

Shift work pay differentials and practices in manufacturing

Most of the late-shift workers received premium pay for such schedules; however, shift differential pay has not increased as rapidly as basic day-shift wage levels

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About one-fourth of the production workers in metropolitan area factories worked on late shifts in the early 1980's—a proportion that has remained fairly stable over the past two decades. The incidence of late-shift work, however, varies greatly among manufacturing industries, ranging from less than 5 percent of the production work force in such labor intensive industries as apparel and wood furniture to approximately one-half in more capital intensive industries such as cotton and manmade textiles, cigarettes, and glass containers.

In 1984, at least nine-tenths of the late-shift workers in urban factories received premiums over the pay rates of their day-shift counterparts. Most commonly, the differential was a cents-per-hour addition to day-shift rates, averaging 23.2 cents for work on the second shift and 29.9 cents for work on the third shift. For those cases in which there were percentage differentials, the average was 7.3 percent of day rates for the second shift and 10.0 percent for the third. Among individual industries surveyed between May 1978 and October 1984, types and amounts of differentials varied widely. For second shifts, cents-per-hour differentials commonly averaged between 10 and 20 cents; percentage premiums, usually between 5 and 10 percent. Similar ranges for third shifts were 15 to 25 cents per hour and 5 to 10 percent. Differentials expressed in cents-per-hour have been

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Glossary of shift terms

Fixed shift: An arrangement whereby employees remain on the same daily work schedule for long periods of time.

First shift (day): A work period in which half or more of the hours fall between 8am and 4pm.

Second shift (evening): A work period that is scheduled to end at or near midnight.

Third shift (night, graveyard, lobster): A work period that is scheduled to start at or near midnight.

Rotating shift: An arrangement whereby employees work successive weeks on day, evening, and night schedules.

Oscillating shift: An arrangement whereby employees alternate, usually weekly, between day and evening shifts, or between evening and night shifts, but do not make the full 24-hour cycle as under rotating shift arrangements.

Split shift: A daily work schedule which is divided into two or more parts; for example, work 7am to 11am, off 11am to 2pm, and work 2pm to 6pm.

Swing shift: A relief or fourth shift used at periodic intervals in plants with rotating shifts, and operating 7 days a week. It may also be used to equalize day and night work among workers.

increased periodically but, generally, not as rapidly as basic hourly pay rates.

These observations are derived from data collected in the Bureau of Labor Statistics' area and industry wage survey

programs. Both surveys report occupational wage rates and the incidence of selected employee benefits and establishment practices, including late-shift provisions and practices.

Area wage surveys are conducted annually in a sample of 70 Standard Metropolitan Statistical Area (SMSA's). Although the emphasis is on occupational pay and benefits found in individual areas, results of the 70 area surveys are combined, with appropriate weighting, to represent all SMSA's in the United States (excluding Alaska and Hawaii).¹ As of July 1984, factories within scope of the wage survey program employed three-fifths of the Nation's 13 million manufacturing production workers.²

Twenty-five industry wage surveys are conducted in the manufacturing sector and 15 in nonmanufacturing, generally on a 3- or 5-year cycle.³ The most recent industry surveys used in this analysis—which is limited to the manufacturing sector—span the period between October 1979 and October 1984 which included both upswings and downturns in the economy. They covered industries employing about one-fifth of all manufacturing production workers in 1984.

Late-shift operations

Late-shift operations in manufacturing are primarily a product of economic and technological developments associated with factory production.⁴ Increasing ratios of capital investment to labor costs provide an incentive for maximum use of plant and equipment. Furthermore, continuous process industries, like basic steel, require round-the-clock operations to avoid high start-up and shut-down costs. Lower rates charged by electric utilities for night usage may provide another incentive for customers to add shift work. Still another factor may be the need for temporary night workers to meet unanticipated or seasonal increases in the demand for a factory's output.⁵

Establishments operating at night may use either a second shift only or both second and third shifts to supplement their daytime hours. The second (evening) shift generally ends at or near midnight, while the third (night) shift begins at this time. Arrangement is thus commonly made for three 8-hour shifts in a 24-hour period.⁶ Individual employees may regularly work on the same shift or may alternate among shifts. The various possibilities are described in a glossary of shift terms. (See the box.)

Incidence of late-shift work

Workers on late shifts accounted for 24.9 percent of the 6 million production and related workers employed in metropolitan area factories in 1984.⁷ (See table 1.) This compares with 22.8 percent of 7 million workers in 1959–60, the earliest period for which such data are available.⁸ In 1984, 17.7 percent of the factory production workers were on second shifts and 7.2 percent were on third shifts.

