
UNITED STATES DEPARTMENT OF LABOR

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Wages in Rubber Manufacturing Industry
August 1942

By H. M. Douty

DIVISION OF WAGE ANALYSIS

Robert J. Myers, Chief



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LETTER OF TRANSMITTAL

UNITED STATES DEPARTMENT OF LABOR,
BUREAU OF LABOR STATISTICS,
Washington, D. C., March 23, 1943.

The SECRETARY OF LABOR:

I have the honor to transmit herewith a report on wages in the rubber-manufacturing industry, August 1942. A detailed study of the tire and tube and the mechanical rubber goods branches of the industry was undertaken by the Bureau at the request of the National War Labor Board. The survey was designed to provide primary data for use by the Board in its consideration of wage-dispute cases in these industry divisions. This report was prepared in the Bureau's Division of Wage Analysis by H. M. Douty, with the assistance of Joseph W. Bloch and W. H. Weidowke.

A. F. HINRICHS,
Acting Commissioner.

Hon. FRANCES PERKINS,
Secretary of Labor.

*Bulletin No. 737 of the
United States Bureau of Labor Statistics*

[Reprinted from the MONTHLY LABOR REVIEW, February and March 1943]

**WAGES IN RUBBER MANUFACTURING INDUSTRY,
AUGUST 1942**

Part I.—TIRE AND TUBE DIVISION¹

Summary

THE tire and tube division of the rubber-manufacturing industry, despite drastic limitation upon the use of rubber for civilian transportation, employed a substantially larger number of workers in 1942 than in 1939. The facilities of the industry are being intensively utilized in the production of a wide variety of rubber articles for direct military use. Thousands of workers are now engaged in the manufacture of self-sealing fuel tanks for aircraft, barrage balloons, rubber boats, life rafts, pontoons, and other products required by the armed forces of the United Nations. Tires and tire products for military and essential civilian use are being manufactured in important quantities.

Workers in the tire and tube division received average hourly earnings, exclusive of overtime premium pay and shift differentials, of almost \$1.04 in August 1942. Male factory workers averaged \$1.12 an hour, and the average for women was 75.8 cents. The highest level of wages was found in the important Akron-Detroit area, where straight-time earnings averaged almost \$1.14 an hour. Workers in the southern division of the industry averaged 71.4 cents an hour.

These findings are the result of a detailed study of wages in the tire and tube and mechanical rubber goods branches of the rubber-manufacturing industry, undertaken by the Bureau of Labor Statistics at the request of the National War Labor Board. The survey was designed to provide primary data for use by the Board in its consideration of wage-dispute cases in these industry divisions. The major portion of rubber-manufacturing employment is found in these two branches of the industry.

Some Characteristics of the Industry

CONCENTRATION AND COMPETITION

The tire and tube industry is characterized both by marked concentration of control and by sharp competition. The industry often is cited as one in which the benefits of large-scale production and continuous improvement of product have accrued largely to the benefit of consumers. At the same time, four multiple-plant corporations control the greater part of the productive capacity of the industry.

Tire and tube manufacture is dominated by the Firestone Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co., and the United States Rubber Co.—commonly termed the “Big Four.” In 1935, each of these four corporations was listed among the 65 largest industrial corporations in the country, and their combined assets,

¹ See Part 2 (p. 23) for data on the mechanical rubber goods branch of the industry.

including foreign investments, amounted to over \$600,000,000.² These companies in 1935 employed 79.9 percent of the wage earners and accounted for 80.9 percent of the value of product in this division of the rubber industry. The acquisition of new plants since 1935 and the decrease in the number of independent establishments probably has increased the extent to which production in the industry is controlled by the Big Four.

Some measure of the present importance of the four major companies can be derived from data secured by the Bureau in this wage study. Of the 32 plants surveyed in August 1942, 13 were operated by the four major companies, and these 13 plants employed 85.2 percent of the total number of wage earners reported. However, these figures slightly overstate the relative importance of the four major companies, since a number of plants, estimated to employ less than 2 percent of the workers in the industry, were not covered by the survey.

Despite the concentration of production in a few companies, the industry has been highly competitive. During the past two decades, prices, profits, and employment have exhibited marked instability. Competition for the original-equipment trade and for the trade of large distributors of replacement tires has been severe, and price wars have been frequent and bitter. A new phase of distribution obviously began, however, when the Government became the principal consumer of tires and the only consumer of the special war products that now constitute an important part of the output of the industry.

LOCATION OF THE INDUSTRY

In the fourth decade of the last century, rubber-manufacturing plants were established in Massachusetts, Connecticut, and Rhode Island. The industry later spread to other Eastern States, notably New York, New Jersey, and Pennsylvania. The Eastern States remained the dominant area of rubber manufacture until the early years of the present century, and certain types of rubber goods are still produced predominantly in the East.³

The importance of Akron and the Middle West in the rubber industry is based largely upon the rise of the middlewestern area as the major center of automobile production. The original Akron plant was established in 1870, and still bears the name of one of its founders, Dr. B. F. Goodrich. Other rubber firms were established in Akron before the turn of the century. The Akron companies found difficulty in competing successfully with the older eastern establishments in rubber footwear and other forms of rubber goods output then of major significance in the industry, and tended to concentrate, therefore, on the manufacture of solid carriage tires and pneumatic bicycle tires in which competition was less severe. When the demand for pneumatic tires for automobiles began, the small but vigorous Akron firms were in an advantageous position to secure this new business.

Tires soon became the most important product made of rubber. Even in 1914, the value of tire production represented almost 49 percent of the value of the total output of the rubber industry. The importance of Ohio as a center of tire and tube production appears to have increased until about 1935. After 1935, a number of new

² National Resources Committee, *The Structure of the American Economy*, Part I (p. 274). Washington, 1939.

³ Gaffey, John Dean: *The Productivity of Labor in the Rubber Tire Manufacturing Industry* (pp. 149-175). New York, Columbia University Press, 1940.

branch factories of major Akron companies were established outside of the State, and the position of important competitors of the Akron firms apparently improved. Moreover, the Ford Motor Co. opened a tire plant at Dearborn, Mich. These developments combined to reduce the proportion of workers employed in tire and tube plants in Ohio from 68.4 percent of the industry total in 1935 to 55.3 percent in 1939.

At the time of the Bureau's wage survey in August 1942, however, employment in Ohio tire and tube plants had climbed to approximately 64 percent of the industry total. This gain in relative position is accounted for entirely by the almost phenomenal increase in employment in Akron plants between 1939 and 1942; other Ohio plants, with one exception, had fewer workers in 1942 than in 1939.

Akron, in any case, remains the dominant rubber-manufacturing center of the country. The principal plants of Firestone, Goodyear, and Goodrich are situated there, together with the plants of three smaller companies. Half a dozen other tire plants are found in Ohio outside of Akron, but the combined labor force of these plants does not equal that in any one of the three big Akron plants.

