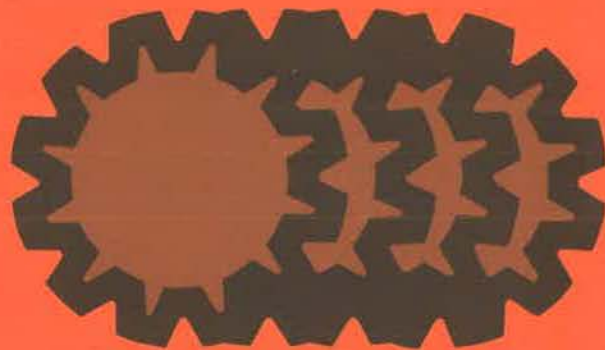


NIOSH

TECHNICAL INFORMATION

SHIFT WORK PRACTICES IN THE UNITED STATES



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE / Public Health Service
Center For Disease Control / National Institute For Occupational Safety And Health



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ABSTRACT

The purpose of this investigation was to determine the types and distribution of shiftwork systems and the distribution of workers within the major shiftwork industries and service groups in the United States.

Sources of data utilized in fulfilling this task were agencies (e.g., U.S. Department of Labor, Bureau of Labor Statistics; U.S. Department of the Interior, etc.), management consulting firms for particular industries (e.g., Northern Textile Association), unions (e.g., United Mine Workers), and trade associations (e.g., Air Traffic Controllers Association). The most comprehensive data source was the Bureau of Labor Statistics, which maintains information regarding work starting times for major industries throughout the United States.

The results indicated that there are numerous shift schedules and many systems of rotation. These vary in complexity and differ across industries, companies, and occupations. The hospital, transportation, food processing, and health care industries/occupations were identified as employing the highest percentage and absolute number of shiftworkers, while the chemical, lumber and wood products, and textile industries were identified as among the lowest.

The authors discuss the lack of a central, systematic data source for obtaining information of shift scheduling and recommend directions for future research.

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I INTRODUCTION

Shift work has been a topic of concern as far back as the Thirteenth Century when European guilds protested against night work. As a result of the protests night work became virtually nonexistent until the advent of the Industrial Revolution when shift work began to reappear. It became prevalent after the establishment of the corporations in England, especially after 1791. It did not take long for workers' reactions to night work to command attention from labor leaders and legislators. For example, by 1802, England had enacted a law restricting the working hours of apprentices.^{1*} In the years that followed, additional labor-regulating laws were enacted as a result of negative reaction to shift work.

Around the turn of the century, England, Germany, France, and Switzerland created government agencies to control the working conditions of shift workers. Shift-work hours and wages in the United States are now regulated primarily by collective bargaining agreements with some stipulations in the Fair Labor Standards Act of 1974 (see Appendix B).

While this report does not attempt to measure the potential impact of shift-work related stress or worker adjustment and health, it is necessary to realize that the implications of shift work are significant to a large segment of the employed population. In 1972, the Director-General of the International Labour Organization expressed the need for study and reevaluation of shift schedules in his statement to the International Labour Conference:

Shift work, while no novelty, is increasing as a larger number of industries seek to take full advantage of greater mechanisation and automation by the use on a twenty-four hour basis of modern industrial equipment in a wider range of processes. Owing to the introduction of expensive data-processing equipment, it is also being extended to many nonmanual occupations where shift work was previously unknown. As the extent of shift work increases, the social problems which it presents grow and call for far more organised effort, by both management and society at large, to reduce its inconveniences and improve the social and other amenities available to the shift worker. Traditional shift-work rotation schedules could be re-examined and adapted to the needs not only of the undertaking but also of the individual worker and of society in general.²

* All numbered references are listed at the end of this report.

Technical considerations dictate that shift work may be prevalent in a given industry whenever:

- The manufacture of goods produced by an industry is dependent on equipment or chemical reactions, which cannot be started and stopped within the duration of a single shift.
- A service rendered by a particular industry is in demand 24 hours a day.

Industries of the first type are called "continuous process" industries. Typical of such industries are steel mills which use furnaces taking several days to reach operating temperatures, oil refineries and chemical plants in which production may be continuous.

Industries in the second type are called "continuous operations," or "round-the-clock" industries. These include metropolitan police officers, firemen, nurses, and other health workers. Also included are the vast transportation, communications, and utilities industries as well as many smaller ones. As data in this report reflect, businesses serving the public--restaurants, hotels, theaters, amusement and recreation services, cleaning services, and the whole gamut of related industries--are experiencing an increased demand for services in the evenings or during the night.

Public transportation and public utilities have traditionally been shift work industries. Railroads, buses, airlines, and related transport services such as rental cars, railway express service, and freight forwarding are 24-hour operations in most major American cities. Utility services such as electric, gas, and sanitary as well as communications industries must provide for their customers' needs in accordance with their habits and the peak hour requirements for such services. The service occupations have high numbers of shift workers and even higher proportions of shift workers than the continuous process industries. The social needs for service personnel to work shifts are evident and not likely to diminish in the near future.

Shift work is also prevalent in industries with high ratios of capital equipment in relation to wages. The financial advantages of shift work became clear to Eighteenth Century employers when they recognized that the cost of capital is, in part, a function of time. Because shift work provides greater average output per unit time (i.e., over a 24-hour day), it spreads the time dependent costs of the capital over more units of output. This provides an advantage for the producer if other relative costs remain constant. Because other relative costs often do not remain constant (especially labor costs, because shift workers typically are paid more than nonshift workers), shift work is financially advantageous only if the savings in capital costs are greater than the losses in labor costs. Those industries, in which capital costs are high relative to labor costs, are called capital-intensive industries. The more capital intensive an industry is, the greater financial advantage it will likely realize by the use of shift work. Examples of industries with relatively

high ratios of capital investment compared to wages are basic iron and steel, industrial chemicals, pulp, paper and paperboard, and synthetic fibers.

While the financial and technical advantages for industry and the social demands for service clearly keep shift work a reality in America (26.8% of people go to work at times other than 7, 8, or 9 am), the impact of shift schedules on the worker is not clear. The fact that shift work exists does not tell us whether workers will successfully adapt to shift work. Assuming that some workers do adapt, we need to know more about how they accomplish this and what types of scheduling maximize their adaptation. These questions do not have clear answers at present, but need to be investigated.

The following sections of this report are an attempt to assess the nature and distribution of shift work throughout the country. What, if anything, could or should be done about shift work systems and/or workers' adaptation to shift work, is another issue entirely.

II SHIFT WORK SYSTEMS

Shift work is a system of fixed working hours with predetermined starting and finishing times, or a transition of one group of people who work in turn for another group. It enables management to better use the capital employed and to increase production capacity by a more efficient organization of human resources.

The most frequent starting and stopping times of shift industries are from 7 am to 3 pm, 3 pm to 11 pm, and 11 pm to 7 am. The next most frequent hours are from 8 am to 4 pm, 4 pm to midnight, and midnight to 8 am. The definitions of a late shift vary widely among companies. Work beginning on or after 10:30 am but before 7 pm may be considered a late shift. The third shift may begin when the second shift ends and extends into the morning hours.

Basic Types

Fixed, Rotating, and Oscillating Shifts

Shift schedules vary from industry to industry, but are related to the nature of the industry. If the industry is a continuous processing one, or one in which capital investments are large in proportion to labor costs, the incidence of shift work will be apparent. The nature of the industry affects both the incidence and the type of work schedules used.

Fixed and Rotating--These two types were the shift work schedules most often described by trade associations, labor unions and industries. Fixed shifts are characterized by workers who regularly work either the day, evening or night schedules. Maintenance workers in some plants are on fixed shifts--generally the third shift if the other two are the production shifts.

O'Connor (1970) describes rotating shifts as characteristic of industrial chemicals and petroleum refining industries in which employees are required to work day, evening, or night schedules in rotation. He goes on to mention that some plants with rotating shifts operate 24 hours, seven days a week, with workers in processing jobs on the rotating shifts and maintenance workers assigned to fixed shifts.³

Oscillating Shifts--Another shift described by O'Connor (1970) is the oscillating shift whereby workers commonly alternate on a weekly basis between the day and evening shifts or between the evening and night shifts. BLS data indicate one of the few industries in which this is

used is the synthetic fiber industry, but even there it represents only 1.3% (approximately 877) of the workers.⁴ The use of the oscillating shift as an alternative to rotating shifts is becoming more prevalent in the nursing profession.

Other Shift Schedules

Split Shifts

A split shift can be defined as a working arrangement whereby the employee works a given number of hours, is released from work, and returns for additional work the same day. The split is the time between the two periods of work. Under some arrangements management may decide to have more than one split in a work day.

In describing split shifts, Goldner (1952) makes the following observation:

Workers generally dislike split shifts because of the spread of time during which they are liable for duty and because of the inconvenience of traveling back and forth to work more than once a day. Many agreements prohibit split shifts or permit them only in emergencies. Without expressly referring to split shifts, some agreements in effect prohibit them implicitly by stipulating that the hours of work shall be continuous and consecutive. However, the daily operation of some industries--urban passenger transportation and restaurants, for example--is characterized by two or more peak periods with relatively little interim activity. Agreements in such industries usually permit the splitting of shifts, but regulate the number of splits permissible and the length of the spread of hours. For example, only one split in a shift may be permitted, the shift to be completed within 12 hours.⁵

Relief Shifts

The need for relief shift workers is created by the absence, illness or time off of regular workers. Since employees work a variety of shift schedules, as previously described, relief shifts reflect all possibilities of shift systems. For example, in a three-crew rotating shift system, the relief shift may be staffed according to seniority, thus enabling workers to have fixed shifts after a period of time in the establishment. However in other industries, workers bid for fixed shifts by seniority, and the only rotating shifts are those relief shifts that cover the days off of other employees.

III ALTERNATIVE WORK SCHEDULES

The most common system of work scheduling involves a fixed starting time each day. Each employee must be at work at a regular hour and in many cases, must punch a time clock or sign an attendance record. Only in exceptional cases are individuals permitted to start and finish later than others. Day workers usually work two periods, one in the morning and the other after a break at noontime. An example of a typical day would be from 7:30 am to 4:30 pm or from 8 am to 5 pm. The break for lunch is generally from noon to 1 pm with morning and afternoon coffee breaks.

There is no general agreement on the best length or workweek or scheduling of hours within that week. Innovations such as the four-day or eight-day weeks, flexi-time, and staggered working hours are being tried for a variety of reasons.

Four-Day and Eight-Day Weeks

The American Management Association in their publication, The Four-Day Week, predicted that over the next decade a sizeable segment of American workers may be experiencing a workweek of four days. It was reported that in 1972, an estimated 100,000 employees (approximately one out of 840 American workers) in approximately 1,000 manufacturing companies, service and retail organizations, and municipal agencies were working four-day weeks. Whereas the four-day pioneers have been accurately described as small, predominantly nonunion, and nonurban manufacturing firms, or service and retail companies, the movement has spread increasingly to more urban-centered organizations. Four-day work weeks are being used in hospitals, insurance companies, and municipal agencies.

