
	DISABLING WORK INJURY EXPERIENCE OIL NATURAL GAS IND US 1970 US BUREAU OF MINES MR 72 17P		WATTS GWENDOLYN M
72 2612	5	5	
	TEXAS SENIOR CITIZENS ACCIDENT STUDY TEXAS SAFETY ASSOC 71 77P		
72 2765	2	1	
	INSPECT YOUR PLANT FOR COMPLIANCE NSC TRANSACTIONS VOL 10 71 P27-30		REBHOLZ HOWARD
6 72 3228	7	7	
	SURVEY DEFINITIONS FARM SAFETY REVIEW JE 72 P6-7 10		
72 3867	5	6	
	ACCIDENT FACTS 1972 ED NSC 72 96P		
72 4291	0	0	
	WORST FIRST TARGET SHOOTS FOR BEST SAFETY STANDARDS JL/AG 72 P26-29		FOSTER JAMES
72 4689	5	5	
	INJURY EXPERIENCE IN QUARRYING 1961-63 IC 8562 BUREAU OF MINES 72 184P		MOYER FORREST T
72 4690	5	5	
	ANNUAL REPORT YEAR ENDED DEC 1970 SOUTH AUSTRALIA S AUSTRALIA DEP LAB INDUSTRY 71 45P		
72 5042	5	7	
	ANNUAL REPORT 1971 JAPAN JAPAN INDUSTRIAL SAFETY ASSOC JL 72 42P		

DOCUMENT NO. FALLS PEOPLE WORK

73 0036	5	2	CAUSE AND EFFECT INVES ASPECTS INDUSTRIAL ACCIDENTS UNITED KINGDOM INTERNATIONAL LABOR REVIEW 71 P99-115	CRONIN J B
73 0408	0	0	NSC WEEKLY MANAGEMENT REPORTS NSC 1973 VP	
73 2609	5	6	KANSAS ACCIDENTAL DEATH REPORT 1967 1968 KANSAS DEP OF HEALTH 69 80P	
73 3117	5	5	ACCIDENT FACTS 1973 NSC 73 96P	
73 3820	5	5	ANNUAL REPORT 1972 JAPAN INDUSTRIAL SAFETY ASSOCIATION JAPAN INDUSTRIAL SAFETY ASSOC 73 40P	
73 4125	7	7	FARM RESIDENT ACCIDENT 1972 FARM SAFETY REVIEW S/O 73 P12-15	
74 0483	5	5	ANNUAL REPORT 1973 INDIANA INDIANA STATE HIGHWAY COMMISSION ND 6P	
74 1714	2	2	IDEAS FOR PROMOTING SAFETY AMERICAN MANAGEMENT ASSOC 67 56P	
74 1840	2	1	OFFICE WORK A HAZARDOUS OCCUPATION MUTUAL INSURANCE BULLETIN MY 74 P9	
74 2868	5	5	ACCIDENT FACTS 1974 EDITION NATIONAL SAFETY COUNCIL 1974 96P	
74 3240	7	5	NEBRASKA STATISTICAL REPORT 73 NEBRASKA STATE DEPT HEALTH 73 102P	
74 3297	5	7	FARM RESIDENT ACCIDENTS 1973 FARM SAFETY REVIEW S/O 74 P11-14	
74 3379	5	5	JAPAN INDUSTRIAL SAFETY ASSOCIATION 1973 ANNUAL REPORT JAPAN IND SFTY ASSOC AG 74 52P	