The largest tire plant of the United States Rubber Co. is in Detroit. The industry also is represented in Indiana and Illinois. About three-fourths of the workers in the industry in August 1942 were in the Middle West.

In the Far West, tire and tube manufacture is carried on chiefly in Los Angeles. Each of the Big Four has a plant there, the Goodyear plant dating from 1920. Between 1919 and 1938, the number of tires built in California increased from less than 1 percent to approximately 10 percent of the national output.

The eastern tire plants are scattered from Pennsylvania to Massachusetts. The East is somewhat less important than the Far West in this division of the rubber industry, but somewhat more important than the South. Two of the three plants in the South are branch factories of Big Four companies, and the third southern plant is affiliated with an eastern tire company. The rise of tire manufacturing in the South dates from the late 1920's.

UNIONIZATION

Attempts to unionize the rubber industry prior to 1933 were sporadic and short lived. The passage of the National Industrial Recovery Act, however, ushered in a period of vigorous organizational effort. Initial success was slight. Indeed, it was not until 1937, after the validation by the Supreme Court of the National Labor Relations Act, that the United Rubber Workers of America (by this time affiliated with the C. I. O.) obtained a written agreement with any of the large companies. Unionism in the industry obviously has enjoyed effective recognition for only a few years. The spread of organization, however, has been rapid. By 1942, the major portion of the tire and tube division of the industry was operating under the terms of collective agreements. Akron and Los Angeles are major centers of union strength.

Twenty-four of the 32 tire and tube plants covered by the present study reported union agreements with locals of the United Rubber Workers of America. The United Automobile Workers, also affiliated with the C. I. O., exercised collective-bargaining rights in an

additional plant. No agreements in this division of the industry were reported with unions affiliated with the American Federation of Labor. Independent unions functioned in two plants. Five plants were operating without union agreements at the time of the wage survey. It is estimated that at least 80 percent of the workers in the tire and tube division of the industry are covered by collective agreements.

The jurisdiction of the United Rubber Workers of America extends to all incentive or straight-time workers employed in the manufacture of rubber products or in the metal-fabricating departments and plants operated by rubber companies. Collective agreements are usually restricted to the individual plant. The prevalence of incentive methods of wage payment throughout the industry and frequent alterations in products and specifications make for constant participation in wage negotiations. Union locals typically act independently in adjusting disputes over wage rates. They enjoy likewise a large measure of independence in negotiating general wage changes.

LABOR PRODUCTIVITY

The various stages in the manufacture of tires and tubes—preparation of crude rubber, processing, curing and finishing—are highly mechanized.⁴ Although no fundamental changes in technology have occurred during the past decade, many new devices have been introduced. The extensive application of time and motion study throughout the industry undoubtedly has played an important role in the rationalization of production.

Between 1929 and 1940, labor productivity, as measured in physical terms, increased remarkably in the tire and tube division.⁵ Average output per man-hour approximately doubled, and average output per wage earner increased by almost 62 percent. Stated differently, production in 1940 was about 10 percent greater than in 1929, and this output was achieved by the use of about 68 percent as many workers and only 54 percent of the man-hours necessary in 1929.

Several factors that help to account for the very large gain in labor productivity over the past decade have already been mentioned. The cumulative effect of many relatively small technological changes probably has been great. The wide use of incentive-wage systems, which in turn involves careful job analysis and tends in general to stimulate managerial effort, has been important. Over this period, moreover, a material reduction in the number of plants in the industry has taken place, and it is reasonable to suppose that production has been concentrated in the more efficient plants. Some new and superbly equipped plants have been added to the industry since 1935.

In terms of technology and production organization, the fabrication of rubber war products included in the survey stands in sharp contrast to the fabrication of tires and tubes. The manufacture of these products—barrage balloons, rubber boats, other inflatable products, and self-sealing fuel tanks—does not appear to lend itself readily to high mechanization. Moreover, the large-scale production of these products is so recent that production methods are in a state of flux, and neither precise job classification nor time and motion study had been undertaken by many plants at the time of the wage survey. The

⁴ For a description of the processes in tire and tube manufacture, see U. S. Bureau of Labor Statistics Bulletin No. 585: *Labor Productivity in the Automobile Tire Industry*, by Boris Stern, Washington, 1933. Although this study is 10 years old, the description of basic processes is still valid.

⁵ U. S. Bureau of Labor Statistics, *Productivity and Unit Labor Cost in Selected Manufacturing Industries, 1919-1940* (p. 94). Mimeographed.

separation of stock preparation, assembly, curing, and finishing were relatively clear cut, but within these stages of fabrication the differentiation of workers by jobs had not, as a rule, proceeded far. This statement, in general, is less true of the production of self-sealing fuel tanks than of the other products covered.

EFFECT OF THE WAR

Few industries have been affected more decisively by the war than rubber manufacturing. The major sources of plantation rubber are in the hands of the enemy, and a tremendous development of synthetic rubber production is under way to meet the basic raw-material requirements of the industry. Production for normal civilian needs has been largely suspended, except to the extent that such needs fit into the war production program. The market mechanism as a guide to production policy has been replaced by governmental controls calculated to secure the most effective use of available rubber supplies for the war effort. The production of new rubber products for direct military use has assumed large proportions.

In view of this, the basic factors affecting rubber manufacture—rubber supply, use of plant capacity in establishments normally devoted largely to the manufacture of tires and tire products, and the effect of the war on the labor requirements of the industry—are of great importance.

Rubber Requirements and Raw Material Supply

The basic requirements for rubber products in the present situation have been authoritatively described as follows:

The demands now placed upon us are enormous. Without any allowance whatsoever for civilian passenger car tires, the estimated requirements for the year 1943 are 574,000 tons (of crude rubber or its synthetic equivalent). This contrasts with the total average over-all consumption in the United States before the war of about 600,000 tons.

We must supply not only the needs of our own armed forces but much of those of the military machines of our Allies as well. We must equip our busses and trucks and other commercial vehicles and provide on a large scale specialty items for such purposes as factory belting, surgical, hospital and health supplies. And in addition to all these we *must* maintain the tires on *at least* a substantial portion of our 27,000,000 civilian passenger automobiles. Otherwise an economy geared to rubber-borne motor transport to an extent not approached elsewhere in the world will break down.⁶

The precise quantitative estimates of rubber supply and basic rubber requirements for the 1942-44 period contained in the report of the Baruch Committee are unquestionably the best available. It is unnecessary in this article to discuss these estimates in detail. Barring a possible shortage of milling, mixing, and tire-building capacity in 1944, all of the crude, synthetic, and reclaimed rubber available for consumption during this period can be used. The really crucial question relates to rubber supply, and its answer hinges on the fulfillment of the planned synthetic-rubber production program. The planned program provides for an output of more than 500,000 tons of synthetic rubber in 1943 and of more than 900,000 tons in 1944. These figures gain perspective when viewed against the record consumption of 775,000 tons of crude rubber in 1941.