The incidence of late shifts among metropolitan areas varied, in part, because of differences in industry mix within individual localities. In the Miami area, for example, where

Table 1. Percent of manufacturing production workers on late shifts and average shift differentials, metropolitan areas¹ of the United States, 1959–84

Year of survey ² and shift schedule	Percent employed on late shifts	Percent with shift differential			Average shift differential		
		Total	Uniform cents-per-hour	Uniform percentage	Other ³	Uniform cents-per-hour	Uniform percentage
1959–60							
Second shift . . .	16.4	15.5	10.5	4.0	0.9	8.8	7.8
Third shift	6.4	6.1	4.6	.1	.5	11.1	9.9
1964–65							
Second shift . . .	17.8	16.6	11.5	4.2	.9	9.5	7.6
Third shift	6.5	6.3	4.9	.9	.5	12.0	9.9
1967–68							
Second shift . . .	18.7	17.7	11.9	4.9	.8	10.0	7.6
Third shift	7.3	7.1	5.2	1.2	.7	12.8	9.9
1971–72							
Second shift . . .	19.6	18.6	12.3	5.8	.5	12.3	7.3
Third shift	6.7	6.5	4.9	1.1	.5	16.1	9.9
1975							
Second shift . . .	21.3	20.2	13.7	6.0	.5	13.5	7.1
Third shift	7.6	7.4	5.6	1.4	.4	17.7	9.9
1977							
Second shift . . .	19.2	18.0	11.5	6.0	.5	16.8	6.8
Third shift	7.7	7.4	5.3	1.7	.4	21.6	9.7
1980							
Second shift . . .	20.1	18.8	11.8	6.7	.4	19.8	6.9
Third shift	8.0	7.7	5.4	1.7	.6	25.3	9.8
1984							
Second shift . . .	17.7	16.6	10.8	5.3	.4	23.2	7.3
Third shift	7.2	6.9	5.1	1.2	.6	29.9	10.0

¹Standard Metropolitan Statistical Areas (excluding those in Alaska and Hawaii), as defined by the U.S. Office of Management and Budget.

²Data are based on BLS wage surveys of 60 metropolitan areas in 1959–60; 80 areas in 1964–65; 85 metropolitan areas in 1967–68 and 1971–72; and 70 areas in 1975, 1977, 1980, and 1984. The results of these surveys were weighted to represent all Standard Metropolitan Statistical Areas, excluding those in Alaska and Hawaii, as defined by the U.S. Office of Management and Budget in 1959, 1961, 1967, and 1974.

³Includes pay at regular rates for more hours than worked, a paid lunch period not provided day-shift workers, a flat sum per shift, and other provisions, often provided in combination with a cents or percentage differential for hours actually worked.

NOTE: Because of rounding, sums of individual items may not equal total. A tabulation providing distributions of cents-per-hour and percentage differentials is available from the Bureau of Labor Statistics.

there is a high share of apparel industries, the relatively low proportions of late-shift workers—7.9 percent on second shifts and 2.5 percent on third shifts in 1984—reflect the influence of the apparel industries, which do not typically operate late shifts. In Green Bay, however, where there is round-the-clock pulp and paper manufacturing, second shifts accounted for 25.3 percent of the manufacturing production workers and third shifts, for 15.3 percent.⁹

The incidence of late shifts is generally highest in industries that are capital intensive, including those having continuous process operations. (See examples from the Bureau's industry wage survey program shown in table 2.) The highest proportions of workers on late shifts are in cotton and manmade textile (51.5 percent), cigarette (51 percent), and glass container industries (50 percent) which are all capital intensive. Late shifts accounted for between 40 and 50 percent of the workers in a number of other industries, including those with continuous process operations (basic steel; pulp, paper, and paperboard; blended and prepared

Table 2. Percent of production and related workers employed on late shifts and percent paid shift differentials, selected manufacturing industries, 1973-84