DOCUMENT NO. FALLS PEOPLE WORK

74 3563	5	5	KANSAS AGRICULTURAL ACCIDENTAL DEATH REPORT 1973 KANSAS STATE DEPT HEALTH & ENVIRNMNT 73 21P	
74 3834	2	2	INJURY CONTROL PROGRAM FOR SMALL BUSINESS MONTHLY PLANNING GUIDE NATIONAL SAFETY COUNCIL 74 44P	
74 3871	5	5	INJURIES AT SAND AND GRAVEL PLANTS ANNUAL MESA 0 74 21P	
75 0488	0	0	WEEKLY MANAGEMENT REPORTS PORTFOLIO NSC 75 VP	HUELKE DONALD F
75 0689	2	1	TARGET INDUSTRY PROGRAM REVISITED 24 PAGE SPECIAL REPORT NATIONAL SAFETY NEWS MR 75 P69-92	
75 0698	2	1	OSHA COMPLIANCE STILL THORNY NATIONAL PROVISIONER MR 8 75 P13-14	
75 1751	2	2	MEETING OSHA HALFWAY NSC TRANSACTIONS VOL 10 74 P55-57	KINCHELOE ROBERT S
75 1960	5	5	INJURY EXPERIENCE IN QUARRYING 1970 1971 MESA IR 1007 MINING ENFORCEMENT SFTY ADM 75 164P	
75 2635	5	2	NINETEEN SEVENTY THREE WAS A DISAPPOINTING YEAR OCCUPATIONAL SAFETY AND HEALTH D 74 P14-16	HAMILTON MARGARET
75 3034	5	6	ACCIDENT FACTS 1975 NATIONAL SAFETY COUNCIL 75 96P	
75 3303	2	2	TEXTILE INJURY CONTROL NSC TEXTILE SECTION REV 1975 31P	
75 3513	7	7	FARM RESIDENT ACCIDENTS 1974 FARM SAFETY REVIEW S/O 75 P12-15	
75 3588	5	1	WIRE FROM WASHINGTON NATIONAL SAFETY NEWS 0 75 P99-112 119-123	ROSENFELD HARRY N

DOCUMENT NO.

FALLS PEOPLE

WORK

75 4072	2	2	
CHECKPOINT 76 1976 GUIDE TO SAFETY INDUSTRIAL ACCIDENT PREVENTION ASSN ND 39P			
76 055A	7	7	
BODY INJURIES			
FARM SAFETY REVIEW VOL 34 NO 1 76 P9-13			
76 2055	2	1	
LADDER SAFETY PART 1			
SAFETY SURVEYOR JA 76 P15-18			
76 2507	2	2	
FIVE MINUTE TALKS ON OFF THE JOB SAFETY			
NATIONAL SAFETY LEAGUE OF CANADA 65 UNP			
76 2846	2	1	
REDUCE WORK HAZARDS VIA ACCIDENT REVIEWS			
PIT AND QUARRY S 76 P87-89 96			
76 337A	2	1	
HANDBOOK FOR SAFE LIVING HAVE A SAFE DAY			
BRITISH COLUMBIA AUTOMOBILE INSRNC BRD JE 72 48P			
76 3456	5	5	
ACCIDENT FACTS 1976 EDITION			
NATIONAL SAFETY COUNCIL 76 96P			
76 3744	0	1	
WIRE FROM WASHINGTON			
NATIONAL SAFETY NEWS 0 76 P84-97			
76 3847	5	5	
JAPAN INDUSTRIAL SAFETY ASSOCIATION 1974 ANNUAL REPORT			
JAPAN IND SFTY ASSOC JL 75 51P			
76 3864	5	5	
INJURY EXPERIENCE IN QUARRYING 1972 IR 1044			
MINING ENFORCEMENT AND SFTY ADM 76 89P			
77 0222	5	6	
WORK INJURIES IN TRUCKING CALIFORNIA			
CALIFORNIA DEPT INDUS RELATIONS JE 75 23P			
77 0505	5	5	
DISABLING WORK INJURIES IN SAWMILLS AND PLANING MILLS CALIFORNIA 1974			
CALIFORNIA DEPT INDUS RELATIONS ND 22P			
77 1291	1	1	
TITLE INFORMATION NOT AVAILABLE			

HANFORD WILLIAM D

HICKEY JAMES A

ROSENFIELD HARRY N

DOCUMENT NO. FREE FALLS

68 0011	1	SURVIVAL OF HIGH-VELOCITY FREE-FALLS IN WATER FEDERAL AVIATION AGENCY AP 65 12P	SNYDER RICHARD G
75 1926	1	FALL ARRESTOR ALERT NATIONAL SAFETY NEWS JE 76 P78-82	DICKIE D E
77 0406	1	FREE FALL RESTRAINT SYSTEMS PROFESSIONAL SAFETY F 77 P9-13	WANG CHEN H

APPENDIX C.

OCCUPATIONAL CLASSIFICATION SYSTEM

(U.S. Bureau of Census, Alphabetical Index of Industries and Occupations, 1970)

OCCUPATIONAL CLASSIFICATION SYSTEM

Equivalent numeric codes follow the alphabetic codes. Either code may be utilized, depending on the processing method. "N.e.c." means "not elsewhere classified."

Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS	Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS—Continued
001	Accountants		
002	Architects	074	Nurses, dietitians, and therapists
	Computer specialists	075	Dietitians
003	Computer programmers	076	Registered nurses
004	Computer systems analysts		Therapists
005	Computer specialists, n.e.c.	080	Health technologists and technicians
	Engineers	081	Clinical laboratory technologists and technicians
006	Aeronautical and astronautical engineers	082	Dental hygienists
010	Chemical engineers	083	Health record technologists and technicians
011	Civil engineers	084	Radiologic technologists and technicians
012	Electrical and electronic engineers	085	Therapy assistants
013	Industrial engineers		Health technologists and technicians, n.e.c.
014	Mechanical engineers	086	Religious workers
015	Metallurgical and materials engineers	090	Clergymen
020	Mining engineers		Religious workers, n.e.c.
021	Petroleum engineers	091	Social scientists
022	Sales engineers	092	Economists
023	Engineers, n.e.c.	093	Political scientists
024	Farm management advisors	094	Psychologists
025	Foresters and conservationists	095	Sociologists
026	Home management advisors	096	Urban and regional planners
	Lawyers and judges		Social scientists, n.e.c.
030	Judges	100	Social and recreation workers
031	Lawyers	101	Social workers
	Librarians, archivists, and curators	101	Recreation workers
032	Librarians	102	Teachers, college and university
033	Archivists and curators	103	Agriculture teachers
	Mathematical specialists	104	Atmospheric, earth, marine, and space teachers
034	Actuaries	105	Biology teachers
035	Mathematicians	110	Chemistry teachers
036	Statisticians	111	Physics teachers
	Life and physical scientists	112	Engineering teachers
042	Agricultural scientists	113	Mathematics teachers
043	Atmospheric and space scientists	114	Health specialties teachers
044	Biological scientists	115	Psychology teachers
045	Chemists	116	Business and commerce teachers
051	Geologists	120	Economics teachers
052	Marine scientists	121	History teachers
053	Physicists and astronomers	122	Sociology teachers
054	Life and physical scientists, n.e.c.	123	Social science teachers, n.e.c.
055	Operations and systems researchers and analysts	124	Art, drama, and music teachers
056	Personnel and labor relations workers	125	Coaches and physical education teachers
	Physicians, dentists, and related practitioners	126	Education teachers
061	Chiropractors	130	English teachers
062	Dentists	131	Foreign language teachers
063	Optometrists	132	Home economics teachers
064	Pharmacists	133	Law teachers
065	Physicians, medical and osteopathic	134	Theology teachers
071	Podiatrists	135	Trade, industrial, and technical teachers
072	Veterinarians	140	Miscellaneous teachers, college and university
073	Health practitioners, n.e.c.		Teachers, college and university, subject not specified

Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS—Continued
	Teachers, except college and university
141	Adult education teachers
N (142)	Elementary school teachers
143	Prekindergarten and kindergarten teachers
144	Secondary school teachers
145	Teachers, except college and university, n.e.c.
	Engineering and science technicians
150	Agriculture and biological technicians, except health
151	Chemical technicians
152	Draftsmen
153	Electrical and electronic engineering technicians
154	Industrial engineering technicians
155	Mechanical engineering technicians
156	Mathematical technicians
161	Surveyors
162	Engineering and science technicians, n.e.c.
	Technicians, except health, and engineering and science
163	Airplane pilots
164	Air traffic controllers
165	Embalmers
170	Flight engineers
171	Radio operators
172	Tool programmers, numerical control
173	Technicians, n.e.c.
174	Vocational and educational counselors
	Writers, artists, and entertainers
175	Actors
180	Athletes and kindred workers
181	Authors
182	Dancers
183	Designers
184	Editors and reporters
185	Musicians and composers
190	Painters and sculptors
191	Photographers
192	Public relations men and publicity writers
193	Radio and television announcers
194	Writers, artists, and entertainers, n.e.c.
195	Research workers, not specified
	MANAGERS AND ADMINISTRATORS, EXCEPT FARM
201	Assessors, controllers, and treasurers; local public administration
202	Bank officers and financial managers
203	Buyers and shippers, farm products
205	Buyers, wholesale and retail trade
210	Credit men
211	Funeral directors
212	Health administrators
213	Construction inspectors, public administration
215	Inspectors, except construction, public administration
216	Managers and superintendents, building
220	Office managers, n.e.c.
221	Officers, pilots, and pursers; ship
222	Officials and administrators; public administration, n.e.c.
223	Officials of lodges, societies, and unions
224	Postmasters and mail superintendents
225	Purchasing agents and buyers, n.e.c.
226	Railroad conductors

Occupation Code	MANAGERS AND ADMINISTRATORS, EXCEPT FARM—Continued
230	Restaurant, cafeteria, and bar managers
231	Sales managers and department heads, retail trade
233	Sales managers, except retail trade
235	School administrators, college
240	School administrators, elementary and secondary
245	Managers and administrators, n.e.c.