⁶ Rubber Survey Committee (Bernard M. Baruch, James B. Conant, and Karl T. Compton), Report September 10, 1942 (p. 23).

It seems reasonable to assume that the volume of rubber available for consumption will be sufficiently large to sustain a relatively high level of employment in rubber manufacturing as a whole in 1943, and that in 1944 the labor requirements will be even higher. Available rubber in 1943, if the planned synthetic program is pushed through, should be close to the average amount consumed in recent normal years, and appreciably above this level in 1944. Moreover, the labor-time used in the processing of a ton of synthetic rubber, at least at present, is greater than the labor-time required to process a ton of natural rubber.

Present Use of Plant Capacity in Tire and Tube Establishments

It was reasonable to anticipate a decline in employment in the tire and tube division of the industry when normal civilian production was virtually eliminated. Actually, this anticipated decline in employment failed to materialize, at least in an acute form. The Bureau's index of employment in tire and tube establishments does indicate that employment during the first 6 months of 1942 was measurably below the very high plateau attained in the second half of 1941. In no single month during this period, however, did employment fall below the average level in 1939. The index began to climb sharply in June 1942, and in August, at the time of the wage survey, employment was more than 25 percent above the 1939 level. In fact, labor shortages had begun to appear in the major tire-producing areas.

The general maintenance of employment in the tire and tube division may at first glance appear surprising. Tire production did decline drastically. During the first 4 months of 1942, the output of pneumatic tires was only about 26 percent as great as in the corresponding period in 1939. The publication of tire-production data ceased in April 1942, and the level of output in August, at the time of the survey, may well have exceeded the level for the first 4 months of the year. It should be noted, in any case, that the measurement of production in terms of number of units probably understates the importance of tire output in the first 4 months of 1942 as compared with corresponding periods for earlier years. Rubber tonnage consumed would be a better measure. The 1942 output undoubtedly consists of a larger proportion of heavy-duty tires than in normal periods. It is probable, therefore, that man-hour requirements for tire production did not fall so drastically as the production figures would indicate. Moreover, retreading and other forms of tire reconditioning undoubtedly helped to cushion the effects of the decline in tire output in some plants.

It is not possible, from the information obtained in the survey, to indicate in any detail the adjustments made by the tire and tube division of the industry to the changes growing out of the war. A rough picture can be drawn, however, of production at the time of the wage survey in August 1942.

(a) Tire plants were still producing tires. During the course of the wage survey, one or two plants were discovered in which the production of tires had been replaced entirely in recent months by some other form of rubber output. These plants represent highly exceptional cases. Although almost all tire plants continue to manufacture tires and tubes, the relative importance of these products has, of course, declined. Twenty-three plants, however, reported that the value of their tire and tube output in August 1942 represented at least 60

percent of the value of their total output in that month. These plants, on the whole, are relatively small, and accounted for only 31.4 percent of the total employment in all tire plants covered by the survey. Nine plants, on the other hand, reported that tire and tube production represented less than 60 percent of the value of their total output in August 1942. These plants employed 68.6 percent of the total number of workers found in all tire and tube establishments.

(b) The war created an enormous demand for certain types of rubber products not normally produced in large volume. Some of the tire and tube plants were able to move swiftly into the production of the required military products. At the time of the survey, thousands of workers were employed on self-sealing fuel tanks, barrage balloons, rubber boats, pontoons, and other rubber products designed for direct military use. Slightly more than half of the plants—18 out of 32—reported some production of special war products. In 8 of these plants, 20 percent or more of the value of output in August 1942 was accounted for by the production of such goods. These 8 plants employed 58.7 percent of the total number of workers in all of the 32 plants.

(c) The output of mechanical rubber goods or of other categories of rubber products is of appreciable importance in a few plants producing tires and tubes. The continued production of such goods into the war period helped to sustain employment in these particular plants.

(d) Conversion of tire and tube plant facilities to the war effort has not ordinarily taken the form of nonrubber production. In a few plants, however, extensive machine-shop and other facilities are being utilized in the manufacture of nonrubber war products. Important instances of this form of conversion were encountered in the Akron area.

It should not be inferred from this discussion that the war had no adverse effect on production and employment in individual plants, for such is not the case. The adjustment of the industry division as a whole, however, was remarkably favorable.

Changes in the Labor Force

War conditions have not resulted, to any appreciable extent, in the use of female labor in tasks performed traditionally by men. A large influx of female workers and boys has occurred, however, for fabrication work on special war products.

The preparation of rubber and the manufacture of tires have always required a moderate amount of skill and considerable physical stamina in most occupations. The production of heavy tires for military use has increased rather than diminished the need for male labor in these departments. At the time of the survey, women were employed in the processing departments of tire and tube plants principally as band builders, bead flippers, inspectors, splicers, and in a scattering of other jobs.

The fabrication of inflatable rubber-fabric products (barrage balloons, pontoons, rubber boats, life rafts, lift belts, and life jackets) has by no means reached the ultimate limits of process rationalization. Many of the operations, however, have been divided into light and relatively simple tasks, and large numbers of women have been brought into the departments engaged in the fabrication of these

products. At the time of the wage survey, approximately 80 percent of the workers engaged in cutting, assembling, testing, and curing inflatable rubber-fabric products were women. The production of self-sealing and rubber-covered fuel tanks requires a greater amount of male labor, but women constituted a substantial proportion (38 percent) of the workers employed in this division. For the most part, the operations performed in constructing these special products have no counterpart in the normal operations of the rubber industry. The specific skill, dexterity, and experience acquired by the workers appear to have largely, although not entirely, a wartime value.

The total employment of women in the plants included in the tire and tube division is impressive. Almost 18,000 women were found in these plants in August 1942. This number represented 27 percent of the total labor force at that time. In the Far West, 39 percent of the workers were women, as compared with 27 percent in Akron-Detroit, 22 percent in the East, 17 percent in Other Midwest (Middle West exclusive of Akron-Detroit), and 16 percent in the South. Special war-product output was relatively greater in both the Far West and Akron-Detroit than in the other three areas.

Negroes constituted about 5 percent of the total labor force of the industry in August 1942. The proportion of Negro employment was less than 5 percent in the Other Midwest, Far West, and East, and approximately 5 percent in the Akron-Detroit area. In the South, Negroes formed 20 percent of the labor force. Negroes were employed principally in compounding and milling occupations, and as janitors and general plant laborers.