The American Management Association also examined the effects of the four-day week on shift arrangements and shift pattern changes. In their survey, they found that of the 127 four-day companies reporting shift schedules:

- 72 were single-shift operations
- 41 were two-shift operations
- 14 were three-shift operations.

Examples of seven-day continuous service operations cited were hospitals, law enforcement agencies, and small continuous-processing manufacturing firms.^e

These examples discredit the misconception that four-day schedules cannot be applied to two- and three-shift continuous-process or continuous-service operations. The four-day week does not necessarily reflect the total number of days and hours that the business operates nor does it necessarily mean that a company operates four days a week and is closed for three days. Instead, the four-day week is a unique way of scheduling an individual employee's time or that of a group of employees.

The eight-day week consists of four 10-hour days followed by four days off. It is used primarily by firms which operate 10 hours a day for seven days a week. An example of a foundry operating on an eight-day cycle, 20 hours a day, is described by Riva Poor (1970):

Two 10-hour shifts a day for two crews of two 10-hour shifts each. One crew (2 shifts) works 4 days while the other is off--alternating in 8-day cycles--4 days on, 4 days off. Operations go on routinely 20 hours a day, 7 days each calendar week--about 7,000 hours a year.⁷

Easing traffic congestion, increasing leisure time (more than half of the days in the year are free), facilitating recruitment, and improving productivity have all been attributed to both the four-day and the eight-day week.

Flexi-Time

Another rescheduling of work hours that has positive results for worker morale and productivity, as well as traffic congestion and other factors, has been the introduction of flexible hours.

Flexible-time was originated in Europe, and although it is still not widely used in the United States, it has been employed on an ad hoc basis for a long time by research, advertising and other companies where the employee is his/her own resource.

An employee is given considerable latitude in putting together time on a daily basis to meet the standard weekly requirement. The arrival and departure times may take place anywhere within three-hour periods at the beginning and end of the workday. This allows for different arrival, departure, and total time each day, and may include carryover of time debits or credits from week to week.⁸

In general, workers may start and leave work when they wish; however, they must be present during the core time which, for example, could extend from 9:00 am to 4:00 pm. Usually this condition contains a provision for a tolerance of some hours (e.g., plus or minus ten) which may be carried forward to the next month.

Flexi-time helps to alleviate traffic jams both at the gates of the plant or at the time clock. People who need time off to take care of personal matters are encouraged to take time off during the flexible hours and make up the time later.

Another result of the more flexible hours has been the possibility for married women to reenter the labor market or to remain after they have children because their schedules can be made to suit their personal requirements as well as those of their employer.

Staggered Working Hours

One innovation in working hours has been the introduction of staggered working hours, particularly in large metropolitan areas. To alleviate the rush hour congestion, some firms and federal agencies have introduced starting and finishing times which are at staggered intervals. Employees are assigned or allowed to choose their starting times which in turn determine their finishing times.

Summary

In summary, traditional and innovative work schedules and their impact on shift work have been described. It is apparent from the literature that not only the particular shift worked, but also the order of shift rotation are important factors in determining work performance level. Although many other considerations are significant (i.e., work pace, environmental conditions, and physical demands) the described flexibility in work scheduling provides management with the opportunity to optimize productivity and job performance.

IV DATA ANALYSIS OF THE CURRENT POPULATION SURVEY

Introduction

The Current Population Survey, May, 1975 (BLS data) from the Department of Labor is categorized by work starting times and finishing times. No definition of shift work is contained in the data and it is, therefore, necessary to define shift work in terms of starting times. As the BLS data show, the peak starting times for most Americans are 7:00, 8:00 and 9:00 am. For purposes of our analyses, we have defined shift work as work beginning at any time other than 7:00, 8:00, or 9:00 am. Strictly speaking, it might be more appropriate to refer to these other times as atypical starting times rather than shifts; however, with the exception of retailers and farmers (discussed later in this report), our definition appears to delineate what are usually considered to be the conventional shifts.

Another limitation inherent in the BLS data is the inability to differentiate between those workers on fixed or rotating shifts. Because the data are listed by starting times, those rotating shift employees working the day shift (beginning times at 7:00, 8:00, or 9:00 am) at the time of the BLS survey are excluded.

Data on various types of workers in the United States are published by the BLS in the Current Population Survey. This survey is reported monthly from a sample of about 47,000 households. Estimates in this report are for persons 16 years of age and over in the civilian noninstitutional population. In May of each year, the monthly survey data also include figures on the starting times of work. As noted, the data analyzed here are from May 1975.

Workers can be classified by their stated occupation or by the type of industry that employs them. The Current Population Survey reports starting times of workers by occupation and industry.

The first set of data in this section shows the beginning work times of wage and salary workers by major occupation group in which the workers had full- or part-time jobs. The second set of data show the beginning times of work of wage and salary workers by detailed industry group in which the workers had full- or part-time jobs.

In both sets the starting times of workers were grouped, giving 17 categories of starting times of: 12 to 1 am; 2 to 3 am; 4 to 5 am; 6 am; 7 am; 8 am; 9 am; 10 to 11 am; 12 to 1 pm; 2 to 3 pm; 4 pm; 5 pm; 6 pm; 7 pm; 8 to 9 pm; 10 to 11 pm; and starting time not available. We excluded from our study those workers whose starting time at work was not available, giving 16 categories.

Analyses by Occupation

Figure 1 shows the percentage of workers starting in each time segment for the major occupational groups: white collar; blue collar; service; and farm workers, and the overall percentages for starting times for all wage and salary workers in the United States.

Hedges (1975) found that in goods and service industries and in government, 40% of the workers start work at 8 am. Two other peaks occurred, one at 7 am, in manufacturing and mining industries, and one at 9 am, in finance.⁹

In Figure 2, we show the groups that begin work at the main peak, 8 am. Compared with the overall wage and salary graphs for the United States are white collar workers and three subgroupings of white collar occupations: clerical, managers, and professional technical.

These groups were then defined as nonshift groups and were excluded from further study, since they began work at a peak hour.

Two other groups were also excluded from further study: (1) farm workers, who tend to start work at 6 am (not a peak starting time for American workers), but who are definitely not on shifts; and (2) sales workers, who start at 10 am (also a non-peak hour), but who stop work near the peak stopping time of American workers.

What emerges, then, is a study of shift workers in the blue collar and service categories.

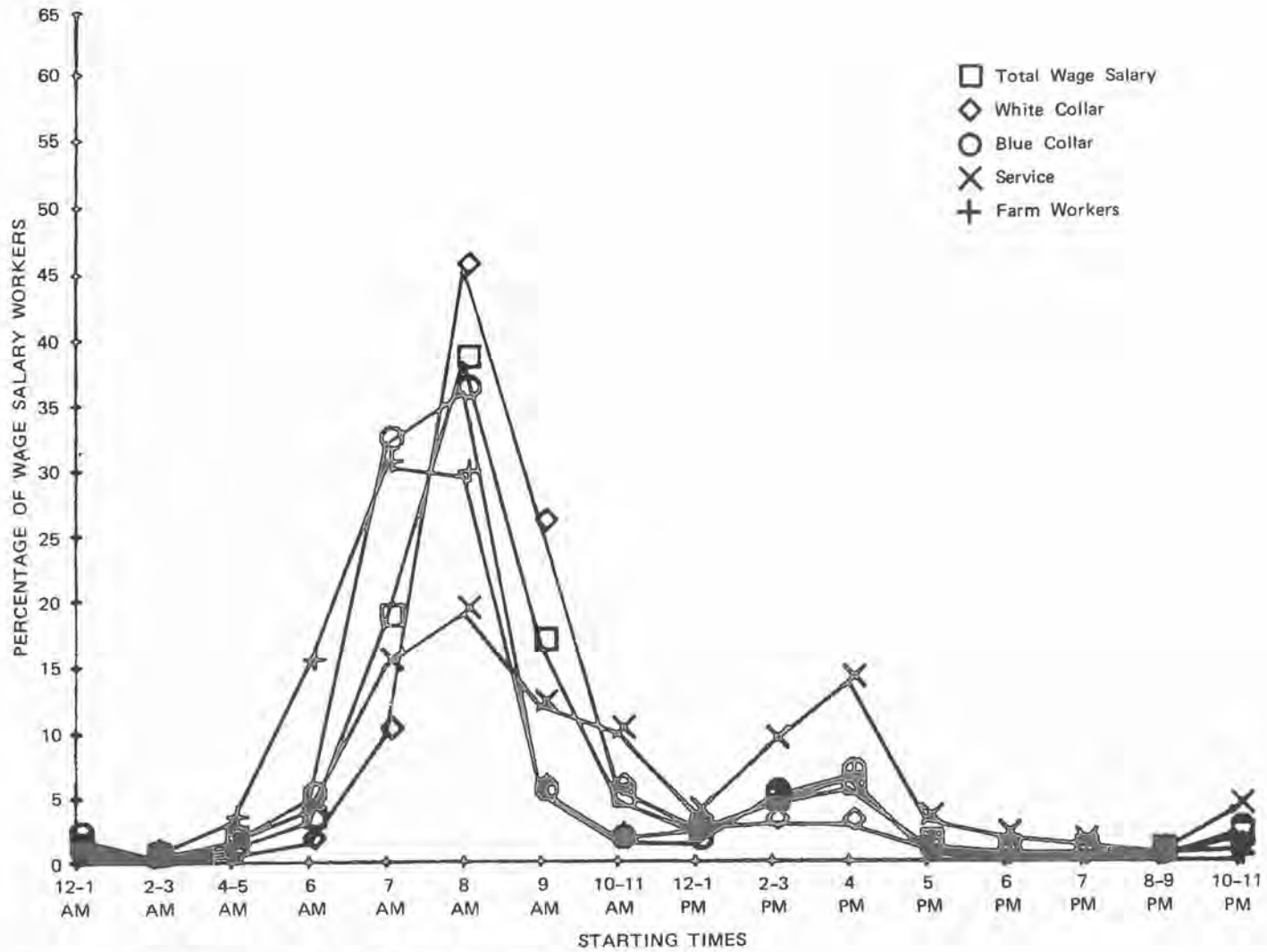
From the set of occupational data, a total number of shift workers was found for blue collar and service occupations. The percentage of shift workers in an occupation was defined as the total number of shift workers in an occupation divided by the total number of workers in an occupation in all starting hour categories, including 7 am, 8 am, and 9 am.

Table 1 shows the total number of shift workers in blue collar and service occupations. Included in the table are the percentages of shift workers for the various occupational groups.

In this table there are two groups that perhaps are not true shift workers. "Laborers, except Farm Workers" includes such nonshift but pre-7 am starters as fishermen and garbage collectors. Private household workers may work shifts, but are probably independent agents and would be hard to study in depth as shift workers.