SALES WORKERS

260	Advertising agents and salesmen
261	Auctioneers
262	Demonstrators
264	Hucksters and peddlers
265	Insurance agents, brokers, and underwriters
266	Newsboys
270	Real estate agents and brokers
271	Stock and bond salesmen
280	Salesmen and sales clerks, n.e.c. ¹

CLERICAL AND KINDRED WORKERS

301	Bank tellers
303	Billing clerks
P (305)	Bookkeepers
310	Cashiers
311	Clerical assistants, social welfare
312	Clerical supervisors, n.e.c.
313	Collectors, bill and account
314	Counter clerks, except food
315	Dispatchers and starters, vehicle
320	Enumerators and interviewers
321	Estimators and investigators, n.e.c.
323	Expeditors and production controllers
325	File clerks
326	Insurance adjusters, examiners, and investigators
330	Library attendants and assistants
331	Mail carriers, post office
332	Mail handlers, except post office
333	Messengers and office boys
334	Meter readers, utilities
	Office machine operators
341	Bookkeeping and billing machine operators
342	Calculating machine operators
343	Computer and peripheral equipment operators
344	Duplicating machine operators

¹Category "280 Salesmen and sales clerks, n.e.c." was subdivided in the Census into 5 occupation groups dependant on industry. The industry codes are shown in parentheses.

Occ. Code	
281	Sales representatives, manufacturing industries (Ind. 107-399)
282	Sales representatives, wholesale trade (Ind. 017-058, 507-599)
283	Sales clerks, retail trade (Ind. 608-699 except 618, 639, 649, 667, 668, 688)
284	Salesmen, retail trade (Ind. 607, 618, 639, 649, 667, 668, 688)
285	Salesmen of services and construction (Ind. 067-078, 407-499, 707-947)

Occupation Code **CLERICAL AND KINDRED WORKERS—Continued**

Office machine operators—Continued

345 Key punch operators
 350 Tabulating machine operators
 355 Office machine operators, n.e.c.
 360 Payroll and timekeeping clerks
 361 Postal clerks
 362 Proofreaders
 363 Real estate appraisers
 364 Receptionists
 Secretaries
 370 Secretaries, legal
 371 Secretaries, medical
 Q (372) Secretaries, n.e.c.
 374 Shipping and receiving clerks
 375 Statistical clerks
 376 Stenographers
 381 Stock clerks and storekeepers
 382 Teacher aides, exc. school monitors
 383 Telegraph messengers
 384 Telegraph operators
 385 Telephone operators
 390 Ticket, station, and express agents
 391 Typists
 392 Weighers
 394 Miscellaneous clerical workers
 395 Not specified clerical workers

CRAFTSMEN AND KINDRED WORKERS

401 Automobile accessories installers
 402 Bakers
 403 Blacksmiths
 404 Boilermakers
 405 Bookbinders
 410 Brickmasons and stonemasons
 411 Brickmasons and stonemasons, apprentices
 412 Bulldozer operators
 413 Cabinetmakers
 R (415) Carpenters
 416 Carpenter apprentices
 420 Carpet installers
 421 Cement and concrete finishers
 422 Compositors and typesetters
 423 Printing trades apprentices, exc. pressmen
 424 Cranemen, derrickmen, and hoistmen
 425 Decorators and window dressers
 426 Dental laboratory technicians
 430 Electricians
 431 Electrician apprentices
 433 Electric power linemen and cablemen
 434 Electrotypers and stereotypers
 435 Engravers, exc. photoengravers
 436 Excavating, grading, and road machine operators; exc. bulldozer
 440 Floor layers, exc. tile setters
 441 Foremen, n.e.c.
 442 Forgemen and hammermen
 443 Furniture and wood finishers
 444 Furriers
 445 Glaziers
 446 Heat treaters, annealers, and temperers
 450 Inspectors, scalers, and graders; log and lumber
 452 Inspectors, n.e.c.