Scope and Method of Survey

The present survey of earnings in the tire and tube division of the rubber industry represents the first detailed study of wages by occupation in this industry division since 1923.⁷ In 1940 the Bureau conducted a mail-questionnaire survey of hours and earnings in the entire rubber industry,⁸ but did not obtain data on occupational wages. The 1940 study did yield valuable information on the distribution of workers, by hourly earnings, in the various divisions of the industry.

The data for the present survey were collected by trained field representatives of the Bureau from actual pay-roll and other plant records. The pay-roll period covered was generally that ending nearest August 29, 1942, but in a few plants was a representative week shortly before or shortly after this period.

The information secured in the course of the survey includes occupational average hourly earnings, exclusive of premium payments for overtime hours and shift-differential payments.⁹ Information also was obtained on method of wage payment for each occupation

⁷ U. S. Bureau of Labor Statistics. Bulletin No. 358: *Wages and Hours of Labor in the Automobile Tire Industry, 1923*. Washington, 1924.

⁸ *Monthly Labor Review*, June 1941 (pp. 1490-1513): *Earnings in the Manufacture of Rubber Products*, May 1940.

⁹ In some plants earnings data were obtained only for workers employed on the first daylight shift. This was done to expedite the study by reducing the number of workers for which wage data had to be obtained, and by avoiding the problem of shift-differential premiums to the extent that such premiums were being paid. In plants where only first-shift workers were scheduled, information was obtained on the number of workers employed in each occupation on the other shifts. Total employment by occupation was used as a weighting factor in combining the data for any given plant with other plants. To a limited extent, the procedure of sampling wages by occupation was employed to increase the rapidity with which the field work could be accomplished.

and on the sex of the workers. General plant information of various kinds was secured to facilitate the interpretation of the earnings data. Information was gathered, for example, on the character of production, general wage changes since July 1940, plant minimum-wage policy, shift operation, unionization, and aggregate employment, man-hours, and earnings for selected periods from August 1939 to August 1942.

Virtually all plants known to be engaged in the manufacture of tires and tubes prior to the entrance of the United States into the war were covered by the study. A few plants employing less than 100 workers in the past were excluded. Data also were not secured for one medium-sized plant. The influence of these omissions upon the data reported is negligible; the labor force in these plants is estimated to represent less than 2 percent of the total employed in the tire and tube division in August 1942. The full scope of the study is indicated in table 1, which shows, by region, the number of plants included in the survey, together with total employment in these plants.

TABLE 1.—*Number of Tire and Tube Plants and Total Number of Workers Covered by Survey, by Region, August 1942*

Region	Number of plants	Number of workers	Percentage of—	
			Plants	Workers
All regions.....	32	66,721	100	100
Akron and Detroit.....	18	45,367	25	68
Other Midwest.....	9	4,486	28	7
Far West.....	5	7,764	16	12
East.....	7	4,940	22	7
South.....	5	4,164	9	6

¹ 6 plants in Akron; 2 in Detroit.

² 6 plants in Ohio; 1 in Indiana; 1 in Michigan; 1 in Illinois.

³ 5 plants in California; data for 1 plant in the Far West primarily manufacturing mechanical goods are not included in this table, although occupational wages for the tire-and-tube operations of this plant are included in subsequent tables.

⁴ 3 plants in Pennsylvania; 1 in New York; 2 in Connecticut; 1 in Massachusetts.

⁵ 1 plant in Tennessee; 1 in Alabama; 1 in Mississippi.

As table 1 shows, the survey covered 32 plants. Fully 68 percent of the 66,721 workers employed in these plants were found in the Akron-Detroit area,¹⁰ and approximately 7 percent in the Other Midwest. Twelve percent of the workers were employed in plants in the Far West, 7 percent in the East, and 6 percent in the South.

Within the limits of the survey, the occupational coverage is comprehensive in scope. The selection of occupations for coverage was based primarily upon two criteria: (1) The importance of an occupation in terms of number of workers employed, and (2) the strategic importance of a job in the occupational structure. It is estimated that from 80 to 90 percent of the workers engaged in the manufacture of tires and tubes are included in the occupational data here presented. Over 90 percent of the workers engaged in the production of selected war products in tire and tube plants likewise are found within the occupations for which wage data were collected.

In normal times, most plants in this division of the industry are relatively homogeneous with respect to product. The requirements

¹⁰ There are too few plants in Detroit to allow separate presentation for this area. Wage levels in Detroit in the rubber industry approximate Akron wage levels, and for this reason the Detroit data were combined with Akron rather than with the Other Midwest.

of a war economy have modified this characteristic of the tire and tube division. Greater diversification of product, as pointed out earlier, has developed from two principal factors—(1) the ability and readiness of some of the large plants to undertake metal-fabricating operations and (2) the growth in output of special rubber products of direct military use. Mechanical-goods production is important in a few plants producing tires and tubes.

In order to make the occupational data comparable from plant to plant, operations relating to the manufacture of metal products, synthetic rubber, rubber products¹¹ other than mechanical goods, miscellaneous specialty goods, and the construction of new plant equipment were not covered by the survey. Workers employed in reclaiming departments operated by rubber companies were scheduled separately, but data for reclaiming operations are not included in the present report. In substance, the occupational data presented in this report relate to rubber preparatory operations, tire and tube manufacture, the production of self-sealing fuel tanks, barrage balloons, rubber boats, pontoons, and life rafts, and plant maintenance.

A special problem obviously arose in connection with those plants producing mechanical rubber goods in addition to tires and tubes and special war products. Direct production jobs on mechanical goods created no difficulty, of course, and these jobs were scheduled separately. Where there was no physical separation of preparatory and maintenance jobs credited to the production of mechanical rubber goods or of products falling outside the scope of the survey, the proportion of employment was necessary. Data pertaining to mechanical-rubber-goods operations, as pointed out earlier, will be included in a subsequent report on that branch of the industry.

Methods of Wage Payment

USE OF WAGE INCENTIVES

The determination of earnings on an incentive basis is found predominantly in the tire and tube industry. Each of the plants represented in the occupational data operated some form of incentive plan. In the main, workers were guaranteed certain basic rates and were rewarded in direct proportion to output, usually above a standard production level. The particular incentive system in use varied from plant to plant; some plants had installed the Bedaux system, while others were operating on a straight piece-work basis.

At least 60 percent of the workers for whom occupational data were reported were paid on an incentive basis. Approximately 95 percent of the preparatory workers and 88 percent of the workers engaged in tire and tube processing were compensated in this manner. About one-third of the general and maintenance workers were covered by incentive plans.