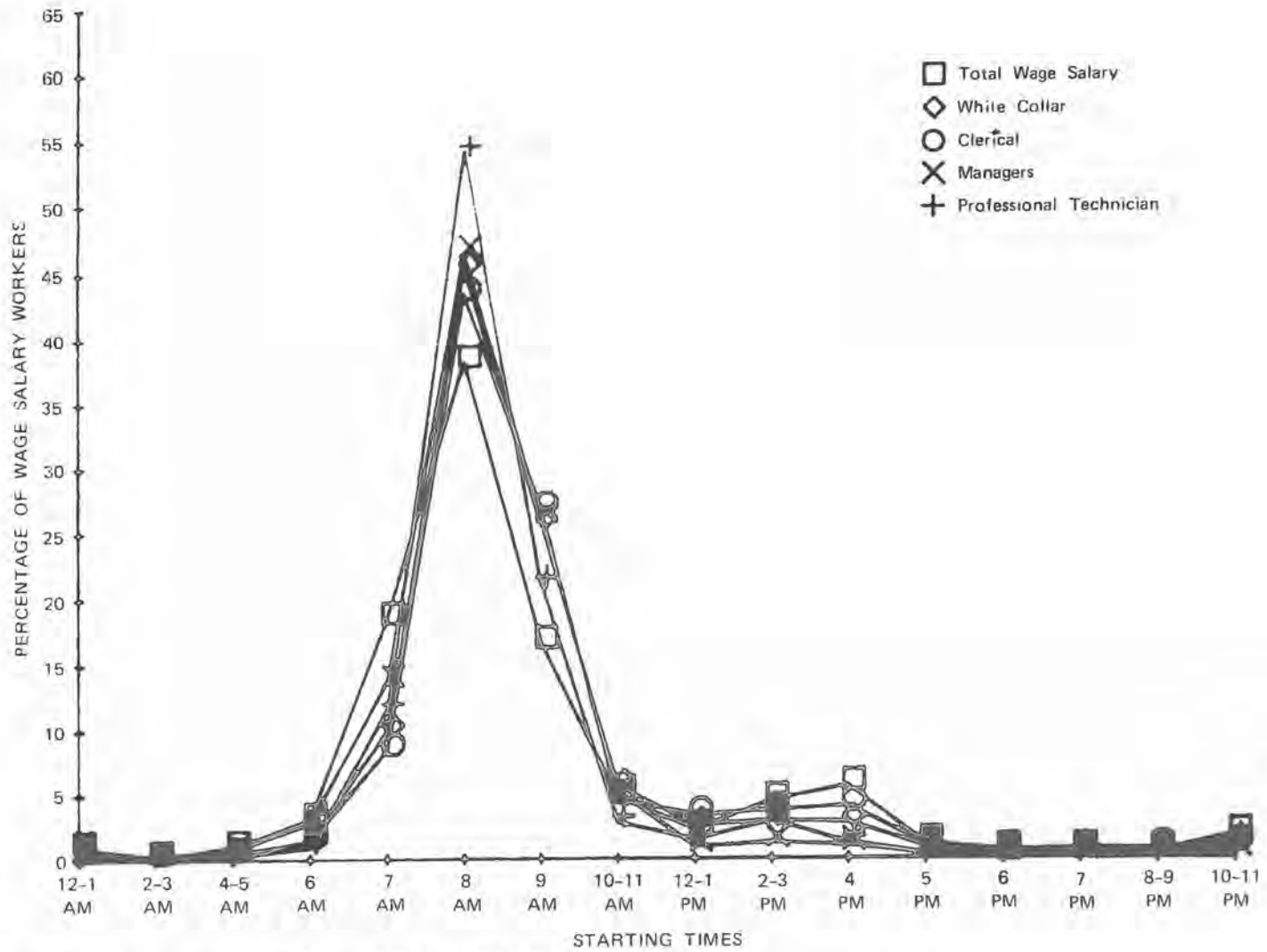
Analyses by Industry

The following tables are generated from the BLS data and are broken down by industry group. Here a total number of workers engaged in shift work was also calculated. The percentage of workers in shift work in



SOURCE: Current Population Survey, BLS, May 1975; SRI.

FIGURE 1 MAJOR OCCUPATIONAL GROUPS



SOURCE Current Population Survey, BLS, May 1975; SRI

FIGURE 2 OCCUPATIONAL GROUPS NOT ON SHIFTS

each grouping was defined as the total number of shift workers in each industry group divided by the total number of workers in all starting hour categories, including 7 am, 8 am, and 9 am. Tables 2 through 8 show the total number and percentage of workers in an industry engaged in shift work from major sectors to specific industry groupings.

Table 3 shows the commonly defined major industry groups. Trade, the industry group with the largest number of workers, is not considered in our analysis to be a true shift work industry because retail employees frequently begin work after 9 am. The next three industry groups containing large numbers of shift workers represent industries that will be further detailed in following tables under manufacturing, professional services, and transportation and public utilities.

In Table 4, the effect of retail sales workers' late starting gives this group a high shift work rating (47.6%), although sales is not considered a shift work industry group.

Tables 5 and 6 show the number of shift workers and the percent of shift workers within the manufacturing and service industries. Table 7 combines the data of Tables 5 and 6 to show comparisons between the manufacturing and service industries.

Table 8 splits the industry groups of Table 7 into the following four categories:

- Large numbers of shift workers and large percentages of the total workers engaged in shift work.
- Small numbers of shift workers and large percentages of the total workers engaged in shift work.
- Large numbers of shift workers and small percentages of the total workers engaged in shift work.
- Small numbers of shift workers and small percentages of the total workers engaged in shift work.

Table 8 contains all the data in Table 7 with the addition of a smaller category, manufacturing automobiles. A large number of shift workers in an industry group was defined as an N above the median of 221,000 (the median split for Table 7 data, plus industry data on manufacturing automobiles) and a large percentage of shift workers in an industry group was defined as a percentage greater than 26.8%, the approximate percentage of all wage and salary workers in the United States who are shift workers.

This gives us a picture of those industry groups which are more homogeneous than others in terms of shift work. For example, cell A represents those industry groups with both a large percentage of shift workers as well as a large number of shift workers.

Table 1

BLUE COLLAR AND SERVICE WORKERS

<u>Grouping</u>	<u>Number (1,000s)</u>	<u>Shift Workers (percent)</u>
Service workers, except private household	4,748	56.0%
Operatives, except trans- port	2,385	29.2
Craftsmen and kindred workers	1,709	19.3
Laborers, except farm	1,141	32.7
Transport equipment operatives	940	37.2
Private household workers	370	37.0

Source: Current Population Survey, BLS, May 1975; SRI.

Table 2

MAJOR SECTORS

<u>Grouping</u>	<u>Number (1,000s)</u>	<u>Shift Workers (percent)</u>
Service producing	12,360	29.9%
Goods producing	4,946	22.2
Public administration	846	20.2%

Source: Current Population Survey, BLS, May 1975; SRI.

Table 3

MAJOR INDUSTRY GROUPS

<u>Grouping</u>	<u>Number (1,000s)</u>	<u>Shift Workers (percent)</u>
Trade	5,665	40.8%
Manufacturing	4,068	24.3
Professional services	3,271	23.4
Transportation and public utilities	1,280	28.1
Finance, insurance, and real estate	442	11.6
Business and repair services	422	23.4
Personal services excluding private household	392	27.4
Agriculture	387	32.1
Entertainment and recreation	376	63.4
Construction	285	7.8
Mining	204	30.4

Source: Current Population Survey, BLS, May 1975; SRI

Table 4

SELECTED MAJOR SUBGROUPINGS OF INDUSTRY

Grouping	Number (1,000s)	Shift Workers (percent)
Retail	5,284	47.6%
Durable goods - manufacturing	2,251	22.6
Nondurable goods - manufacturing	1,816	26.8
Wholesale	375	13.5
Communications	180	17.1
Other public utilities	161	15.5

Sources: Current Population Survey, BLS, May 1975; SRI

In Table 8, nine of the eleven shift work industry groups mentioned in the contract are represented. The two groups missing from the table are police and firemen and mass transit. Both of these groups are sub-categories of larger industry groups and represent a finer breakdown of data than that given in the Current Population Survey.

Also, the contract category, "textiles," should not include both textiles and apparel. As seen in Tables 7 and 8, textiles and apparel are two separate industries with different percentages of shift workers. The proposal category, energy production, is broader than the industry we have data on, i.e., petroleum and coal products.

Figures 3, 4, and 5 show graphs of the starting times of work for four representative industries, two service and two manufacturing. All four of these industries have a large percentage and a large number of shift workers in the industry. All four industries were also mentioned in the original contract.

Figure 3 graphs the two service industries, hospital and postal, against each other. Figures 4 and 5 graph each of these service industries against a manufacturing industry; hospital against primary metal and postal against auto manufacture. Strikingly similar patterns of starting times can be seen between the blue collar and service industries.

Table 5

MANUFACTURING INDUSTRIES

Durable Goods	Number (1,000s)	Shift Workers (percent)
Transportation equipment	498	29.9%
Primary metal industries	402	37.5
Machinery except electrical	363	18.9
Electrical equipment and supplies	278	14.8
Fabricated metal products	261	23.6
Stone, clay, and glass products	154	28.5
Lumber and wood products	130	25.4
Instruments and related products	56	12.9
Miscellaneous durable industries	49	12.0
Furniture and fixtures	33	7.7
Ordnance	29	15.1
Nondurable Goods		
Food and kindred products	593	42.7
Printing and publishing	327	28.5
Textile mill products	216	34.4
Chemical and allied products	199	19.7
Paper and allied products	176	32.4
Rubber and plastic products	174	35.0
Apparel and other textile products	54	5.2
Petroleum and coal products	42	17.7
Tobacco	20	32.8
Leather and leather products	17	7.3

Sources: Current Population Survey, BLS, May 1975; SRI

Table 6

SERVICES

<u>Grouping</u>	<u>Number (1,000s)</u>	<u>Shift Workers (percent)</u>
Hospital	1,117	36.9%
Education	1,115	17.0
Other transportation	763	39.6
Health	572	29.9
Private household	507	40.7
Postal	277	45.8
Other professional services	246	17.3
Welfare	221	21.8
Railroad and railway express service	177	32.6

Sources: Current Population Survey, BLS, May 1975; SRI

Table 7

MANUFACTURING AND SERVICE INDUSTRIES
(Sum of Tables 5 and 6)

<u>Grouping</u>	<u>Number (1,000s)</u>	<u>Shift Workers (percent)</u>
Hospital	1,117	36.9%
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Other transportation service	763	39.6
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Welfare	221	21.8
Textile mill products	216	34.4
Chemical and allied products	199	19.7
Railroad and railway express service	177	32.6
Paper and allied products	176	32.4
Rubber and plastic products	174	35.0
Stone, clay, and glass products	154	28.5
Lumber and wood products	130	25.4
Instruments and related products	56	12.9
Apparel and other textile products	54	5.2
Miscellaneous durable industries	49	12.0
Petroleum and coal products	42	17.7
Furniture and fixtures	33	7.7
Ordnance	29	15.1
Tobacco	20	32.8
Leather and leather products	17	7.3