Industry	Most recent BLS survey ¹						Previous BLS survey ¹					
	Survey date	All production and related workers (thousands)	Second shift		Third shift		Survey date	All production and related workers (thousands)	Second shift		Third shift	
			Working	Receiving differential	Working	Receiving differential			Working	Receiving differential	Working	Receiving differential
Food and kindred products:												
Meatpacking	June/84	82,948	18.9	16.9	4.3	4.2	May/79	104,348	14.9	14.2	2.2	2.2
Prepared meat products	June/84	50,854	18.1	16.3	4.1	3.7	May/79	48,804	15.4	14.4	3.1	3.1
Flour and other grain mill products	Sept./82	8,115	19.7	18.7	12.2	11.8	Sept./77	10,550	17.1	16.3	11.5	11.1
Rice milling	Sept./82	3,246	17.3	6.2	14.6	6.2	Sept./77	2,642	22.2	4.7	9.8	4.6
Blended and prepared flour	Sept./82	5,588	31.1	25.0	15.5	12.0	Sept./77	5,187	26.5	24.3	14.0	12.8
Wet corn milling	Sept./82	6,312	23.0	20.9	20.5	18.4	Sept./77	6,337	23.1	22.8	20.3	20.1
Tobacco manufactures:												
Cigarettes	June/81	32,438	31.3	31.3	19.7	19.7	May/76	32,826	32.9	32.9	16.5	16.5
Textile mill products:												
Cotton and manmade textiles	Aug./80	269,079	27.8	5.5	23.7	19.6	May/75	305,530	29.4	5.5	23.6	19.0
Wool textiles	Aug./80	13,088	27.0	13.5	17.0	15.6	May/75	13,122	24.8	11.9	14.9	12.6
Women's hosiery	Aug./81	20,107	13.1	4.6	6.6	2.1	July/76	23,803	13.6	5.5	5.1	1.9
Other hosiery	Aug./80	28,032	16.5	6.0	7.3	2.8	July/76	23,913	14.8	4.8	5.0	2.3
Textile dyeing and finishing	Aug./80	48,927	27.4	11.3	17.8	15.4	June/76	51,458	26.7	11.8	14.8	13.0
Apparel and other textile products:												
Men's and boys' suits and coats	June/84	46,716	1.0	1.0	(²)	(²)	April/79	61,409	1.0	1.0	(²)	(²)
Men's and boys' shirts	May/84	64,789	(³)	(³)	(³)	(³)	May/81	64,969	(³)	(³)	(³)	(³)
Men's and boys' separate trousers	May/78	85,442	1.0	1.0	(²)	(²)	June/74	71,086	1.0	1.0	(²)	(²)
Furniture and fixtures:												
Nonupholstered wood furniture	June/79	137,150	(³)	(³)	(³)	(³)	June/74	122,350	(³)	(³)	(³)	(³)
Paper and allied products:												
Pulp, paper, and paperboard products	July/82	150,200	22.9	22.7	22.6	22.3	Sum./77	170,757	24.6	24.5	23.1	23.0
Corrugated and solid fiber boxes	May/81	57,301	30.0	29.7	8.2	8.2	March/76	61,912	29.7	29.7	5.2	5.2
Lumber and wood products:												
Millwork	Sept./84	50,419	13.1	10.1	1.4	1.2	June/79	43,914	12.9	10.0	1.7	1.4
Chemicals and allied products:												
Industrial chemicals	May/81	115,230	17.3	17.1	15.2	15.1	June/76	129,952	18.2	18.0	15.9	15.8
Petroleum and coal products:												
Petroleum refining	May/81	65,566	15.7	15.4	15.6	15.4	April/76	63,289	17.1	16.5	17.4	16.8
Stone, clay, and glass products:												
Glass containers	May/80	54,518	25.3	24.6	24.5	24.0	May/75	62,591	25.4	25.4	24.1	24.1
Other pressed or blown glass	May/80	28,394	25.2	24.3	18.9	18.7	May/75	28,328	23.2	23.2	16.9	16.9
Structural clay products ⁴	Sept./80	26,290	10.0	9.1	4.6	4.2	Sept./75	32,954	10.7	9.0	4.1	3.6
Brick and structural clay tile	Sept./80	11,691	6.6	4.6	2.5	1.7	Sept./75	15,375	7.6	4.8	3.2	2.3
Clay refractories	Sept./80	6,340	17.9	17.9	7.8	7.8	Sept./75	7,585	18.0	18.0	7.7	7.7
Primary metal industries:												
Basic iron and steel	Aug./83	184,078	26.1	24.7	20.0	18.6	Feb./78	345,163	25.3	25.1	20.1	19.8
Iron and steel foundries	Sept./79	177,371	26.2	26.0	11.4	11.4	Nov./73	185,394	25.8	25.6	10.5	10.4
Fabricated metal products:												
Fabricated structural metal	Nov./79	51,935	13.7	12.7	1.8	1.8	Nov./74	63,741	15.3	14.8	1.4	1.4
Transportation equipment:												
Motor vehicle parts and accessories	May/83	170,825	23.4	22.6	5.7	5.6	April/74	242,148	27.9	27.6	8.0	7.9
Shipbuilding and repairing	Sept./81	109,410	23.7	23.7	9.0	9.0	Sept./76	104,027	21.7	21.4	8.4	8.4

¹Data are based on the most recent and the previous BLS nationwide occupational wage surveys in selected manufacturing industries, conducted between October 1973 and October 1984. The industry studies nearly always have a minimum establishment size cutoff; establishments below the cutoff usually account for less than one-tenth of an industry's total work force, and if included, would not substantially affect the percentages provided above. The cutoff was 20 workers for all except the following: cotton and manmade textiles (50), industrial chemicals (50), petroleum refining (100), basic steel (100), motor vehicle parts

(50), and shipbuilding (250). Industry definitions are from the 1967 and 1972 editions of the *Standard Industrial Classification Manual*, prepared by the U.S. Office of Management and Budget.

²Less than 0.5 percent.

³Precise estimate not available; less than 2 percent.

⁴Includes data for industries in addition to those shown separately.

flour; and wet corn milling), and those with relatively high ratios of capital investment to wages (other pressed or blown glass, and textile dyeing and finishing). Industrial chemicals, petroleum refining, and shipbuilding each employed about a third of their workers on late shifts. The lowest

incidence—less than 3 percent of the workers—was found in the labor intensive apparel, footwear, and furniture industries.

For most of the manufacturing industries having 30 percent or more of their workers on late shifts, the ratio of

second shift employment to third shift employment was less than 2 to 1. The ratio was generally much higher where relatively few workers were on late shifts. In the millwork and fabricated structural metal industries, for example, late shifts accounted for about 15 percent of the workers, and second shift workers outnumbered those on third shifts by at least 7 to 1.