The application of incentive methods to the manufacture of rubber war products was much less advanced. In August 1942 slightly less than 50 percent of the workers constructing fuel tanks and less than 20 percent of the workers fabricating other war products were paid on an incentive basis. It is likely, however, that further rationalization of production and time study will extend considerably the cover-

¹¹ Such as heels and soles, drug sundries, boots and shoes, sponge-rubber products, and household goods

age of incentive plans to workers on rubber war products. The effect of the extension of incentive methods of wage payment upon the wage structure of these divisions of the industry will undoubtedly be substantial.

SHIFT PRACTICES AND SHIFT DIFFERENTIALS

Multishift operation has been characteristic of the tire and tube industry for many years. All of the plants covered by the wage survey reported continuous operation, 11 working four 6-hour shifts and the remainder working three 8-hour shifts. Of the 11 plants in which four shifts were found, 6 were in Akron, 2 in Other Midwest, 2 in the East, and 1 in the Far West. In these plants, however, substantial numbers of workers were employed on a 3-shift basis, usually in the departments devoted to special war products. It is estimated that only one-third of the workers in the industry were employed on the first daylight shift.

The payment of shift differentials is not common practice in the industry. Only 4 of the 32 plants covered granted premium pay to workers on night shifts. These 4 plants are relatively small, and it is estimated that not more than 1,500 workers received shift-premium pay at the time of the wage survey.

OVERTIME-PAYMENT PRACTICES

Although 36 hours constituted the standard workweek for a substantial portion of the industry at the time of the wage survey, each company included in the study reported the payment of time and a half for hours in excess of 8 per day and 40 per week.

Occupational Earnings, August 1942

The basic information obtained in this survey consists of hourly earnings, exclusive of overtime premium pay or shift-differential premiums, for a comprehensive group of occupations in rubber preparation, tire and tube processing, self-sealing fuel tank, and inflatable rubber war products fabrication, and in service and maintenance.¹² Occupational wage information is here shown for nearly two-thirds of the total number of workers employed in the plants scheduled. The data reflect earnings as of August 1942.

CHARACTER OF OCCUPATIONAL WAGE DATA

In reporting occupational wage data, every effort was made to classify occupations on the basis of duties performed and not merely on the basis of job titles. Field representatives of the Bureau were provided with an occupational glossary for general guidance in the reporting of occupational data. It is believed that in this way reasonable uniformity of reporting was obtained from plant to plant.

It should be recognized, however, that many occupations are likely to vary from plant to plant in terms of specific duties and responsi-

¹² These occupational data relate to 33 plants rather than to only the 32 plants for which general information has been provided. The additional plant is engaged primarily in the manufacture of mechanical rubber goods, but occupations in the tire and tube department of this plant were scheduled separately, and preparatory and maintenance occupations were prorated between tire and mechanical-rubber-goods production.

bilities, despite their basic comparability. Some occupations are more affected by the factor of variability than others. The duties of Banbury mixers, for example, are quite similar from plant to plant; the duties of hand truckers, on the other hand, may vary considerably. In small plants, millmen may be employed during the same workweek, or even the same day, on different types of mills. In tire processing, a worker in one plant may perform tasks that are divided among two or more workers in another plant.

Another type of problem often encountered in occupational wage studies may be illustrated by the case of tire builders. Tire building is a clear-cut occupation. Although there may have been some point in segregating tire builders broadly by size of tire, inquiry indicated that such an approach would have been wholly impractical at the time of the wage survey, since many tire builders were constructing various sizes of tires during the workweek. The earnings here shown for tire builders therefore simply reflect the average earnings of such workers, irrespective of tire size. Similarly, no distinction was made between mixing millmen on 60- and 84-inch mills.

Care often must be exercised in a wage study to keep the data in manageable form. For example, considerable numbers of machine operators' helpers are employed in the rubber industry. These workers are distributed among many occupations, and to have shown them separately by occupation would have greatly increased the number of table entries. These workers, for the most part, were grouped. Data on learners by occupation were obtained, but, except in a few instances, such workers were combined into general learner classifications.

These comments are designed to indicate the limitations inherent in any industry-wide study of occupational wages. It is never possible to introduce all of the refinements that suggest themselves during the course of a survey. To do so, as a matter of fact, would prove more confusing than helpful. What can be done, and what this report attempts to do, is to show earnings data for a large number of occupations capable of relatively precise definition and found widely throughout the industry. Such data should reveal the nature of the wage structure of the industry.

AVERAGE HOURLY EARNINGS BY OCCUPATION, AUGUST 1942

A summary of the data obtained on wages by occupation in tire and tube plants is shown in table 2. Average hourly earnings, exclusive of overtime premium pay or shift premiums, amounted to approximately \$1.04 in August 1942 for all of the workers for whom data on earnings by occupation were obtained. Since the occupational coverage was broad and representative, this single figure dependably reflects the general level of straight-time hourly earnings in the industry. Even the summary data shown in table 2, however, serve to reveal the wide range within which earnings move. Thus, all male workers averaged \$1.12 an hour; the average for all woman wage earners was approximately 76 cents. Male workers engaged in rubber preparation averaged nearly \$1.16 an hour in the industry as a whole; the average for these workers was \$1.28 in the Akron-Detroit area and about 73 cents in the southern region.

TABLE 2.—Average Hourly Earnings¹ in Tire and Tube Plants, by Plant Division, Sex, and Region, August 1942

Division and sex	Average hourly earnings in—					
	United States	Akron-Detroit	Other Mid-west	Far West	East	South
All workers.....	\$1.037	\$1.138	\$0.967	\$0.880	\$0.930	\$0.714
Males.....	1.120	1.245	1.002	.954	.979	.748
Females.....	.758	8.01	.728	.713	.640	.535
Rubber preparation (males).....	1.155	1.281	1.049	1.127	.978	.727
Tire and tube processing.....	1.166	1.279	1.041	1.077	1.042	.778
Males.....	1.229	1.366	1.106	1.101	1.093	.800
Females.....	.843	.899	.759	.769	.712	.658
General, service, and maintenance.....	1.003	1.109	.831	.926	.813	.676
Males.....	1.016	1.125	.843	.952	.819	.680
Females.....	.718	.768	.706	.603	.588	.530
Self-sealing fuel tank fabrication.....	.937	1.106	(?)	.796	(?)	(?)
Males.....	1.046	1.215		.861		
Females.....	.760	.854		.716		
Barrage balloons and other inflatable rubber fabric products.....	.766	.796	(?)	(?)	(?)	(?)
Males.....	1.021	1.047				
Females.....	.702	.728				

¹ The average hourly earnings shown in this table are exclusive of premium overtime pay and shift-differential premiums.

² Number of workers and/or plants too few to justify computation of averages. The earnings data have been included in the totals for the United States and for the region.