Occupation Code **CRAFTSMEN AND KINDRED WORKERS—Continued**

453 Jewelers and watchmakers
 454 Job and die setters, metal
 455 Locomotive engineers
 456 Locomotive firemen
 461 Machinists
 462 Machinist apprentices
 Mechanics and repairmen
 Air conditioning, heating, and refrigeration
 471 Aircraft
 472 Automobile body repairmen
 S (473) Automobile mechanics
 474 Automobile mechanic apprentices
 475 Data processing machine repairmen
 480 Farm implement
 481 Heavy equipment mechanics, incl. diesel
 482 Household appliance and accessory installers and mechanics
 483 Loom fixers
 484 Office machine
 485 Radio and television
 486 Railroad and car shop
 491 Mechanic, exc. auto, apprentices
 492 Miscellaneous mechanics and repairmen
 495 Not specified mechanics and repairmen
 501 Millers; grain, flour, and feed
 502 Millwrights
 503 Molders, metal
 504 Molder apprentices
 505 Motion picture projectionists
 506 Opticians, and lens grinders and polishers
 510 Painters, construction and maintenance
 511 Painter apprentices
 512 Paperhangers
 514 Pattern and model makers, exc. paper
 515 Photoengravers and lithographers
 516 Piano and organ tuners and repairmen
 520 Plasterers
 521 Plasterer apprentices
 522 Plumbers and pipe fitters
 523 Plumber and pipe fitter apprentices
 525 Power station operators
 530 Pressmen and plate printers, printing
 531 Pressman apprentices
 533 Rollers and finishers, metal
 534 Roofers and slaters
 535 Sheetmetal workers and tinsmiths
 536 Sheetmetal apprentices
 540 Shipfitters
 542 Shoe repairmen
 543 Sign painters and letterers
 545 Stationary engineers
 546 Stone cutters and stone carvers
 550 Structural metal craftsmen
 551 Tailors
 552 Telephone installers and repairmen
 554 Telephone linemen and splicers
 560 Tile setters
 561 Tool and die makers
 562 Tool and die maker apprentices
 563 Upholsterers
 571 Specified craft apprentices, n.e.c.
 572 Not specified apprentices

Occu- pation Code	CRAFTSMEN AND KINDRED WORKERS— Continued
575	Craftsmen and kindred workers, n.e.c.
580	Former members of the Armed Forces
OPERATIVES, EXCEPT TRANSPORT	
601	Asbestos and insulation workers
T (602)	Assemblers
603	Blasters and powdermen
604	Bottling and canning operatives
605	Chainmen, rodmen, and axmen; surveying
610	Checkers, examiners, and inspectors; manufacturing
611	Clothing ironers and pressers
612	Cutting operatives, n.e.c.
613	Dressmakers and seamstresses, except factory
614	Drillers, earth
615	Dry wall installers and lathers
620	Dyers
621	Filers, polishers, sanders, and buffers
622	Furnacemen, smeltermen, and pourers
623	Garage workers and gas station attendants
624	Graders and sorters, manufacturing
625	Produce graders and packers, except factory and farm
626	Heaters, metal
630	Laundry and dry cleaning operatives, n.e.c.
631	Meat cutters and butchers, exc. manufacturing
633	Meat cutters and butchers, manufacturing
634	Meat wrappers, retail trade
635	Metal platers
636	Milliners
640	Mine operatives, n.e.c.
641	Mixing operatives
642	Oilers and greasers, exc. auto
643	Packers and wrappers, except meat and produce
644	Painters, manufactured articles
645	Photographic process workers
	Precision machine operatives
650	Drill press operatives
651	Grinding machine operatives
652	Lathe and milling machine operatives
653	Precision machine operatives, n.e.c.
656	Punch and stamping press operatives
660	Riveters and fasteners
661	Sailors and deckhands
662	Sawyers
663	Sewers and stitchers
664	Shoemaking machine operatives
665	Solderers
666	Stationary firemen
	Textile operatives
670	Carding, lapping, and combing operatives
671	Knitters, loopers, and toppers
672	Spinners, twistors, and winders
673	Weavers
674	Textile operatives, n.e.c.
680	Welders and flame-cutters
681	Winding operatives, n.e.c.
690	Machine operatives, miscellaneous specified
692	Machine operatives, not specified
694	Miscellaneous operatives
695	Not specified operatives