Unless special circumstances dictate three shifts (such as increased product demand, favorable utility rates, continuous processing), the economic advantages gained from adding a third shift are generally not as great as those provided by the addition of a second shift. For example, a second shift may reduce fixed overhead costs per unit of output by one-half, while second and third shifts combined

Table 3. Percent of production and related workers on late shifts at time of survey,¹ selected manufacturing industries and regions,² 1979-84

Industry	New England		Middle Atlantic		Border States		Southeast		Southwest	
	Second shift	Third shift	Second shift	Third shift	Second shift	Third shift	Second shift	Third shift	Second shift	Third shift
Food and kindred products:										
Prepared meat products	14.4	2.6	12.9	2.5	16.8	0.4	18.6	8.7	11.1	1.2
Flour and other grain mill products	—	—	16.7	12.3	—	—	26.8	11.9	16.0	9.9
Rice milling	—	—	—	—	—	—	—	—	19.7	16.6
Blended and prepared flour	—	—	—	—	—	—	—	—	29.3	9.9
Wet corn milling	—	—	—	—	—	—	—	—	—	—
Textile mill products:										
Cotton and manmade textiles ³	23.9	12.3	21.8	16.7	—	—	28.0	24.4	30.9	15.0
Wool textiles ³	26.9	11.6	—	—	—	—	27.7	23.1	—	—
Women's hosiery ³	—	—	—	—	—	—	12.7	6.8	—	—
Other hosiery ³	—	—	11.6	7.0	—	—	16.7	7.5	—	—
Textile dyeing and finishing ³	28.9	12.8	22.6	3.2	—	—	27.9	20.8	—	—
Paper and allied products:										
Pulp, paper, and paperboard	23.8	23.7	21.9	21.5	—	—	23.7	23.6	24.3	24.3
Corrugated and solid fiber boxes	27.6	5.0	30.8	7.0	29.8	8.6	28.1	9.2	23.1	6.8
Chemicals and allied products:										
Industrial chemicals	13.6	10.8	19.3	17.2	19.1	15.7	22.8	19.5	11.6	10.9
Stone, clay, and glass products:										
Glass containers	—	—	23.2	21.7	27.7	27.7	26.6	26.5	23.7	23.0
Other pressed or blown glass	—	—	24.5	14.1	23.6	15.4	—	—	—	—
Structural clay products ⁴	—	—	11.8	2.9	13.5	5.1	8.2	6.3	7.6	2.1
Brick and structural clay	—	—	12.1	3.1	6.2	2.9	8.0	2.4	3.0	2.6
Clay refractories	—	—	17.4	3.6	—	—	—	—	—	—
Primary metal industries:										
Iron and steel foundries	16.3	5.5	22.7	11.0	31.2	20.0	23.5	6.8	26.0	14.2
Fabricated metal products:										
Fabricated structural metal	10.9	—	12.3	4.5	19.1	.8	8.7	—	12.9	.9
			Great Lakes		Middle West		Mountain		Pacific	
			Second shift	Third shift	Second shift	Third shift	Second shift	Third shift	Second shift	Third shift
Food and kindred products:										
Prepared meat products			24.7	4.9	14.6	2.8	16.1	2.2	18.7	4.9
Flour and other grain mill products			21.1	13.8	17.9	12.6	20.1	10.7	19.7	11.3
Rice milling			—	—	—	—	—	—	—	—
Blended and prepared flour			30.3	20.9	36.6	12.8	—	—	—	—
Wet corn milling			22.3	19.6	26.4	24.9	—	—	—	—
Paper and allied products:										
Pulp, paper, and paperboard			22.4	21.3	—	—	—	—	21.1	21.1
Corrugated and solid fiber boxes			32.5	7.5	27.5	3.9	—	—	31.3	16.0
Chemicals and allied products:										
Industrial chemicals			20.0	16.5	20.6	20.4	22.5	16.3	15.1	14.2
Stone, clay, and glass products:										
Glass containers			26.1	25.2	—	—	—	—	26.5	26.5
Other pressed or blown glass			26.0	25.2	—	—	—	—	—	—
Structural clay products ⁴			6.8	3.3	20.8	8.8	—	—	4.9	3.2
Brick and structural clay			5.0	3.2	—	—	—	—	—	—
Clay refractories			10.7	5.2	24.7	11.2	—	—	—	—
Primary metal industries:										
Iron and steel foundries			28.5	12.5	20.4	6.3	31.1	7.3	21.0	8.0
Fabricated metal products:										
Fabricated structural metal			18.1	4.5	15.1	—	16.2	.7	13.0	1.6

¹See table 2, column 2 for date of survey.

²The regions are defined as follows: New England—Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont; Middle Atlantic—New Jersey, New York, and Pennsylvania; Border States—Delaware, District of Columbia, Kentucky, Maryland, Virginia, and West Virginia; Southeast—Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee; Southwest—Arkansas, Louisiana, Oklahoma, and Texas; Great Lakes—Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin; Middle West—Iowa, Kansas, Missouri, Nebraska, North Dakota, and South Dakota; Moun-

tain—Arizona, Colorado, Idaho, Montana, New Mexico, Utah, and Wyoming; and Pacific—California, Nevada, Oregon, and Washington. Alaska and Hawaii were not included in the study.

³No data were reported or data did not meet publication criteria for the following regions: Great Lakes, Middle West, Mountain, and Pacific.