Sources: Current Population Survey, BLS, May 1975; SRI

Table 8

INDUSTRIES CATEGORIZED BY NUMBERS AND PERCENTAGES OF SHIFT WORKERS

Industries Above 26.8%* Shift Workers ^{A†}		
Grouping	Numbers	Percent
Hospital‡	1,117,000	36.94%
Other transportation services	763,000	39.64
Food and kindred products‡	593,000	42.69
Health	572,000	29.85
Private household	507,000	40.66
Transportation equipment	498,000	29.87
Primary metal industries‡	402,000	37.47
Printing and publishing	327,000	28.46
Manufacturing automobiles‡	315,000	39.67
Postal*	277,000	45.79

Industries Below 26.8%* Shift Workers ^{B†}		
Grouping	Numbers	Percent
Education	1,115,000	16.95%
Machinery except electrical	363,000	18.85
Electrical equipment and supplies‡	278,000	14.79
Fabricated metal products	261,000	23.58
Other professional services	246,000	17.30

Industries Above 26.8%* Shift Workers ^{C‡}		
Grouping	Numbers	Percent
Textile mill products‡	216,000	34.39%
Railroad and railway express service	177,000	32.60
Paper and allied products	176,000	32.35
Rubber and plastic products	174,000	35.01
Stone, clay, and glass products	154,000	28.47
Tobacco	20,000	32.79

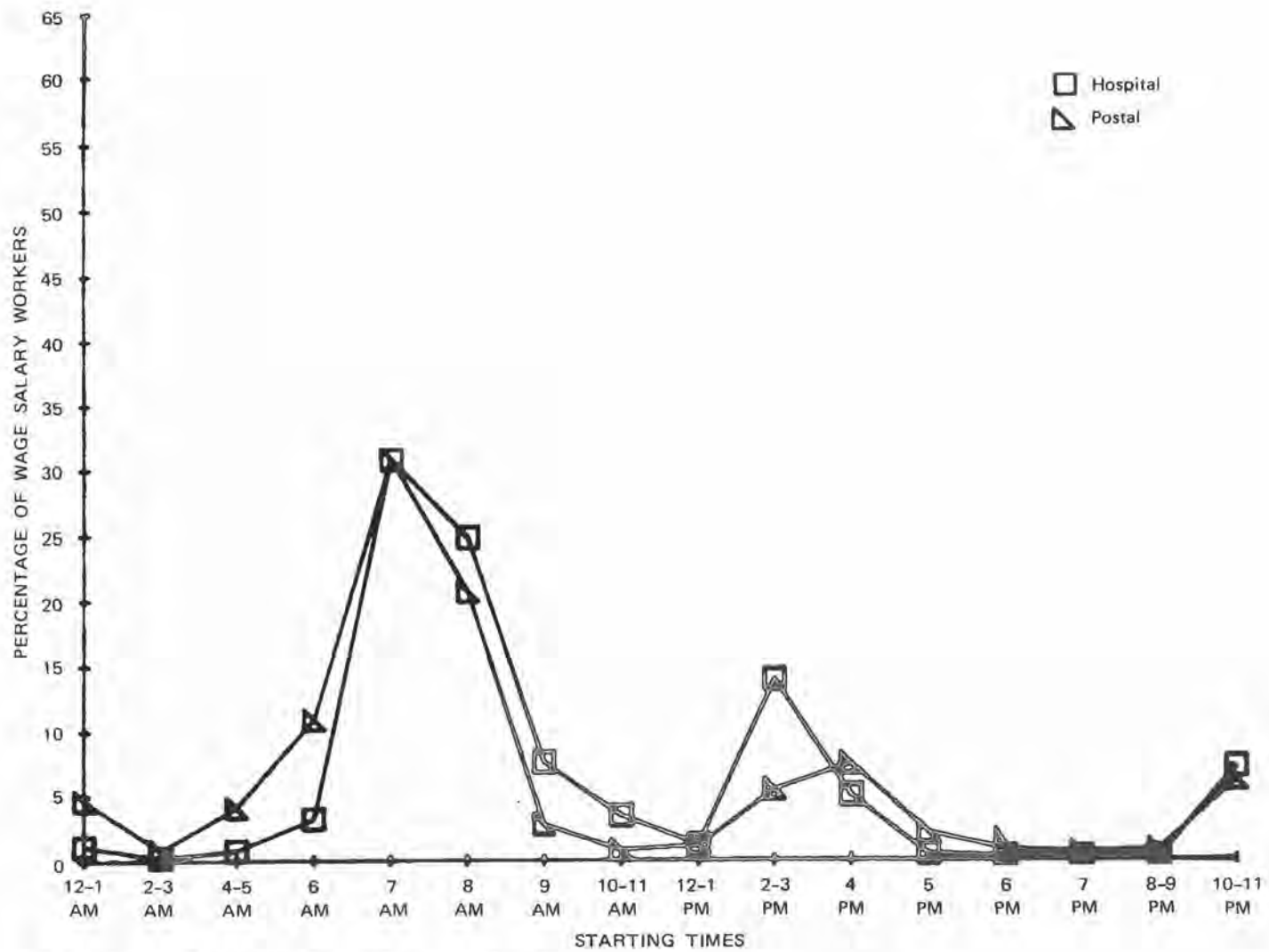
Industries Below 26.8%* Shift Workers ^{D‡}		
Grouping	Numbers	Percent
Welfare	221,000	21.77%
Chemical and allied products‡	199,000	19.72
Lumber and wood products	130,000	25.44
Instruments and related products	56,000	12.93
Apparel and other textile products‡	54,000	5.23
Miscellaneous durable industries	49,000	11.95
Petroleum and coal products‡	42,000	17.72
Furniture and fixtures	33,000	7.73
Ordnances	29,000	15.10
Leather and leather products	17,000	7.30

* 26.8% is the percentage of shift workers in the country at large.

† Industries above 221,000 shift workers, the median number of shift workers within U.S. industries.

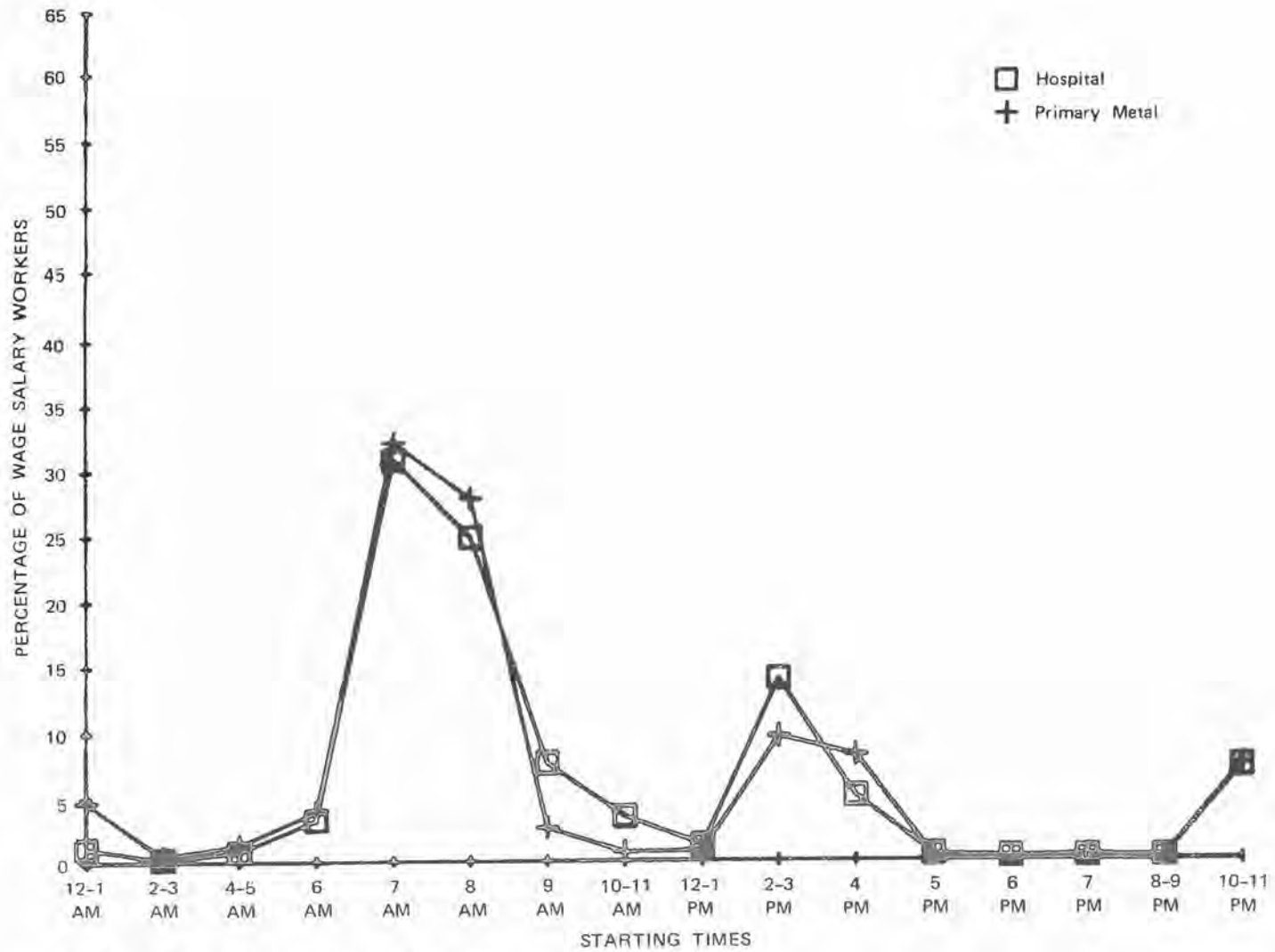
‡ Shows industry cited in contract.

§ Industries 221,000 shift workers or below.