Occu- pation Code	TRANSPORT EQUIPMENT OPERATIVES
701	Boatmen and canalmen
703	Bus drivers
704	Conductors and motormen, urban rail transit
705	Deliverymen and routemen
706	Fork lift and tow motor operatives
710	Motormen; mine, factory, logging camp, etc.
711	Parking attendants
712	Railroad brakemen
713	Railroad switchmen
714	Taxicab drivers and chauffeurs
U (715)	Truck drivers
LABORERS, EXCEPT FARM	
740	Animal caretakers, exc. farm
750	Carpenters' helpers
V (751)	Construction laborers, exc. carpenters' helpers
752	Fishermen and oystermen
753	Freight and material handlers
754	Garbage collectors
755	Gardeners and groundskeepers, exc. farm
760	Longshoremen and stevedores
761	Lumbermen, raftsmen, and woodchoppers
762	Stock handlers
763	Teamsters
764	Vehicle washers and equipment cleaners
770	Warehousemen, n.e.c.
780	Miscellaneous laborers
785	Not specified laborers
FARMERS AND FARM MANAGERS	
W (801)	Farmers (owners and tenants)
802	Farm managers
FARM LABORERS AND FARM FOREMEN	
821	Farm foremen
822	Farm laborers, wage workers
823	Farm laborers, unpaid family workers
824	Farm service laborers, self-employed
SERVICE WORKERS, EXC. PRIVATE HOUSEHOLD	
	Cleaning service workers
901	Chambermaids and maids, except private household
902	Cleaners and charwomen
X (903)	Janitors and sextons
	Food service workers
910	Bartenders
911	Busboys
912	Cooks, except private household
913	Dishwashers
914	Food counter and fountain workers
Y (915)	Waiters
916	Food service workers, n.e.c., except private household

Occupation Code	SERVICE WORKERS, EXC. PRIVATE HOUSEHOLD—Continued
	Health service workers
921	Dental assistants
922	Health aides, exc. nursing
923	Health trainees
924	Lay midwives
925	Nursing aides, orderlies, and attendants
926	Practical nurses
	Personal service workers
931	Airline stewardesses
932	Attendants, recreation and amusement
933	Attendants, personal service, n.e.c.
934	Baggage porters and bellhops
935	Barbers
940	Boarding and lodging house keepers
941	Bootblacks
942	Child care workers, exc. private household
943	Elevator operators
944	Hairdressers and cosmetologists
945	Personal service apprentices
950	Housekeepers, exc. private household
952	School monitors
953	Ushers, recreation and amusement
954	Welfare service aides
	Protective service workers
960	Crossing guards and bridge tenders
961	Firemen, fire protection
962	Guards and watchmen
963	Marshals and constables
964	Policemen and detectives
965	Sheriffs and bailiffs

Occupation Code	PRIVATE HOUSEHOLD WORKERS
980	Child care workers, private household
981	Cooks, private household
982	Housekeepers, private household
983	Laundresses, private household
Z (984)	Maids and servants, private household
995	OCCUPATION NOT REPORTED²

ALLOCATION CATEGORIES³

196	Professional, technical, and kindred workers—allocated
246	Managers and administrators, except farm—allocated
296	Sales workers—allocated
396	Clerical and kindred workers—allocated
586	Craftsmen and kindred workers—allocated
696	Operatives, except transport—allocated
726	Transport equipment operatives—allocated
796	Laborers, except farm—allocated
806	Farmers and farm managers—allocated
846	Farm laborers and farm foremen—allocated
976	Service workers, exc. private household—allocated
986	Private household workers—allocated

²This code is used to identify not reported occupations in surveys where the not reported cases are not allocated.

³Those returns from the Population Census which do not have an occupation entry are allocated among the major occupation groups during computer processing. These cases are labeled with the code for the "allocation" category to which they are assigned. (See text, page IV).