⁴Includes data for industries in addition to those shown separately.

NOTE: Dashes indicate no data or data that do not meet publication criteria.

may reduce these costs by two-thirds. Thus, the addition of the third shift results in incremental savings in overhead costs of only one-sixth.¹⁰

Fourteen of the industries listed in table 2 increased the proportion of production workers on late shifts between the survey dates shown; 7 had declines; and 10 had virtually no change (that is, a change of less than 1 percentage point). The largest proportionate increases were in meatpacking (from 17.1 to 23.2 percent), prepared meat products (from 18.5 to 22.2 percent), and hosiery other than women's (from 19.8 to 23.8 percent). Increases of at least 10 percent were also recorded for blended and prepared flour, flour and other grain mill products, wool textiles, and other pressed or blown glass. Shift work declines were most dramatic in motor vehicle parts (from 35.9 percent in 1973 to 29.1 percent in 1984) and in brick and structural clay (from 10.8 to 9.1 percent). Overall production worker employment also changed substantially in a number of these industries, but there was no consistent relationship between work force

changes and changes in the proportions of shift workers.

Regionally, the proportions of shift workers did not vary substantially for such industries as pulp, paper, and paperboard; chemicals; glass containers; and cotton and manmade textiles. (See table 3.) However, in a few of the industries analyzed, such as iron and steel foundries, the proportion of all late-shift workers in one region (Border States) of the country was more than double that in some of the other regions studied during the early 1980's. Where comparisons were possible, the proportions of workers on late shifts were usually below industrywide levels in the New England, Middle Atlantic, and Southwest regions, while generally above those in the Border States, Southeast, and Great Lakes. Comparisons with industrywide proportions yielded no general pattern in the Middle West, Mountain, and Pacific regions.

Late-shift work is not confined to the manufacturing sector. For the economy as a whole, the Current Population Survey (a household survey conducted for the BLS by the

Table 4. Percent of late shift production and related workers receiving differentials, and average differentials, selected manufacturing industries, 1973-84

Industry	Survey date	Industry average hourly earnings ¹	Second shift				Third shift					
			All workers receiving differential ²	Cents-per-hour differential		Percentage differential		All workers receiving differential ²	Cents-per-hour differential		Percentage differential	
				Percent receiving	Average amount	Percent receiving	Average amount		Percent receiving	Average amount	Percent receiving	Average amount
Most recent survey³												
Food and kindred products:												
Meatpacking	June/84	\$ 7.80	100	79.2	13.7	0.1	5.0	100	42.8	18.1	—	—
Prepared meat products	June/84	7.61	100	74.2	16.8	0.1	10.0	100	59.4	18.3	—	—
Flour and other grain mill products	Sept./82	8.59	100	98.9	17.8	—	—	100	99.9	25.0	—	—
Rice milling	Sept./82	6.25	100	100.0	10.7	—	—	100	100.0	14.7	—	—
Blended and prepared flour	Sept./82	8.01	100	93.6	16.5	2.0	10.0	100	95.0	22.4	4.2	15.0
Wet corn milling	Sept./82	10.72	100	100.0	18.1	—	—	100	100.0	31.2	—	—
Tobacco manufactures:												
Cigarettes	June/81	10.47	100	100.0	18.1	—	—	100	100.0	31.2	—	—
Textile mill products:												
Cotton and manmade textiles	Aug./80	5.09	100	94.6	9.4	1.8	7.5	100	98.5	7.4	0.5	6.7
Wool textiles	Aug./80	4.91	100	96.3	7.8	3.7	6.8	100	99.4	9.0	0.6	10.0
Women's hosiery	Aug./81	4.70	100	69.6	21.6	30.4	4.2	100	52.4	17.3	47.6	9.2
Other hosiery	Aug./81	4.56	100	60.0	10.9	38.3	6.1	100	57.2	19.4	39.3	10.4
Textile dyeing and finishing	Aug./80	5.23	100	98.2	7.6	0.9	5.0	100	99.4	8.0	—	—
Paper and allied products:												
Pulp, paper, and paperboard products	July/82	10.22	100	100.0	20.0	—	—	100	100.0	27.6	—	—
Corrugated and solid fiber boxes	May/81	7.09	100	98.0	14.1	1.0	8.3	100	99.7	20.9	0.3	5.0
Chemicals and allied products:												
Industrial chemicals	May/81	9.88	100	91.2	29.5	2.9	6.0	100	86.0	50.1	4.5	3.2
Petroleum and coal products:												
Petroleum refining	May/81	11.58	100	98.7	50.0	—	—	100	96.8	98.3	2.0	10.0
Stone, clay and glass products:												
Glass containers	May/80	7.66	100	96.4	16.9	—	—	100	96.3	20.9	—	—
Other pressed or blown glass	May/80	6.40	100	96.7	15.2	2.9	10.0	100	96.3	19.3	3.2	10.0
Structural clay products ⁴	Sept./80	5.86	100	92.3	17.1	6.6	5.8	100	95.2	18.5	2.4	7.5
Brick and structural clay tile	Sept./80	5.07	100	87.0	15.0	10.9	6.4	100	82.4	19.1	11.8	8.8
Clay refractories	Sept./80	7.96	100	100.0	18.7	—	—	100	100.0	23.8	—	—
Primary metal industries:												
Basic iron and steel	Aug./83	11.87	100	99.6	28.4	—	—	100	100.0	41.8	—	—
Iron and steel foundries	Sept./79	7.16	100	72.3	18.2	25.8	5.2	100	67.5	21.6	28.9	9.4
Fabricated metal products:												
Fabricated structural metal	Nov./79	6.35	100	89.0	20.7	7.1	7.8	100	94.4	28.8	0.6	5.0
Transportation equipment:												
Motor vehicle parts and accessories	May/83	8.20	100	86.3	18.7	12.4	6.8	100	85.7	22.4	12.5	9.3
Shipbuilding and repairing	Sept./81	8.97	100	43.9	30.7	38.4	7.9	100	40.0	43.4	34.4	7.9