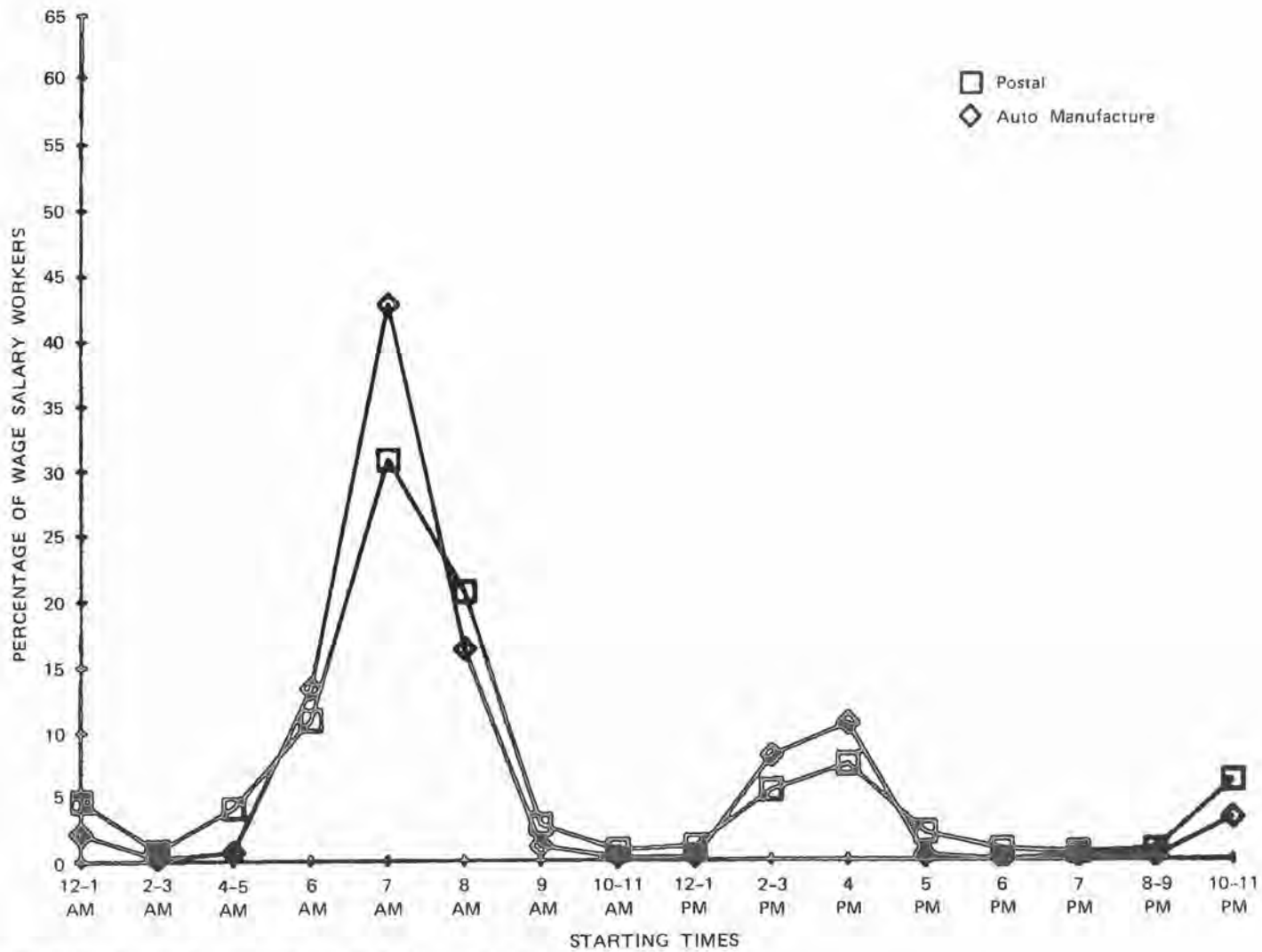
SOURCE: Current Population Survey, BLS, May 1975; SRI.

FIGURE 3 CONTRASTING SERVICE INDUSTRIES



SOURCE: Current Population Survey, BLS, May 1975; SRI.

FIGURE 4 SERVICE AND GOODS PRODUCING INDUSTRIES I



SOURCE: Current Population Survey, BLS, May 1975; SR1.

FIGURE 5 SERVICE AND GOODS PRODUCING INDUSTRIES II

V STUDY OF LATE-SHIFT EMPLOYMENT IN MANUFACTURING
AND NONMANUFACTURING INDUSTRIES

Follow-up Study of Manufacturing Industries*

The proportions of late-shift workers, those working shifts other than the day shift, varied greatly among individual industry groups. Shift work was not prevalent in such labor-intensive industries as apparel and other textile products. Among the industries studied, the highest proportions of late-shift workers--slightly more than 50%--were in glass container manufacturing plants, cotton textile mills, and man-made fiber textiles. There has been little change in these proportions since O'Connor's findings in the 1960s. O'Connor (1970) found that the incidence of late shifts is generally highest in industries that are capital intensive, have continuous processing operations, and/or encounter increased demand for their product. The lowest proportions of late-shift workers--less than 2%--were found in apparel industries, which are labor intensive and employ large numbers of women.

As stated previously, the nature of the industry (i.e., capital-intensive or labor-intensive) not only affects the incidence of late shifts but also influences the type of work schedule used. O'Connor (1970) describes three types of work schedules: fixed, oscillating, and rotating. Employees assigned to fixed shifts regularly work day, evening, or night schedules. On oscillating shifts, workers commonly alternate on a weekly basis, between the day and evening shift or between the evening and night shift. Rotating shifts in such industries as industrial chemicals and petroleum refining require employees to work day, evening, and night schedules successively. Some plants with rotating shifts operate 24 hours a day, seven days a week.

Of the 29 time comparisons shown in Table 9, the percentage of late-shift workers increased in 19 industries and declined in 10 over the eight year period, 1964-72. The largest increases in the proportions of late-shift workers (more than 20%) were in cigarettes, sanitary food containers, and noncellulose synthetic fibers.

* For the first survey dates shown, see industry wage surveys, U.S. Department of Labor, Bureau of Labor Statistics. For second survey dates shown, see Charles M. O'Connor, "Late Shift Employment in Manufacturing Industries," 1968 Monthly Labor Review (November 1970). For those industries showing one survey date only, no comparisons were possible. More recent statistics on these industries have not been collected by the Bureau of Labor statistics.

Table 9

THE INCIDENCE OF SHIFT OPERATIONS IN SELECTED
MANUFACTURING INDUSTRIES ILLUSTRATED BY TWO DATES

Industry and Dates	All Production and Related Workers	Percentage of Workers on Late Shift			
		All Late	Increase or Decrease	2nd	3rd or Other
Food and kindred products					
Meatpacking					
Jan 69	128,645	11.2%		10.1%	1.1%
Prepared meat products					
Jan 69	44,003	13.4		11.4	2.0
Flour and other grain mill products					
May 72	10,928	25.6	-	16.0	9.6
Feb 67	12,565	26.2		15.8	10.4
Candy and confectionary products					
Aug 70	48,112	24.0	+	19.7	4.3
Sep 65	49,736	21.2		18.5	2.7
Tobacco manufacturers					
Cigarettes					
May-Jun 71	31,474	42.6		33.8	8.8
Jul-Aug 65	31,507	31.5	+	30.6	0.9
Cigars					
Mar 72	11,443	19.9	-	19.0	0.9
Mar 67	16,552	23.8		21.7	2.1
Textile mill products					
Cotton textiles					
Aug 71	193,014	54.2	+	29.3	23.9
Sep 65	240,996	53.4		29.1	24.3
Synthetic textiles					
Aug 71	145,296				
Sep 65	104,136	52.7		29.4	23.3
Wool textiles					
Yarn and broadwoven fabric					
Nov 66	41,765	45.2		28.6	16.6
Dyeing and finishing					
Nov 66	3,559	24.8		17.3	7.5
Scouring and combing					
Nov 66	4,401	46.5		27.7	18.8
Women's hosiery					
Sep 70	49,700	22.1	-	14.7	7.4
Sep 67	44,545	24.0		14.4	9.6
Men's hosiery					
Sep 70	17,608	23.9	-	16.0	7.9
Sep 67	20,078	24.8		16.9	7.9
Children's hosiery					
Sep 70	11,251	17.1	-	12.7	4.4
Sep 67	15,255	19.0		14.3	4.7
Textile dyeing and finishing					
Dec 70	60,378	40.5	-	27.0	13.5
Winter 1965-66	54,775	40.0		27.1	12.9

Table 9 (Continued)

Industry and Dates	All Production and Related Workers	Percentage of Workers on Late Shift			
		All Late	Increase or Decrease	2nd	3rd or Other
Apparel and other textile products					
Men's and boys' suits and coats					
Apr 70	103,000				
Apr 67	98,354	0.05%		0.05%	0.05%
Men's and boys' shirts, except work shirts and nightwear					
Oct 71	91,094				
Oct 68	92,537	1.1		1.0	0.1
Work clothing					
Feb 68	62,775	0.8		0.8	--
Furniture and fixtures					
Wood household furniture, except upholstered					
Oct 68	130,803	4.6		4.5	0.1
Paper and allied products					
Pulp, paper, and paperboard mills					
Oct 67	197,919	46.5		24.4	22.1
Folding paperboard boxes					
Mar 71	32,040	29.4		23.2	6.2
Nov 64	29,201	26.9	+	21.7	5.2
Set-up paperboard boxes					
Mar 71	14,725	3.5		3.4	0.1
Nov 64	16,545	4.6	-	4.4	0.2
Corrugated and solid fiber boxes					
Mar 71	70,601	38.1		31.4	6.7
Nov 64	57,132	37.2	+	30.9	6.3
Sanitary food containers					
Mar 71	19,437	48.7		29.2	19.5
Nov 64	18,625	40.8	+	26.5	14.3
Fiber cans, tubes, drums, and similar products					
Mar 71	12,530	26.1		20.1	6.0
Nov 64	9,484	22.5	+	17.6	4.9
Chemicals and allied products					
Industrial chemicals					
Jun 71	171,762	36.0		19.1	16.9
Nov 65	168,515	35.1	+	18.5	16.6
Synthetic fibers					
Cellulose					
Dec 70	19,551	42.6		21.0	21.6
Feb/Apr 66	26,712	46.1	-	23.2	22.9
Noncellulose					
Dec 70	47,877	54.1		27.3	26.8
Feb/Apr 66	35,695	45.6	+	23.0	22.6
Paints and varnishes					
Nov 65	31,147	10.2		7.8	2.4
Fertilizer					
Mar/Apr 71	19,302	22.4		14.5	7.9
Mar/Apr 66	25,484	21.0	-	15.2	5.8

Table 9 (Continued)

Industry and Dates	All Production and Related Workers	Percentage of Workers on Late Shift			
		All Late	Increase or Decrease	2nd	3rd or Other
Petroleum and coal products					
petroleum refining					
Apr 71	69,831	32.6%		16.4%	16.2%
Dec 65	73,318	32.1	+	16.1	16.0
Rubber and plastics products					
Miscellaneous plastics products					
1969	178,870	39.3		22.9	16.4
Jun 64	109,482	36.0	+	20.5	15.5
Leather and leather products					
Leather tanning and finishing					
Jan 68	23,712	13.5		10.6	2.9
Stone, clay and glass products					
Glass containers					
May 70	89,923	53.1		27.1	26.0
May 64	51,848	52.6	+	26.9	25.7
Other pressed or blown glass					
May 70	29,629	35.2		20.5	14.7
May 64	29,900	31.5		17.5	14.0
Structural clay products					
Sep 69	43,409				
Brick and structural clay tile					
Sep 69		8.1		5.4	2.7
Jul/Aug 64	23,274	5.7		4.0	1.7
Ceramic wall and floor tile					
Sep 69		19.0		13.8	5.2
Jul/Aug 64	9,805	18.3	+	14.5	3.8
Clay refractories					
Sep 69		24.3		17.5	6.8
Jul/Aug 64	9,421	21.5	"	16.3	5.2
Clay sewer pipe					
Sep 69		11.8		8.1	3.7
Jul/Aug 64	7,277	12.9	-	8.6	4.3
Primary metal industries					
Basic iron and steel					
Sep 67	452,977	47.8		27.3	20.5
Iron and steel foundries					
Gray iron, except pipe and fittings					
Gray iron pipe and fittings					
Malleable iron					
Steel					
Nonferrous foundries					
Jun 70	61,895	21.6		16.9	4.7
Jun/Jul 65	57,507	20.6	"	16.1	4.5

Table 9 (Concluded)

Industry and Dates	All Production and Related Workers	Percentage of Workers on Late Shift			
		All Late	Increase or Decrease	2nd	3rd or Other
Fabricated metal products					
Fabricated structural steel					
Oct 69	64,557	16.9%	-	15.3%	1.6%
Oct/Nov 64	55,429	18.2	-	16.5	1.7
Machinery except electrical					
Machinery manufacturing					
Winter 70-71	1,205,800	18.0	-	14.9	3.1
Mid-66	1,171,278	23.5	-	19.0	4.5
Engines and turbines					
Farm machinery					
Construction and related machinery					
Construction machinery					
Metalworking machinery					
Special dies, tools, jibs, and fixtures					
Machine-tool accessories					
Special industry machinery					
General industry machinery					
Office and computing machinery					
Service industry machinery					
Transportation equipment					
Motor vehicle parts					
Apr 69	226,946	34.7		27.4	7.3

O'Connor (1970) reported declines in the proportions of late-shift workers in four industry groups in the 1960s--basic iron and steel, cigarettes, flour and other grain mill products, and pressed or blown glass, except containers. Of these in the 1970s, the proportions have increased in cigarettes and pressed and blown glass, and have continued to decline in flour and other grain mill products. No figures for the 1970s were available in the basic iron and steel industry.