APPENDIX D.
A SUMMARY OF ELEVATOR FALLS

	Sex	Age	Description	Est.Ht.	Injuries	Location	Date	File No.
1	M	32	Repairing hotel elevator, when it fell 4 stories	40'	multiple injuries	St. Moritz Hotel N. Y., N. Y.	28 Dec 62	8969
2	M	36	Feed deliveryman; cable snapped on homemade elevator, fell 2 floors to chicken barn	20'	<u>Fatal</u>	Seitz Poultry Farm Lancaster Cty, Pa.	12 Jan 61	2738f
3	M	37	Leather worker - elevator fell	unknown	<u>Fatal</u>	Gloversville Leather, Inc. Johnstown, N.Y.	13 Oct 64	7237f
4	M	40	Dam worker, wooden elevator fell	142'	injured	Terminus Dam Fresno, Calif.	26 Oct 61	181f
5	M	41	Elevator operator fell 6 stories to basement of loft building. Elevator "Dropped only slightly faster than normal descent.	60'	minor injury	Hicksville, N.Y.	17 Jul 62	5979
6			27 laborers on construction elevator, fell 5 stories to sidewalk	50'		Continental Building Milwaukee, Wisc.	12 May 63	
	M	54			leg injury			11172-
	M	47			leg injury			11197
			(injuries unknown to other 25 workers)					
7			4 workers on oil company elevator which failed	50'		Champlin Oil Co. Enid, Okla.	15 Jun 61	
	M	28			<u>Fatal</u>			2022
	M	31			fracture leg			2023
			(injuries unknown to other 2 workers)		multiple fractures			2020
								2021
8			3 ironworkers, riding a hoist elevator during church construction, when it failed	50'		Winnetka, Ill.	4 Apr 61	
	M	32			injured			10784
	M	53			injured			10782
	M	52			injured			10783
9			15 female office employees; self-service elevator, got on at 10th floor, but didn't fail and go into free-fall until reached 3rd floor	30'		Commerical Bldg. N. Y., N. Y.	9 Oct 62	
	F	31			treated for shock at hospital			7951
	F	34						7950
	F	35						7962
			12 shaken up but no injuries reported					

	Sex	Age	Description	Est.Ht.	Injuries	Location	Date	File No.
10	M	22	Elevator repairman, jumped clear as fell 4 stories while repairing it. (Did not fall with elevator)	40'	cuts & bruises	Bronx, N.Y.	28 Dec 62	8976
11	M	47	Service elevator fell from main floor to basement	10'	"good condition"	Andrews School for Girls Jefferson, Ohio	25 Sep 62	7581
12			2 workers, in 90' shaft of sewerage project, elevator "broke" fell to bottom of shaft in earth	60'		Milwaukee Metro Sewerage Commission Oak Creek, Wisc.	19 Dec 61	
	M	24			fracture back & both legs			1576
	M	32			fracture back & rt. leg			1575
13	M	27	Employee riding freight elevator when cable snapped	19'	injured rt. leg & feet	Stewart Stamping Co. New York, N.Y.	23 July 62	12840
14	M	27	Feed & grain worker riding 1-man lift when it fell	35'	fractured legs, pelvic injury	Kaufman Feed & Grain Co. Stanley, Iowa	10 Oct 63	14894
15			6 workers (iron workers?), work elevator fell from 10th floor. Hydraulic safety device under elevator reportedly cushioned fall, causing elevator to bounce on impact	100'		Marina City Twin Towers Apt. Chicago, Ill.	19 Jun 62	
	M	28			fracture legs & back (serious cond.)			3802
	M	36			possible fracture back (serious cond.)			3804
	M	36	(operator of elevator)		fracture left leg, possible internal injuries			3803
	M	34			possible fracture back (serious cond.)			3801
	M	41			back & right leg injuries			3805
	M	29			injuries not specified			3806
16	M	49	Construction worker, elevator fell 3 stories	30'	concussion & scalp, head & rt. arm lacerations	Lehigh County Courthouse Allentown, Pa.	13 Nov 63	15444
17	M	49	Freight elevator fell 6 stories to basement. Emergency rope also broke.	60'	"fair condition"	Bloomington, Ill.	6 Oct 61	937
18	M	54	Carpenter, tippie elevator fell to ground.	Unknown	Fatal head injury	Amigo Smokeless Coal Co. MacArthur, W.Va.	14 Mar 63	3429f
19	M	54	Operator/manager of market, unloading freight elevator on main floor, mechanism failed & elevator fell to basement	18'	fractured rib	Thriftway Market Montoque, Mich.	12 Sep 63	14103
20	M	54	Warehouse worker fell when elevator fell 3 stories to basement	30'	back injuries	Jack M. Puletzter & Bros. New Orleans, La.	18 Dec 63	15715