Bureau of the Census) reports that 11 percent of all full-time nonfarm wage and salary workers were on late shifts in May 1980.¹¹ The proportion of workers on late shifts was higher in goods-producing (13 percent) than in service-producing (10 percent) industries. By broad occupational group, the range was from 3 percent for salesworkers to 29 percent for service workers—a group that frequently works late shifts and includes police officers, firefighters, and health and cleaning personnel.

Shift premiums

Late-shift work, although often economically advantageous to employers, may adversely affect workers—bio-

logically, psychologically, and socially. Evening or night work, according to some authorities, may lead to a variety of physical problems and may impair normal family and social life.¹²

As a consequence, extra pay is generally provided for late-shift work.¹³ Payment of premiums to workers on late shifts can be traced at least to World War I, when the National War Labor Board awarded a 5-percent shift bonus in several cases under its review. During the 1920's, a survey by the National Industrial Conference Board indicated that about 10 percent of the workers in 243 companies, largely in manufacturing, were on night shifts. The study found that premiums were rarely paid for rotating shift work, but were commonly found for fixed shifts. During the 1930's

Table 4. Continued—Percent of late shift production and related workers receiving differentials, and average differentials, selected manufacturing industries, 1973–84

Industry	Survey date	Industry average hourly earnings ¹	Second shift						Third shift			
			All workers receiving differential ²	Cents-per-hour differential		Percentage differential		All workers receiving differential ²	Cents-per-hour differential		Percentage differential	
				Percent receiving	Average amount	Percent receiving	Average amount		Percent receiving	Average amount	Percent receiving	Average amount
Previous survey³												
Food and kindred products:												
Meatpacking	May/79	\$6.97	100	99.3	16.3	0.1	5.0	100	100.0	17.5	—	—
Prepared meat products	May/79	6.52	100	99.3	17.7	0.7	10.0	100	96.8	19.2	3.2	10.0
Flour and other grain mill products	Sept./77	5.52	100	100.0	12.4	—	—	100	100.0	19.3	—	—
Rice milling	Sept./77	3.85	100	100.0	13.3	—	—	100	100.0	22.4	—	—
Blended and prepared flour	Sept./77	6.14	100	95.9	12.1	0.4	7.0	100	99.2	19.4	0.8	10.0
Wet corn milling	Sept./77	6.87	100	100.0	15.0	—	—	100	100.0	26.6	—	—
Tobacco manufactures:												
Cigarettes	May/76	5.71	100	61.1	26.6	38.9	8.0	100	52.1	35.0	47.9	10.0
Textile mill products:												
Cotton and manmade textiles	May/75	3.08	100	85.5	8.7	10.1	8.2	100	95.8	6.9	3.2	6.8
Wool textiles	May/75	3.17	100	97.5	6.6	0.8	7.0	100	99.2	8.5	—	—
Women's hosiery	July/76	3.00	100	60.0	18.2	34.6	6.7	100	42.1	16.2	42.1	11.6
Other hosiery	July/76	3.05	100	41.7	7.9	47.9	5.1	100	47.8	12.3	39.1	8.9
Textile dyeing and finishing	June/76	3.82	100	90.7	8.3	4.2	6.2	100	94.6	8.3	1.5	7.5
Paper and allied products:												
Pulp, paper, and paperboard products	Sum./77	6.54	100	98.8	14.0	—	—	100	99.1	21.6	—	—
Corrugated and solid fiber boxes	March/76	4.65	100	98.0	10.2	2.1	4.3	100	98.1	16.7	—	—
Chemicals and allied products:												
Industrial chemicals	June/76	6.28	100	88.9	18.4	5.6	7.1	100	88.6	31.0	5.7	7.1
Petroleum and coal products:												
Petroleum refining	April/76	7.38	100	100.0	21.2	—	—	100	—	43.4	—	—
Stone, clay, and glass products:												
Glass containers	May/75	4.63	100	100.0	13.8	—	—	100	100.0	17.8	—	—
Other pressed or blown glass	May/75	4.32	100	100.0	11.7	—	—	100	100.0	15.0	—	—
Structural clay products ⁴	Sept./75	3.79	100	96.7	12.0	2.2	6.8	100	91.7	15.7	1.1	8.8
Brick and structural clay tile	Sept./75	3.35	100	99.6	9.4	0.4	9.0	100	99.7	12.1	0.3	9.0
Clay refractories	Sept./75	4.78	100	99.4	13.7	0.6	5.0	100	88.3	18.0	1.3	7.5
Primary metal industries:												
Basic iron and steel	Feb./78	8.32	100	100.0	20.0	—	—	100	100.0	30.0	—	—
Iron and steel foundries	Nov./73	4.12	100	75.8	11.4	23.4	5.3	100	62.5	15.0	36.5	10.0
Fabricated metal products:												
Fabricated structural metal	Nov./74	4.55	100	87.8	13.1	6.8	6.2	100	92.9	17.3	2.4	5.0
Transportation equipment:												
Motor vehicle parts and accessories	April/74	4.45	100	75.0	13.4	24.6	5.5	100	79.8	14.2	16.5	8.0
Shipbuilding and repairing	Sept./76	5.66	100	52.8	22.8	35.1	7.3	100	70.2	19.3	17.9	7.5