The detailed occupational wage data are shown in tables 3 and 4. Table 3 shows occupational average hourly earnings by region and sex for workers in three broad plant divisions: rubber preparation, tire and tube processing, and general, service, and maintenance. The number of workers in each occupation could not be shown because of necessary restrictions on the disclosure of certain types of information in time of war. Instead, the total number of workers in each division was taken as 100 percent, and the number of workers in each occupation was expressed as a percentage of this total. It is thus possible to indicate the relative importance of various kinds of workers in the occupational structure of a given plant division. Calender operators, for example, comprised 7.2 percent of the workers in rubber preparation; 26.9 percent of the workers in tire and tube processing were tire builders.

Occupational wages in the fabrication of specified rubber war products made in tire and tube plants are shown in table 4. It should be clear, of course, that a portion of the workers in rubber preparation and general and maintenance (table 3) was engaged in preparing stock or maintaining plant and equipment for the production of barrage balloons and other war products.

All of the rubber-preparation workers for whom data are shown in table 3 are men. The average straight-time hourly earnings of these workers amounted to almost \$1.16 in August 1942. In the individual occupations, earnings for experienced workers ranged from 99.7 cents for compound sifters to \$1.55 for spreaders. The relatively small group of learners averaged 59.5 cents an hour. Calender operators, a highly skilled group, averaged \$1.34. The average earnings of workers in three occupations containing 43.9 percent of the workers—calender operators' helpers, mixing millmen, and warm-up millmen—fell in the narrow range of from \$1.12 to \$1.16.

It has already been pointed out that practically all workers engaged in rubber preparation were paid on an incentive basis. The most skilled jobs probably are calendaring and spreading, with spreaders subject to more unpleasant working conditions because of the presence of fumes from solvents. The other jobs, on the whole, require moderate skill and considerable physical effort.

Earnings in the Akron-Detroit area for preparatory workers as a group were consistently above earnings for preparatory workers in the other regions. The general level in the Far West was about 15 cents lower than the level in Akron-Detroit; in the Other Midwest about 22 cents lower; in the East 30 cents lower; and in the South 55 cents lower. These differences reflect to some extent differences in occupational structure from region to region; spreaders, for example, were found only in Akron-Detroit.

More than 83 percent of the workers engaged in tire and tube processing in August 1942 were men. Hourly earnings of all processing workers, male and female, amounted to almost \$1.17. The level of earnings of processing workers was heavily affected by the earnings of male tire builders, who constituted about 27 percent of the labor force and whose earnings averaged \$1.36 an hour.

The earnings of male processing workers alone averaged \$1.23; female employees averaged approximately 84 cents. The range in earnings among experienced male workers was from 88.4 cents for class C inspectors to more than \$1.37 for tire mold handlers and solid tire builders. Tire builder learners¹³ averaged 73.5 cents and other male learners, 69.5 cents. Hourly earnings for experienced male employees averaged less than \$1.00 in only 5 occupations, and these occupations contained only 3 percent of all male workers. The earnings of experienced women ranged from 68 cents for the handful of tire builders¹⁴ to almost 94 cents for band builders. As in the case of preparatory workers, the greater part of the processing workers (about 88 percent) were paid on an incentive basis.

The general level of earnings in the processing division in the Akron-Detroit area was \$1.28, as compared with almost \$1.08 in the Far West, about \$1.04 in Other Midwest and the East, and approximately 78 cents in the South.

The workers grouped in the general, service, and maintenance category averaged almost exactly \$1.00 an hour in August 1942 (table 3). Male workers earned an average hourly wage of approximately \$1.02, while the small group of woman workers averaged almost 72 cents. Among the experienced male workers, hourly earnings ranged from 79.6 cents for janitors to \$1.24 for rubber-cement mixers. Average earnings for class A carpenters and electricians, sheet-metal workers, tool and die makers, and machine repairmen fell within the very narrow range of from \$1.178 to \$1.190. Hand truckers, who comprised 15 percent of the workers in this division, averaged \$1.00 an hour. About one-third of the workers in the general, service, and maintenance group were paid on an incentive basis.

The general level of earnings for the workers in this division in Akron-Detroit was approximately \$1.11. This compares with a level of about 93 cents in the Far West, 83 cents in Other Midwest, 81 cents in the East, and about 68 cents in the South.

¹³ I. e., less than 3 months of experience.

¹⁴ Woman tire builders are employed principally on bicycle tires.

TABLE 3.—Average Hourly Earnings¹ in Tire and Tube Industry, by Division, Occupation, Sex, and Region, August 1942