Data on Nonmanufacturing Industries

An attempt was made to determine the percentage of workers on late shifts in nonmanufacturing industries. Of the 17 nonmanufacturing industries included in the industry wage surveys published by the Bureau of Labor Statistics, only four such wage surveys provided information on the percentage of workers working all late shifts, second shifts, and third or other shifts. While the industry wage surveys were available for most of the industries, these bulletins do not all provide data on shift practices as shown in Table 10.

Table 10

THE INCIDENCE OF SHIFT OPERATIONS IN
SELECTED NONMANUFACTURING INDUSTRIES

Industry	Date	All Production and Related Workers	Percentage of Workers on Late Shift		
			All Late	2nd	3rd or Other
Appliance repair shops					
Auto dealer repair shops					
Banking					
Bituminous coal mining	Jan. 1967	87,510	27.0%	18.6%	8.4%
Communications					
Contract cleaning services					
Crude petroleum and natural gas production	Aug. 1972	74,900			
Educational institutions					
Nonteaching employees					
Electric and gas utilities	Oct./Nov. 1967	424,000	12.0	6.9	5.1
Hospitals	Mar. 1969	2,100,000	37.0	20.7	16.3
Laundry and cleaning services					
Life insurance					
Metal mining	Sept. 1972	106,060			
Iron ore	Sept. 1972	13,128	42.2	24.0	18.2
Copper ore	Sept. 1972	27,046	37.8	20.7	17.1
Lead and zinc ore	Sept. 1972	6,586	38.7	28.6	10.1
Motion picture theaters					
Nursing homes and related facilities					
Scheduled airlines					
Wages and tips in restau- rants and hotels					

Source: Industry Wage Surveys, for Nonmanufacturing Industries, U.S.
Department of Labor, BLS.

VI NATIONAL TRADE ASSOCIATIONS

In addition to surveying the existing literature, it seemed appropriate to contact the major trade associations in the country to see if they are keeping any records for the industry which they represented. They were requested to send existing records on man hours worked, starting times, descriptions of shifts, and distribution of workers by shift or to put us in touch with any organization which kept such records for their industry.

A list of approximately 150 associations was compiled from the Encyclopedia of Associations¹⁰ using the following criteria:

- (1) Size of membership. If it was a manufacturing association, then the majority of those selected held at least 24 company members. If it was an individual members' association (e.g., the Masters Brewers Association of America), then some groups have as many as 4,000 members.
- (2) Directly related to the size of the association's membership was the consideration of the size of its staff. The presence of a research department, a library, or a newsletter was thought to be an indication of the capacity and the potential for having such information and statistics.
- (3) Manufacturers were primarily selected because of the proclivity for shift work to be prevalent in this industry type.
- (4) Those excluded associations which were primarily comprised of:
 - Retailers or wholesalers.
 - Suppliers to industry.
 - Providers of marketing information to industry.
 - Nutrition research, cleanliness promotion, etc.
 - Some individual membership groups (i.e., World Dredging Association).
 - Distributors, packers, brokers, suppliers, or warehouses.
 - Major activities comprise public relations and merchandising.
- (5) If one association appeared as if it might include many smaller associations, then we contacted the larger

association. (For example, we contacted the National Soft Drink Association and not the Root Beer Institute.)

It became apparent that the trade associations do not keep information on shift workers or shift work schedules. They either referred us to the BLS data or concluded that we would have to contact each industry individually for such information. In contrast to the responses from national union officials, those from the trade associations were not such that they could be quantified and tabulated in a meaningful form.

VII NATIONAL LABOR UNIONS

Data were obtained primarily from union officials. Approximately 100 national labor unions were selected from the BLS booklet, Directory of National Unions and Employee Associations, 1974. Selection criteria were size of the union membership, number of local unions represented, and potential for having shift work systems. An attempt was made to elicit from these organizations any available information on:

- Existence of formal record keeping on the extent of shift work on various industries.
- Man hours worked.
- Starting times.
- Descriptions of shifts.
- Distribution of workers by shift.

To date, 20 national labor unions keeping such information have responded to our letters with enclosures and/or articles about work, workers' hours, and scheduling which provided the basis for further discussion on the extent of shift work in various industries. In addition, responses have been received from 10 other union officials who stated that no formal records are kept on the information we are seeking. The overall response rate to our initial contact was approximately 35%. No follow-up on nonrespondents was made.

In general, we found that formal records are not being kept on the extent of shift work except perhaps by the individual employers themselves. Since shift work patterns seem to vary from company to company, from plant to plant, and even among different departments of the same plant, generalizations about these matters even within a particular industry group are difficult to make.

Of the 20 national labor unions responding with information, 15 of these reported their members to be working 24-hour operations in the particular industry group (see Table 11). For those industry groups with rotating shifts, there is wide variation in the frequency with which workers generally rotate. Some reported that workers rotate every week, others every month, while still others rotate as many as three shifts per week (e.g., Professional Air Traffic Controllers Organization). In addition, the frequency with which workers rotate depends on the facility and varies from plant to plant and within different departments of the same plant. For the unions reporting the existence of shift work within their industries, 60% reported that shift work is not at all voluntary (see Table 12).

Table 12

SHIFT WORK

<u>Type</u>	<u>Number</u>	<u>Percent</u>
Completely voluntary	0	
Partially voluntary	3	15.0%
Not at all voluntary	12	60.0
Based on seniority	2	10.0
No information available	<u>3</u>	<u>15.0</u>
Total	20	100.0%

Source: National Labor Unions; SRI

A further breakdown by percentage of workers working each shift by union is shown in Table 13. Approximately 66% (12 of the 18 unions that provided percentage breakdowns by shifts) of the unions had 15% or more of their employees working shifts.

Table 13

PERCENTAGE OF WORKERS WORKING EACH SHIFT BY LABOR UNION*

Industry	Day	Afternoon		Night or Graveyard	Rotating	Other	Total
		PM or Swing	%				
Textile Workers Union of America	40 %	30 %		30 %	%	%	100%
Synthetic Fiber and Yarn	20				80		100
Allied Workers' International Union United	54	25		21			100
Fraternal Order of Police†	25	25		25		25‡	100
Professional Air Traffic Controllers Organization†	35	35		15		15 [§]	100
United Steelworkers of America†	50	30		20			100
United Mine Workers	35	25		25	15		100
Iron Workers International	80	10		6	4		100
International Union of Bricklayers and Allied Craft	99.5	0.5					100
American Train Dispatchers Association	25	25		25	25		100
Airline Employees Association International	40	35		15		10 ^{**}	100
International Association of Firefighters††	← See footnote →						
Airline Dispatcher's Association					100		
International Typographical Union	60-65	← 35-40 →					100
Upholsterer's International Union	95	← 5 →					100
United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry	99.9					0.1	100
Amalgamated Meat Cutters and Butchers	90	6-7		3-4			100‡‡
Bakery and Confectionary Workers Inter- national Union of America	60			40			100

* Source: Self-report by unions in response to mail correspondence as of November 1, 1975.
Percentages are estimates only.

† Industries having 100% of workers rotating shifts (i.e., everyone has to rotate) or a substantial number of rotating shift.

‡ Day off.

§ Annual leave, sick leave, familiarity trips and regular days off, etc.

** Relief workers bid fixed shifts by seniority; the only "rotating" shifts are those relief shifts which cover the days off of other employees.

†† An analysis of the 1974 Salaries and Working Conditions Survey indicates that 58% of the municipal fire fighters in the United States work a 24-hour shift--41% work the 10-14 or 9-15 hour shifts, and less than 1% work the 8 hour-12 hour and 48-hour shifts.

** These figures include those shift workers in the meat slaughtering, meat processing, food processing, and retail food industries.

VII SUMMARY

The practice of shiftwork has been receiving increasing attention over recent years from researchers in a variety of fields and professions. Such diverse disciplines as medicine, economics, physiology, psychology, human engineering, and sociology have expressed interest in the impact of shiftwork on their respective domains.

The purpose of this report was to attempt to identify the types and distribution of shiftwork systems and the number of workers employed in such systems for the major U.S. industries and occupations. It was hoped that such information could be used by researchers to define areas of particular interest for intensive follow-up research.

At first, this task appeared to be straightforward. As we proceeded to search the literature and potential data sources, however, it soon became apparent that existing information on U.S. shiftwork practices is skeletal at best. The most comprehensive data was maintained by the Bureau of Labor Statistics (BLS) (Appendix A), which provided a comprehensive list of industry/occupational groups, as well as the distribution of workers by starting time within each of these groups. These data (presented in Table 8, p. 25 of the text) were used to identify those industries/occupations having the greatest incidence of shiftwork, categorized by absolute number and percentage of shiftworkers.

An attempt to be more comprehensive about the quantification of shiftwork systems proved fruitless. Contacts with national trade associations and labor unions revealed that no systematic records are maintained on shift scheduling or distribution within their respective organizations. Even the BLS data presented problems in that some industries/occupational categories were subsumed and included under others, making systematic comparisons difficult.

Regarding the precise nature of shiftwork systems, it would have been convenient to be able to report which type of shiftwork schedules were characteristic of which types of industries and services. As has already been mentioned, trade associations and national labor unions do not maintain these records, and the BLS data report only starting times, not rotation systems, within each industry. Even where some information on specific shift schedules was available for a particular industry/occupation, the data were extremely complex and cumbersome. For example, the International Association of Fire Fighters reports approximately 150 different types of work schedules for fire fighters alone.