¹Data relate to straight-time hourly earnings which exclude premium pay for overtime and for work on weekends, holidays, and late shifts.

²Includes workers receiving other than cents-per-hour or percentage differentials.

³See footnote 1, table 2.

⁴Includes data for industries in addition to those shown separately.

NOTE: Dashes indicate no data or data that do not meet publication criteria. A tabulation providing distributions of cents-per-hour and percentage differentials is available from the Bureau of Labor Statistics. Because of rounding, sums of individual items may not equal 100.

and 1940's, the practice of paying premiums for fixed night-shift work expanded, and since World War II, the payment of late-shift premiums has become a widespread practice in American industry.¹⁴

In 1984, more than 90 percent of the workers on second and third shifts in urban manufacturing plants received premium pay for such schedules. Uniform cents-per-hour differentials, averaging 23.2 and 29.9 cents above day-shift rates, applied to two-thirds of the second-shift workers and to three-fourths of the third-shift workers, respectively. Similarly, uniform percentage differentials, averaging 7.3 percent and 10.0 percent of day rates, applied to one-third of the second-shift workers and nearly one-fifth of the third-shift workers. Other types of differentials included pay at regular rates for more hours than worked (such as 8 hours' pay for 7.5 hours' work), paid lunch periods which were not provided to first-shift workers, or a flat sum per shift. These "other differential" arrangements, available to fewer than 1 percent of the workers, were commonly provided in combination with a cents-per-hour or percentage differential for hours actually worked.

More than 90 percent of the late-shift workers in the manufacturing industries surveyed separately by BLS during the October 1973–October 1984 period were paid shift differentials. (See table 2.) Industries in which the proportions paid shift differentials were substantially below 90 percent for second shifts included rice milling (36 percent of the workers), cotton and manmade textiles (20 percent), women's hosiery (35 percent), other hosiery (36 percent), and textile dyeing and finishing (41 percent). Industries in which the incidence of third-shift differentials fell substantially below 90 percent of the workers included rice milling (42 percent), women's hosiery (32 percent), and other hosiery (38 percent).

In part, these differences among the industries studied reflect the influence of collective bargaining. For 25 of the industries shown in table 2, it was possible to compare the percent of late-shift workers receiving shift premiums and

the percent of the industry's production workers employed in establishments with collective bargaining agreements covering a majority of these workers. A positive relation was found between an industry's incidence of premium pay for shift work and its degree of unionization; the coefficient of correlation was 0.87.

Shift differential pay has not increased as rapidly as basic day-shift wage levels.¹⁵ For example, straight-time average hourly earnings of unskilled plant workers in metropolitan areas rose 92 percent from July 1975 to July 1984, and skilled maintenance worker averages rose 97 percent. In contrast, the average cents-per-hour shift differential advanced 72 percent for second-shift and 69 percent for third-shift work.

Between 1975 and 1984, for workers receiving percentage differentials, the average premium rose 3 percentage points for second-shift and 1 percentage point for third-shift work. Percentage premiums automatically reflect increases in hourly pay rates, but cents-per-hour premiums (the principal type used) require adjustment to keep pace.

Shift differentials in the industries studied separately were usually paid as cents-per-hour additions to day-shift rates and typically averaged from 10 to 20 cents more for second shifts and from 15 to 25 cents more for third shifts. (See table 4.) When paid as a percentage of day-shift rates, differentials for second and third shifts averaged 5 to 10 percent and were most frequently found in industries such as women's hosiery, iron and steel foundries, brick and structural clay tile, shipbuilding, and motor vehicle parts. In most of the industries, the average cents-per-hour differential increased between the survey periods studied. In a few instances, growth in the average shift differential outpaced the rise in average hourly earnings. For example, between April 1976 and May 1981, the average cents-per-hour differential in petroleum refining increased from 21.2 to 50.0 cents for second shifts and from 43.4 to 98.3 cents for third shifts.¹⁶ Over the same period, average hourly earnings increased 57 percent, from \$7.38 to \$11.58. □

FOOTNOTES

¹For summaries of findings of surveys conducted in 1984, see *Area Wage Surveys: Selected Metropolitan Areas, 1984*, Bulletin 3025–72 (Bureau of Labor Statistics, 1985); and *Occupational Earnings in All Metropolitan Areas, July 1984*, Summary 85–4 (Bureau of Labor Statistics, 1985).