Division, occupation, and sex	United States		Akron-Detroit		Other Mid-west		Far West		East		South	
	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings
<i>Preparatory processes</i>												
All workers: Males.....	100.0	\$1.155	100.0	\$1.281	100.0	\$1.049	100.0	\$1.127	100.0	\$0.978	100.0	\$0.727
Bale openers.....	2.3	.940	2.0	1.153	.9	.750	1.7	1.038	3.5	.873	6.0	.521
Banbury mixers.....	9.1	1.128	6.7	1.243	19.3	1.103	10.6	1.083	7.8	.987	9.5	.854
Calender operators.....	7.2	1.339	6.6	1.450	8.3	1.156	11.2	1.348	5.9	1.231	6.3	1.033
Calender operators, help- ers.....	14.3	1.145	12.9	1.273	17.2	1.014	19.3	1.139	14.3	.957	13.9	.840
Compound sifter opera- tors.....	.9	.997	1.0	1.173	1.3	.898	.....	.....	.....	.....	2.2	.577
Learners, miscellaneous.....	1.6	.695	.6	.736	.....	.....	.....	.....	8.6	.577	4.4	.503
Millmen, break-down.....	4.3	1.100	5.0	1.275	2.1	1.131	8	(?)	.5	(?)	11.1	.594
Millmen, mixing.....	14.7	1.120	13.0	1.193	21.2	1.042	17.0	1.128	24.2	1.027	2.8	.618
Millmen, sheeting.....	8.2	1.090	8.5	1.223	4.3	1.012	7.0	1.107	8.4	.860	13.9	.746
Millmen, warm-up.....	14.9	1.162	16.0	1.248	9.8	1.020	20.6	1.086	14.1	1.067	10.4	.815
Millmen, washing.....	2.5	1.014	2.0	1.107	4.3	(?)	3.4	.968	.....	.....	4.4	.617
Plasticator tenders.....	1.2	1.061	.9	1.223	1.9	.904	1.4	1.077	1.6	1.019	.9	(?)
Rubber compounders.....	9.8	1.113	10.7	1.207	6.8	1.028	6.7	1.066	9.2	1.113	12.0	.663
Rubber cutters.....	1.6	1.030	1.4	1.185	2.6	.929	.3	(?)	1.9	.907	2.2	.646
Spreaders.....	7.4	1.552	12.7	1.552	.....	.....	.....	.....	.....	.....	.....	.....
<i>Tire and tube processing</i>												
All workers.....	100.0	1.166	100.0	1.279	100.0	1.041	100.0	1.077	100.0	1.042	100.0	.775
<i>Male workers</i>												
Air-bag extractors.....	.9	1.169	.7	1.400	.5	1.111	2.0	1.071	1.2	1.157	1.7	.690
Band builders.....	3.5	1.060	2.8	1.269	4.7	1.015	6.0	1.014	5.9	.948	5.2	.688
Bead builders.....	.3	1.132	.2	1.262	.6	.940	.7	1.030	.2	1.096	.....	.....
Bead coverers.....	.2	.977	.....	.....	.1	(?)	1	(?)	.9	1.015	.3	(?)
Bead flippers.....	.5	1.036	.3	1.259	.3	1.053	1.5	.973	1.2	1.028	.8	(?)
Bead-wire insulators.....	.5	1.164	.5	1.302	.3	1.040	.4	1.033	.5	.934	.6	.791
Blas-machine opera- tors.....	2.1	1.201	1.7	1.356	3.6	1.083	3.0	1.059	2.6	1.088	1.8	.856
Buffers.....	1.3	1.250	1.5	1.290	.4	.873	.4	.873	2.0	.930	1.2	.735
Creel tenders.....	.1	1.164	.1	1.244	.....	.....	.4	(?)	.7	1.166	.....	.....
<i>Foremen, working:</i>												
Class A.....	.5	1.281	.3	1.429	.1	(?)	2.1	1.165	1.1	(?)	.....	.....
Class B.....	2.8	1.250	3.7	1.326	1.3	.860	1.2	.880	.6	.962	2.5	.962
Gum dippers.....	.2	1.128	.1	1.325	.1	(?)	1.4	1.063	.2	1.031	.1	(?)
Helpers, machine op- erators.....	5.9	1.245	7.7	1.335	4.7	.918	1.1	.811	2.0	.894	3.3	.746
Inner-tube builders.....	1.2	1.213	1.4	1.300	2.8	.970	.3	(?)	.....	.....	.....	.....
Inner-tube curers.....	1.8	1.218	1.5	1.337	4.6	1.081	1.1	1.109	1.8	1.198	.9	.824
Inner-tube inflators and deflators.....	.2	.913	.1	1.117	.7	.740	1	(?)	.1	(?)	.....	.....
Inner-tube splicers.....	1.8	1.159	2.1	1.264	1.5	.941	1.8	(?)	.5	1.134	1.5	.787
<i>Inspectors:</i>												
Class A.....	.8	1.265	.6	1.386	.....	.....	1.6	(?)	1.6	1.139	1.2	(?)
Class B.....	4.2	1.181	4.6	1.269	4.5	.958	2.6	1.077	2.4	1.000	4.0	.825
Class C.....	.3	.884	(?)	.....	.....	.....	1.9	.856	.7	.920	.3	.766
Learners, miscellane- ous.....	1.5	.695	1.0	.787	.....	.....	2.2	.627	4.0	.638	2.9	.622
Pot-heater tenders.....	2.2	1.289	1.4	1.380	3.3	1.162	5.8	1.273	4.9	1.246	.2	(?)
Slitting-machine op- erators.....	.3	1.170	.3	1.253	.5	1.109	.7	1.094	.2	.943	.1	.705
Soapstoners.....	.5	.931	.3	1.319	.3	.761	.....	.....	.6	.846	2.7	.720
Solid-tire builders.....	.6	1.377	.9	1.385	.1	(?)	.....	.....	.....	.....	.....	.....
Solid-tire tread pre- parers.....	.1	1.283	.2	1.354	.1	(?)	.....	.....	.....	.....	.....	.....
Splicers.....	1.8	.938	.7	1.145	1.8	.915	6.0	1.016	3.2	.965	4.3	.634
Tire balancers.....	.8	1.225	1.1	1.270	.5	1.033	.8	.996	.2	.850	.....	.....
Tire builders.....	26.9	1.359	27.6	1.467	23.3	1.293	28.4	1.243	23.8	1.211	24.6	.948
Tire builders, learners.....	3.8	.735	2.6	.833	.....	.....	3.7	(?)	2.3	.682	17.1	.610
Tire-mold handlers.....	5.5	1.372	6.8	1.446	5.6	1.156	3.4	1.131	3.9	1.155	1.1	(?)
Tire shapers.....	2.8	1.350	2.7	1.471	3.6	1.125	5.1	1.325	1.8	1.206	2.1	.932
Tire wrappers.....	.3	1.225	.3	1.292	.2	.993	.1	(?)	.7	1.196	.....	.....
Tread splicers.....	.2	1.054	.1	(?)	.8	.858	.....	.....	.1	(?)	.....	.....
Trimmers, hand.....	.5	1.187	.5	1.285	.7	.849	.4	(?)	.3	1.292	.2	.687
Trimmers, machine.....	.3	1.100	.2	1.224	.6	.902	.2	(?)	.4	(?)	.5	(?)
Tube cutters.....	1.5	1.201	1.6	1.343	1.0	.918	2.0	1.033	1.1	1.010	1.5	.761

See footnotes at end of table.

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TABLE 3.—Average Hourly Earnings¹ in Tire and Tube Industry, by Division, Occupation, Sex, and Region, August 1942—Continued