Probably even more striking than problems with the existing data was the skeletal picture of shift work that the quantitative data yielded. Therefore, to provide a context within which to interpret the data, this report attempted to present an enriched qualitative picture of shift work based on existing nonquantitative writings on the topic.

It has become clear that a consistent and coherent picture of the nature of shift work and the distribution of shift workers throughout the country is not contained in any existing document. It is hoped that this attempt to synthesize existing information and data will point more clearly to the need for a systematic approach to the study of shift work in the United States.

Appendix A

BUREAU OF LABOR STATISTICS CURRENT POPULATION SURVEY
(May 1975) RAW DATA

Table A-1

BEGINNING TIMES OF WORK FOR WAGE/SALARY WORKERS BY DETAILED INDUSTRY GROUP AND FULL OR PART-TIME STATUS

	Total	Time Begin Work																N.A.
		AM								PM								
		12-1	2-3	4-5	6	7	8	9	10-11	12-1	2-3	4	5	6	7	8-9	10-11	
Total wage and salary workers	72,552*	715	151	663	2,126	12,506	25,924	11,195	3,184	1,539	3,035	3,794	749	373	381	303	1,139	4,776
Good producing	23,618	353	63	244	1,019	7,160	8,766	1,400	214	176	941	1,171	75	59	93	52	486	1,347
Agriculture	1,295	3	5	35	155	346	374	94	24	28	60	66	8	1	2	0	0	88
Mining	709	36	4	10	38	180	263	25	3	4	35	33	3	3	5	5	25	35
Construction	3,880	5	0	13	105	1,114	2,080	167	39	20	30	35	3	12	16	3	4	235
Manufacturing	17,734	309	54	186	720	5,519	6,043	1,114	147	125	815	1,037	61	43	70	44	457	990
Durable goods	10,551	160	19	59	413	3,729	3,470	511	54	57	462	696	24	25	23	13	246	588
Ordnance	210	0	0	0	3	54	106	3	0	0	4	17	0	2	0	0	3	17
Lumber	544	6	5	9	34	219	154	8	2	3	24	36	3	1	0	2	5	32
Furniture and fixtures	452	0	2	0	11	236	120	35	0	2	11	5	0	0	0	0	2	29
Stone, clay and glass products	563	24	3	7	27	194	155	38	1	6	31	28	0	3	3	2	19	21
Primary metal industries	1,133	50	5	14	42	345	298	28	7	8	102	87	3	2	3	2	77	60
Fabricated metal products	1,188	9	0	8	63	427	366	53	13	7	49	82	2	1	7	0	20	80
Machinery except electrical	2,009	15	2	9	55	734	718	111	13	13	72	126	3	7	1	2	45	84
Electrical equipment and supplies	1,783	21	1	3	33	610	694	98	9	10	55	97	7	2	4	2	34	104
Transport equipment	1,771	28	2	8	126	693	443	33	2	5	88	190	6	4	3	2	34	104
Automobiles	844	17	2	5	106	340	130	9	2	2	64	84	3	0	2	2	26	53
Aircraft	500	6	0	2	8	146	200	15	0	2	13	54	3	4	2	0	5	36
Other transportation equipment	426	6	0	2	12	207	113	8	0	2	11	47	0	0	0	0	1	16
Instruments and related products	459	1	0	2	4	113	212	52	2	3	17	20	0	3	0	3	1	25
Miscellaneous industries	441	6	0	0	13	105	203	53	6	0	10	8	0	0	1	0	5	31
Nondurable goods	7,183	148	35	127	307	1,790	2,574	603	93	68	353	341	37	18	47	31	211	402
Foods and kindred products	1,496	21	27	105	165	370	361	65	23	18	67	78	18	3	18	9	41	107
Tobacco	64	5	0	0	0	27	10	4	0	0	8	3	0	0	1	0	3	3
Textile mill products	656	35	2	3	37	168	205	39	5	1	60	41	2	4	2	2	22	29
Apparel and other textile products	1,091	1	0	0	6	388	508	87	9	9	6	10	0	3	4	2	4	53
Paper and allied products	572	10	0	1	18	174	172	22	0	3	61	39	2	2	0	0	40	29
Printing and publishing	1,218	15	4	10	34	161	452	209	46	25	54	83	6	10	8	26	70	
Chemical and allied products	1,064	31	0	6	19	178	502	130	9	6	37	46	1	0	9	7	26	56
Petroleum and coal products	242	10	1	0	3	46	133	16	0	0	10	5	1	0	2	0	8	6
Rubber and plastics products	530	18	1	1	20	130	169	24	2	3	48	33	3	0	0	3	42	33
Leather and products	249	2	0	0	5	148	62	6	0	2	3	3	0	0	2	0	0	16

*These numbers represent thousands (1000s).

Source: U.S. Department of Labor, Bureau of Labor Statistics

Table A-1 (Concluded)

	Total	Time Begin Work															N.A.	
		AM								PM								
		12-1	2-3	4-5	6	7	8	9	10-11	12-1	2-3	4	5	6	7	8-9		10-11
Service producing	44,468	289	81	371	978	4,686	15,100	9,177	2,916	1,314	1,953	2,456	633	302	266	238	563	3,144
Transportation and public utilities	4,970	116	32	112	231	833	1,959	486	116	67	187	232	39	18	19	17	94	411
Railroad and railway express	580	25	5	8	15	129	211	24	5	3	42	52	2	2	3	0	15	37
Other transportation	2,158	66	25	86	171	398	551	213	70	45	94	92	25	15	8	16	50	233
Communications	1,134	12	2	0	17	97	580	193	33	14	22	50	9	0	5	2	14	84
Other public utilities	1,098	13	0	18	28	209	615	56	8	4	29	38	3	2	3	0	15	57
Trade	14,852	54	31	163	337	1,267	4,032	2,918	1,637	631	645	1,455	399	72	76	75	90	973
Wholesale	2,993	10	7	34	88	421	1,388	588	58	45	41	45	8	4	10	13	12	219
Retail	11,858	43	25	128	248	846	2,643	2,329	1,578	586	603	1,410	391	67	66	62	77	755
Finance, insurance and real estate	4,127	8	0	0	29	154	1,592	1,620	141	76	39	66	18	6	18	35	6	318
Private household	1,428	7	0	6	22	109	313	318	114	55	60	79	21	83	45	8	7	184
Miscellaneous service	19,090	103	17	90	360	2,324	7,206	3,835	908	486	1,023	624	156	123	107	104	366	1,258
Business and repair services	1,976	27	0	12	26	149	805	426	62	45	44	121	27	13	12	18	15	175
Personal	1,536	16	2	11	56	183	476	382	96	36	59	62	17	3	11	6	17	103
Entertainment and recreation	642	0	1	8	13	62	89	66	75	29	38	64	48	45	21	23	11	48
Professional	14,882	60	15	56	262	1,924	5,806	2,955	675	374	882	378	64	62	64	56	323	927
Health	2,035	16	5	12	53	307	557	480	70	63	175	64	9	10	5	8	82	119
Hospital	3,207	32	5	22	98	932	748	227	104	38	421	152	12	7	7	5	214	185
Welfare	1,101	3	2	5	37	77	341	376	63	31	35	24	5	7	5	2	2	87
Education	7,017	6	3	15	56	553	3,591	1,321	350	213	224	107	25	32	41	26	17	435
Other professional services	1,522	2	0	3	17	56	569	551	88	28	27	31	13	6	6	16	9	100
Forestry and fisheries	54	0	0	3	3	7	29	5	0	2	0	0	0	0	0	0	0	6
Public administration	4,466	74	7	49	129	660	2,058	618	54	48	141	167	40	12	22	13	90	284
Postal	635	28	5	25	66	186	125	17	5	7	33	45	13	5	3	5	37	29
Other Federal	1,525	10	0	7	18	232	899	180	11	13	13	33	5	0	6	0	2	95
State	712	4	2	10	7	53	371	140	8	16	23	13	4	0	2	3	14	44
Local	1,595	31	0	6	38	189	663	280	30	13	72	75	19	7	11	5	38	116

Table A-2

BEGINNING TIMES OF WORK OF WAGE/SALARY WORKERS BY MAJOR OCCUPATION GROUP AND FULL OR PART-TIME STATUS

	Time Begin Work																	N.A.
	Total	AM								PM								
		12-1	2-3	4-5	6	7	8	9	10-11	12-1	2-3	4	5	6	7	8-9	10-11	
Total wage and salary workers	72,552	715	151	663	2,126	12,506	25,924	11,195	3,184	1,539	3,035	3,794	749	373	381	303	1,139	4,776
White collar workers	36,635	142	38	138	480	3,411	15,573	8,799	1,888	864	987	940	312	117	169	194	268	2,315
Professional technical and kindred workers	11,417	37	7	22	92	1,235	5,793	2,260	295	157	305	130	34	55	77	66	129	724
Managers and administrators, except farm	7,032	27	12	44	186	894	3,053	1,715	336	61	78	67	22	4	16	28	21	466
Sales workers	4,459	4	8	19	36	194	1,124	1,370	669	211	137	223	108	24	15	20	5	291
Clerical and kindred workers	13,727	73	12	52	166	1,088	5,604	3,455	587	435	467	520	148	34	61	80	112	834
Blue collar workers	24,651	448	83	350	1,129	7,384	8,276	1,215	340	309	1,140	1,503	135	85	100	57	495	1,602
Craft and kindred workers	9,410	151	22	66	322	2,637	4,016	496	100	55	299	428	33	23	37	12	161	552
Operatives, except transport	8,678	186	14	76	423	3,165	2,314	314	85	89	511	658	36	30	32	16	229	501
Transport equipment operatives	2,759	63	39	161	250	718	726	143	59	55	116	108	20	15	12	14	28	234
Nonfarm laborers	3,804	48	8	47	135	865	1,220	262	95	109	214	309	46	17	19	16	78	315
Service workers	10,270	124	24	146	378	1,431	1,802	1,129	940	345	866	1,293	297	169	111	51	376	788
Private household workers	1,151	4	0	4	22	90	275	266	87	36	35	19	76	43	8	1	168	
Other service workers	9,119	120	24	142	356	1,341	1,526	863	853	308	831	1,258	278	92	68	43	375	640
Farm workers	997	2	5	29	140	280	273	52	17	22	42	59	5	1	0	0	0	71
Farmers and farm managers	38	0	0	2	5	17	9	3	2	0	0	0	0	0	0	0	0	2
Farm laborers and supervisors	959	2	5	28	135	263	264	49	15	22	42	59	5	1	0	0	0	70

Source: U.S. Department of Labor, Bureau of Labor Statistics

Appendix B
LAWS GOVERNING SHIFT WORK

Appendix B

LAWS GOVERNING SHIFT WORK

Two federal acts, the Fair Labor Standards Act (FLSA) and the Walsh-Healy Act, contain most of the laws regulating wages and hours in the United States. The first applies to employment in both government and private industry, while the second is additional regulations for employers who are government contractors.