	Sex	Age	Description	Est.Ht.	Injuries	Location	Date	File No.	
21	M	57	Worker riding freight elevator when cable snapped	19'	released after checkup	Stewart Stamping Co. Bronx, N.Y.	23 Jul 63	12841	
22	M	57	Worker riding freight elevator when cable snapped, fell 3 stories	30'	crushed left hand, head cut possible concussion	Gorbutt, Inc. Topeka, Kansas	2 Aug 62	6344	
23	M	58	Worker riding freight elevator when 1' steel cable snapped, fell	12-15'	abrasions at shoulder, left heel, rt. elbow	Electric Service Bldg. Austin, Texas	28 Sep 62	7678	
24			43 in elevator, which fell 14'. Fell slowly 1st 10' then more rapidly when cable snapped. Reportedly overloaded 600-1000 lbs. (only two of those injured remained in hospital for observation)	14'		Glen Mfgr. Co. Milwaukee, Wisc.	24 Apr 62		
	F	41						unknown	2981
	F	24			unknown			2980	
25			3 passengers, department store elevator fell 3 stories to basement	-		Vaughn-Well Dept. Store Birmingham, Ala.	9 Jan 63		
	F	62						unknown	9129
	unknown	unknown						unknown	9130 9131
26			5 in department store elevator, fell 10'	10'		McCarthy's Dept. Store Womsocket, Mass	30 Aug 62		
	F	39						dislocated shoulder	7160
	F	61						compound fracture left leg	7107
	F	46						sprained neck & right ankle	7121
	M	20						unknown	7183
27			2 in elevator, entered elevator at 4th floor intending go to 5th floor. When pushed "up" button failure occurred and elevator fell. One occupant fully erect as fall begin, during fall flexed legs, bent head, brought hands up to chest. Thrown laterally backwards upon impact.	39'		Houston, Texas	29 Nov 60		
	M	48						compress fracture T ¹² , L ¹	2010
	unknown	unknown			fracture left medial malleolus				
					contrusions rt. ankle, shoulder				
					scalp lacerations, other injuries				
					unknown				
28	M	34	Corporation elevator failed & fell 3 floors to bottom of shaft	30'	cuts/bruises	General Split Corp. Milwaukee, Wisc.	3 Oct 61	924	
29			2 in office elevator, fell from 1st floor to basement	12'		Zaiger Bldg. Lynn, Mass.	27 Feb 63		
	M	19						Lacerations top of head	9788
	unknown	unknown			unknown			9789	
30	F	58	Department store elevator fell 10'	10'	shock				

	Sex	Age	Description	Est.Ht.	Injuries	Location	Date	File No.
31	M	27	Business building elevator fell from 6th to 3rd floor	30'	"permanent injuries"	Empire Bldg. Norwalk, Iowa	26 Jun 61	9788
32	M	24	Business building elevator fell from 1st floor to basement	10'	shaken-up	Zaiger Bldg. Lynn, Mass.	27 Feb 63	9787
33	F	47	Hotel elevator fell 6 stories	60'	minor injuries	Huntington Hotel San Francisco, Calif.	12 Jul 64	18651
34	M	20	Elevator fell when cable broke	60'	<u>Fatal</u>	Bison Storage & Whse.Corp. West Seneca, N.Y.		
35			8 passengers in hotel elevator, failed at 5th floor level and fell to basement.	50'		Hotel Fourteen New York, N.Y.	21 Mar 62	
	F	30?	pregnant woman, near term		no reported injuries			2659
	M	30?	husband got directly beneath her as fell, and she was held up by another women (uninjured)		possible back injury			2660
	F	71			hospitalized & released			2666
	unknown		(x singer Eydlie Gorme & husband Steve Lawrence)					
	unknown							
	unknown							
	unknown							
	unknown							
36	F	62	Had just entered elevator when it "broke its supports" and fell to bottom of shaft	20'	minor injuries	Baltimore St. Baltimore, Md.	9 Apr 64	16937
37	M	24	Subject fell while in elevator	10'	back, leg, & arm injuries		1 Nov 61	7020
38			Two workmen working on elevator when it failed and plunged to bottom of shaft	10-11'			23 Jun 62	
	M	37			minor abrasions, lacerations			5398
	M	51			laceration left temple & neck			5397
39	M	adult	Workers injured when elevator chain broke	10'	fractured heel		2 Oct 64	19932
	M	adult			fractured verebra, fractured heels			19933