²The surveys are restricted to establishments employing 50 workers or more in the following industry divisions: manufacturing; transportation, communications, electric, gas, and sanitary services; wholesale trade; retail trade; finance, insurance, and real estate; and selected services. (In the 13 largest areas studied, the minimum establishment size is 100 workers in manufacturing; transportation, communications, electric, gas, and sanitary services; and retail trade.)

³For an example, see *Industry Wage Survey: Meat Products, June 1984*, Bulletin 2247 (Bureau of Labor Statistics, 1985).

⁴See Janice Neipert Hedges and Edward S. Sekscenski, "Workers on late shifts in a changing economy," *Monthly Labor Review*, September 1979, pp. 14–15.

⁵Outside manufacturing, round-the-clock demand for medical, protection, and other services require night work. For a detailed analysis, see Marc Maurice, *Shiftwork, Economic Advantages and Social Costs* (Geneva, International Labour Office, 1975). See also Murray F. Foss, "Changing utilization of fixed capital: an element in long-term growth," *Monthly Labor Review*, May 1985, pp. 3–8.

⁶An alternative approach is described in Herbert R. Northrup, James T. Wilson, and Karen M. Rose, "The Twelve Hour Shift in the Petroleum and Chemical Industries," *Industrial and Labor Relations Review*, April 1979, pp. 312–26.

⁷Information on shift work typically is obtained in a given metropolitan area once every 3 years, with the information being collected annually in a third of the areas. Data for 1984 actually relate to information collected in 1982, 1983, and 1984. For ease of reference, the survey period is labeled 1984.

⁸For an analysis of late-shift employment during the 1960's, see Charles M. O'Connor, "Late-shift employment in manufacturing industries," *Monthly Labor Review*, November 1970, pp. 37–42.

⁹ Summary data for individual areas surveyed in 1984 are in *Area Wage Surveys: Selected Metropolitan Areas, 1984*.

¹⁰ This example is cited in F. P. Cook, *Shift Work* (London, Institute of Personnel Management, 1954), p. 8.

¹¹ The latest date for which this information is available. See *Workers on Late Shifts*, Summary 81-83 (Bureau of Labor Statistics, 1981).

¹² See Peter Finn, "The effects of shift work on the lives of employees," *Monthly Labor Review*, October 1981, pp. 31-35; and Graham L. Staines and Joseph H. Pleck, *The Impact of Work Schedules on the Family* (Ann Arbor, MI, Institute for Social Research, University of Michigan, 1983).

¹³ Unlike overtime premium provisions in union-management agreements, which may be set high enough to deter long workweeks, collectively bargained shift premiums are essentially designed as compensation for work at disagreeable hours; unions rarely seek penalty payments as deterrents to shift operations. See Sumner H. Slichter, James J. Healy, and E. Robert Livernash, *The Impact of Collective Bargaining on Management* (Washington, Brookings Institution, 1960), pp. 228-30. Further discussion of collective bargaining issues and shift work is found in John Zalusky, "Shiftwork—A Complex of Problems," *AFL-CIO American Federationist*, May 1978, pp. 1-6.

Provisions for shift differentials appeared in 1,290 of 1,550 collective bargaining agreements covering 1,000 workers or more which were in effect on or after January 1, 1980. See *Characteristics of Major Collective Bargaining Agreements, January 1, 1980*, Bulletin 2095 (Bureau of Labor Statistics, 1981), pp. 50-52. (Analysis of collective bargaining agreements was discontinued in 1981.)

¹⁴ For a brief history of shift premiums, see Milton Derber, "The History of Basic Work Hours and Related Benefit Payments in the United States," in *Studies Relating to Collective Bargaining Agreements and Practices Outside the Railroad Industry*, Appendix Volume IV to the *Report of the Presidential Railroad Commission* (Washington, February 1962), pp. 288-90.

¹⁵ Shift differential pay accounted for less than 1 percent of total compensation of production workers in manufacturing in 1977, the last year for which such data were published. See *Employee Compensation in the Private Nonfarm Economy, 1977*, Summary 80-5 (Bureau of Labor Statistics, 1980), p. 8.

¹⁶ During the 1976 union contract negotiations between petroleum refiners and the Oil, Chemical and Atomic Workers' Union, shift premium pay was doubled for both evening and night shifts. For further details, see *Current Wage Developments* (Bureau of Labor Statistics, February 1977).

ERRATUM

Because of a typographical error, a tabulation was duplicated in the Howard N Fullerton, Jr. article "The 1995 labor force: BLS' latest projections," November issue, p. 22, first column. The paragraph containing the correct tabulation appears below:

The labor force participation rates of a few age groups of women are projected to increase by more than 1 percent a year. The following tabulation shows the eight groups with the fastest participation growth projected for 1984-95:

Race	Age group	Projected growth per year
White women	25-34	1.4
White women	35-44	1.3
White women	45-54	1.1
Black women	35-44	1.0
Black women	45-54	.9
Black women	25-34	.9
Black women	20-24	.8
White women	18-19	.8