Amendments to the Fair Labor Standards Act in 1974 extended coverage to federal and state governments, private household employees, and to retail and agricultural "conglomerates."

Until then, FLSA requirements had not applied to small stores of large retail chains, food service operations, bowling alleys, and seasonal and agricultural processing industries. These exemptions are being phased out by law. The amendments also raised the minimum wage to \$2.30 an hour, effective in several successive steps.¹¹

The FLSA does not stipulate that premiums or differentials be paid for shift work. However, almost every union agreement contains provisions for overtime and shift work even when shift work is virtually nonexistent or used infrequently by the industry. These agreements frequently delineate higher premiums for the shifts considered to be less desirable.

Shift work premiums established through collective bargaining agreements are designed to discourage the unnecessary scheduling of late shifts, and to provide extra compensation for work performed during undesirable hours.¹²

The FLSA stipulates the following:

- (1) Extra pay for shift work can either be paid at a higher straight-time rate or as overtime pay. If a higher straight-time rate, it must be included in the regular-rate figures and cannot be credited towards FLSA overtime pay; if overtime pay, it may be ignored when calculating regular rates and applied against overtime pay required by the statute.
- (2) When an employee is paid two shift rates during one week-- for example, the day-shift rate and the night-shift rate-- overtime pay under the FLSA is, as a general rule, based on the average rate. However, if agreed to by the employee before performance of overtime work, his FLSA

overtime pay may be based on the shift rate in effect during the overtime hours.

- (3) Whether or not a night premium is overtime pay or a shift differential must be decided before computing overtime pay under the FLSA. This is necessary because shift differentials are includable in the regular rate as higher straight-time earnings for undesirable hours, whereas overtime premiums are excludable as extra pay for hours worked in excess of basic daily standards. The statute allows night premiums falling in the overtime-pay category to be applied against the FLSA indebtedness, but shift differentials do not qualify as credits.

An employee who ordinarily works the night shift will most likely be paid the night premium as a part of his regular wages. On the other hand, an employee assigned to the day shift, who works exceptionally long hours which carry over into night work, might be paid premium rates as overtime because of excess hours. Second, third, graveyard, and swing shift differentials (whether a percent of base rates, additional cents per hour or eight hours pay for seven hours work) constitute higher straight-time pay for undesirable hours. But an employee working one of these shifts might also be paid true statutory overtime if he is paid a higher rate for working longer hours than those called for on his shift.

A particular employee's straight-time and overtime hours are determined by his own work schedule, and not necessarily by the straight-time and overtime hours of the particular shift on which he happens to be working.

- (4) Extra compensation paid to employees for work performed before and after their regular working hours are known as pre-shift and post-shift premiums. There are two possible ways of qualifying such premiums as true overtime pay under the FLSA:

- Premiums paid for hours worked in excess of daily standards, in which case the premium rate may be less than 150 percent of straight-time rates.
- Premiums paid for hours worked outside of clock-time days, in which case the premium rate must be 150% of straight-time rates, the basic workday must not exceed eight hours, and these standards must be set up by a union contract or an employment agreement.

Pre-shift and post-shift premiums which qualify as overtime pay under the FLSA may be ignored when computing regular rates and may be applied towards any overtime pay owing under the statute. However, if these premiums do not qualify as statutory overtime pay, they become a part of the employee's straight-time insofar as the FLSA is concerned and must be included in computation of his overtime pay.¹³

Appendix C

PREMIUM PAY FOR SHIFT WORK

Appendix C

PREMIUM PAY FOR SHIFT WORK

During the past thirty-five years, there has been a marked increase in various forms of premium pay for overtime, shift work, work on Saturday or Sunday or on holidays as well as increased benefits in the form of programs--medical insurance, old-age and unemployment insurance and so on. Supplementary compensation appears to have increased relatively more rapidly than direct wages, so that it represents a large proportion of total compensation. The impact of collective bargaining agreements on shift work over the years has been to make it more profitable for workers and more costly for employers; however, differential pay for shift work in particular has not kept pace with day-shift wage levels.

In Hours of Work, it is noted that collective bargaining agreements generally do not prohibit night work entirely, but often require the payment of a wage differential as compensation for the undesirable features. Shift premiums established through collective bargaining are often designed to serve a dual purpose: (1) to deter or penalize the unnecessary scheduling of late shifts, and (2) to provide extra compensation for work performed during undesirable hours.¹⁴

Restrictions on night shifts are affected in some agreements by a provision that work performed before or after the regular hours must be paid for at the overtime rate, generally time and a half.

According to BLS, nearly all manufacturing industries pay shift differentials (95% in 1967-1968).¹⁵ They average about 10 cents an hour for the second shift and 15 cents an hour for the third shift.¹⁶

BLS has analyzed 620 collective bargaining agreements in effect in 1971. These agreements cover 4.9 million workers in total and each agreement covers 2,000 workers or more. Shift differential provisions by industry are indicated below:

Shift differentials in agreements covering 2,000 workers or more by industry, 1971

INDUSTRY	METHOD OF PAYING DIFFERENTIALS												NO REFERENCE TO SHIFT DIFFERENTIALS	
	ALL AGREEMENTS		TOTAL		MONEY		TIME		TIME AND MONEY		DIFFERENTIAL VARIES ¹			
	AGREEMENTS	WORKERS	AGREEMENTS	WORKERS	AGREEMENTS	WORKERS	AGREEMENTS	WORKERS	AGREEMENTS	WORKERS	AGREEMENTS	WORKERS		
ALL INDUSTRIES.....	620	4,863,380	488	3,910,980	338	2,639,650	64	465,200	45	404,800	41	401,330	132	952,400
MANUFACTURING.....	366	2,575,480	274	2,285,830	227	1,911,400	2	4,500	10	56,050	35	313,880	32	289,650
ORDNANCE.....	11	61,200	11	61,200	7	27,200	-	-	-	-	4	34,000	-	-
FOOD.....	29	121,000	27	117,000	27	117,000	-	-	-	-	-	-	2	4,000
TOBACCO.....	6	18,250	6	18,250	6	18,250	-	-	-	-	-	-	1	4,000
TEXTILES.....	5	23,650	4	19,650	4	19,650	-	-	-	-	-	-	15	217,000
APPAREL.....	15	217,000	-	-	-	-	-	-	-	-	-	-	1	2,300
LUMBER.....	3	7,400	2	5,100	1	2,600	1	2,500	-	-	-	-	-	-
FURNITURE.....	2	6,900	2	6,900	2	6,900	-	-	-	-	-	-	2	4,300
PAPER.....	7	26,100	5	21,800	5	21,800	-	-	-	-	-	-	-	-
PRINTING, PUBLISHING.....	6	28,600	6	28,600	5	19,200	-	-	-	-	1	9,400	-	-
CHEMICALS.....	12	44,000	12	44,000	12	44,000	-	-	-	-	-	-	-	-
PETROLEUM REFINING.....	4	14,950	4	14,950	4	14,950	-	-	-	-	-	-	1	17,000
RUBBER AND PLASTICS.....	4	68,450	3	51,450	2	40,000	-	-	1	11,450	-	-	5	22,400
LEATHER PRODUCTS.....	5	22,400	-	-	-	-	-	-	-	-	-	-	-	-
STONE, CLAY, GLASS.....	17	81,400	10	81,400	10	81,400	-	-	-	-	-	-	-	-
PRIMARY METALS.....	46	480,850	46	480,850	45	478,850	-	-	1	2,000	-	-	-	-
FABRICATED METALS.....	16	70,850	16	70,850	10	56,350	1	2,000	5	7,000	2	5,500	-	-
MACHINERY.....	24	100,900	23	92,900	22	90,900	-	-	-	-	1	2,000	1	8,000
ELECTRICAL MACHINERY.....	19	339,850	37	334,850	37	334,850	-	-	-	-	-	-	2	5,000
TRANSPORTATION EQUIP.....	55	805,330	55	805,330	23	506,750	-	-	5	35,600	27	262,980	-	-
INSTRUMENTS.....	5	23,800	4	20,750	4	20,750	-	-	-	-	-	-	1	3,050
MISC. MFG.....	2	12,600	1	10,000	1	10,000	-	-	-	-	-	-	1	2,600
NONMANUFACTURING.....	314	2,287,900	214	1,625,150	111	728,250	62	460,700	35	348,750	6	87,450	100	662,750
MINING, CRUDE PETROL. AND NATURAL GAS.....	8	102,800	7	94,800	7	94,800	-	-	-	-	-	-	1	8,000
TRANSPORTATION.....	36	273,300	9	66,700	9	66,700	-	-	-	-	-	-	27	206,600
COMMUNICATIONS.....	50	524,000	46	469,700	17	119,850	-	-	23	262,400	6	87,450	4	54,300
UTILITIES, ELEC. AND GAS.....	15	63,150	13	57,300	13	57,300	-	-	-	-	-	-	2	5,850
WHOLESALE TRADE.....	3	29,000	2	27,000	2	27,000	-	-	-	-	-	-	1	2,000
RETAIL TRADE.....	34	173,750	21	125,650	21	125,650	-	-	-	-	-	-	13	48,100
HOTELS, RESTAURANTS.....	24	141,300	9	43,600	9	43,600	-	-	-	-	-	-	15	97,700
SERVICES.....	28	206,300	13	89,100	13	89,100	-	-	-	-	-	-	15	117,200
CONSTRUCTION.....	116	774,300	94	651,300	20	104,250	62	460,700	12	86,350	-	-	22	123,000
MISC. NONMFG.....	-	-	-	-	-	-	-	-	-	-	-	-	-	-

¹ 35 agreements provide a money differential for the second shift and a time plus money differential for the third shift. 6 agreements in communications provide time and money differentials for traffic employees and money differentials only for plant and other employees.

² Excludes railroads and airlines.

Source: "Characteristics of Agreements Covering 2,000 Workers or More," Bulletin 1729, BLS, U.S. Department of Labor (1972).

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The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial statements. This includes not only sales and purchases but also expenses, income, and any other financial activity.

In addition, the document highlights the need for regular reconciliation of accounts. By comparing the internal records with the bank statements and other external sources, discrepancies can be identified and corrected promptly. This process helps to prevent errors from accumulating and ensures that the books are balanced at all times.

Furthermore, the document stresses the importance of transparency and accountability. All financial transactions should be clearly documented and supported by appropriate evidence, such as receipts, invoices, and contracts. This not only helps to build trust with stakeholders but also provides a clear audit trail for future reference.

Finally, the document concludes by reminding the reader that good financial management is essential for the long-term success of any business. By following these principles and practices, businesses can ensure that their financial records are accurate, reliable, and reflective of their true financial position.

The second part of the document provides a detailed overview of the various components of a financial statement. It explains how each component, from the balance sheet to the income statement, provides valuable insights into the company's financial health and performance. The document also discusses the importance of understanding the underlying assumptions and accounting policies used in the preparation of these statements.

Overall, the document serves as a comprehensive guide for anyone looking to improve their financial management practices. It offers practical advice and clear explanations of key concepts, making it an essential resource for business owners, managers, and anyone interested in the financial aspects of a business.

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