Division, occupation, and sex	United States		Akron-Detroit		Other Midwest		Far West		East		South	
	Percent of workers	Average hourly earnings	Percent of workers	Average hourly earnings	Percent of workers	Average hourly earnings	Percent of workers	Average hourly earnings	Percent of workers	Average hourly earnings	Percent of workers	Average hourly earnings
<i>Tire and tube processing—Continued</i>												
Male workers—Con.												
Tube-machine operators:												
Inner tube.....	0.6	\$1.184	0.4	\$1.454	2.7	\$1.051	0.7	\$1.094	0.3	\$1.033	0.6	\$0.915
Tread.....	1.1	1.223	.7	1.419	2.8	1.083	2.3	1.109	.9	1.144	.7	.874
Miscellaneous.....	.3	1.069	.2	1.296	.5	.937	.3	.923	1.1	.988	.1	(?)
Valve assemblers.....	.3	1.064	.1	1.426	.5	.980	1.0	.915	.4	1.204	.5	.737
Vulcanizers, miscellaneous.....	.9	1.240	1.1	1.346	-----	-----	-----	-----	.7	(?)	1.3	.804
Watchcase vulcanizer tenders.....	1.8	1.249	1.2	1.418	1.7	1.277	-----	-----	3.9	1.271	5.0	.968
Female workers	16.3	.843	18.6	.899	18.6	.759	7.2	.769	13.5	.712	9.1	.558
Band builders.....	3.0	.937	4.0	.966	.1	(?)	-----	-----	4.5	.793	-----	-----
Bead builders.....	.2	.833	.1	(?)	.1	(?)	1.0	(?)	-----	-----	.2	(?)
Bead coverers.....	.7	.899	1.0	.901	.9	.710	-----	-----	.2	(?)	.3	(?)
Bead flippers.....	1.2	.841	1.4	.880	.9	.676	.9	.802	1.4	.739	-----	-----
Bias-machine operators.....	.5	.936	.6	.920	1.2	(?)	-----	-----	-----	-----	-----	-----
Creel tenders.....	.2	.887	.2	.885	-----	-----	.2	(?)	-----	-----	-----	-----
Helpers, machine operators.....	.8	.880	1.1	.895	.7	.781	-----	-----	.6	(?)	-----	-----
Inner-tube builders.....	.3	.768	.2	(?)	2.0	.669	-----	-----	-----	-----	-----	-----
Inner-tube infators and deflators.....	.1	.753	.1	(?)	.5	.756	-----	-----	.2	.650	.1	(?)
Inner-tube splicers.....	.3	.857	.3	.954	1.2	.783	-----	-----	.1	.525	.1	(?)
Inspectors and testers.....	3.2	.800	4.1	.819	3.8	.758	.7	.800	1.5	.652	.3	(?)
Learners, miscellaneous.....	1.2	.610	.4	.676	.1	(?)	1.4	.629	2.7	.540	6.0	.526
Skivers.....	.2	.811	.2	.842	.5	.753	-----	-----	-----	-----	-----	-----
Splicers.....	3.3	.897	4.4	.930	2.1	.723	1.4	(?)	.9	(?)	1.4	(?)
Tire builders.....	.5	.680	-----	-----	3.5	.638	.6	(?)	.9	(?)	-----	-----
Trimmers, hand.....	.1	.752	.1	(?)	.3	(?)	-----	-----	-----	-----	.4	(?)
Valve assemblers.....	.5	.836	.4	.926	.7	.751	1.0	(?)	.5	.607	.3	(?)
<i>General, service, and maintenance</i>												
All workers	100.0	1.003	100.0	1.109	100.0	.831	100.0	.926	100.0	.813	100.0	.676
Male workers	95.6	1.016	95.2	1.125	97.3	.843	92.7	.952	97.6	.819	97.0	.680
Carpenters:												
Class A.....	1.5	1.178	1.8	1.219	1.5	.978	1.4	1.135	.4	.907	.2	(?)
Class B.....	.6	.976	.2	1.111	.3	.800	2.0	.997	2.4	.936	.5	.873
Cement mixers.....	4.7	1.243	6.3	1.290	.4	.827	4.2	.977	.8	.871	1.2	.791
Cleaners, equipment.....	2.1	.986	2.6	1.043	1.5	.886	.2	(?)	.9	.900	2.3	.587
Electricians:												
Class A.....	2.5	1.188	2.6	1.239	2.2	1.055	4.0	1.187	1.5	1.008	1.9	.993
Class B.....	.6	1.002	.2	1.133	.8	.947	1.8	1.029	2.0	.945	1.0	.934
Elevator operators.....	3.5	.914	4.8	.942	1.1	.702	1.3	.805	2.2	.701	.4	(?)
Firemen.....	1.8	1.062	1.3	1.229	3.9	.901	3.0	1.128	3.2	.775	.7	.980
Helpers, journeymen.....	3.6	.867	1.8	1.003	3.4	.755	4.2	.949	14.5	.774	3.9	.769
Janitors.....	10.7	.796	9.7	.895	12.6	.690	12.0	.794	10.6	.673	14.3	.482
Laborers.....	4.0	.827	3.2	1.006	8.8	.705	1.0	(?)	4.4	.745	7.6	.480
Learners, miscellaneous.....	2.5	.708	1.6	.839	-----	-----	7.1	.693	4.7	.640	5.7	.507
Loaders and unloaders, racks and conveyors.....	2.7	1.132	3.5	1.206	.4	(?)	.7	(?)	2.2	.789	1.8	.618
Millwrights:												
Class A.....	.9	1.096	.8	1.204	.7	.771	.5	1.080	1.4	1.004	2.3	.979
Class B.....	.5	.891	.1	.955	1.3	.723	-----	-----	2.3	.963	1.1	.882
Packers and craters.....	2.1	1.036	1.8	1.228	4.8	.780	5.0	.848	.6	.863	.7	.768
Pipefitters.....	3.3	1.158	3.3	1.215	3.8	1.069	2.1	1.199	2.6	1.037	4.3	.967
Repairmen, machine.....	10.2	1.187	11.0	1.238	10.1	.982	13.7	1.165	5.7	1.011	5.1	.959
Sheet-metal workers.....	.7	1.190	.7	1.249	.8	(?)	.1	(?)	.4	1.050	.7	.980
Stock clerks.....	9.3	1.041	8.5	1.196	14.2	.824	9.6	.926	13.3	.873	11.6	.781

See footnotes at end of table.

TABLE 3.—Average Hourly Earnings¹ in Tire and Tube Industry, by Division, Occupation, Sex, and Region, August 1942—Continued

Division, occupation, and sex	United States		Akron-Detroit		Other Midwest		Far West		East		South	
	Per- cent of work- ers	Average hourly earn- ings	Per- cent of work- ers	Average hourly earn- ings	Per- cent of work- ers	Average hourly earn- ings	Per- cent of work- ers	Average hourly earn- ings	Per- cent of work- ers	Average hourly earn- ings	Per- cent of work- ers	Average hourly earn- ings
<i>General, service, and main- tenance—Continued</i>												
Male workers—Con.												
Time clerks.....	0.9	\$1.036	1.0	\$1.117	-----	-----	1.2	(?)	0.7	\$0.606	1.9	\$0.882
Tool and die makers.....	.4	1.184	.2	1.317	1.2	\$1.134	.8	\$1.213	.6	1.067	.2	.975
Truck drivers.....	1.1	1.018	1.1	1.118	1.8	.863	1.5	.888	1.5	.893	*.2	.590
Truckers, hand.....	15.0	1.001	15.7	1.116	12.3	.853	9.6	.889	11.0	.847	21.6	.592
Truckers, power.....	4.3	1.191	6.1	1.224	.2	.745	.6	.882	2.6	.845	.6	(?)
Watchmen.....	5.6	.924	5.3	1.035	9.2	.740	5.1	.981	5.1	.672	5.2	.742
Female workers.....												
Janitors.....	4.4	.718	4.8	.768	2.7	.706	7.3	.603	2.4	.588	3.0	.530
Learners, miscellane- ous.....	1.6	.710	2.0	.729	1.0	.597	1.4	.725	.9	.568	.2	(?)
Packers.....	.4	.557	.1	.515	-----	-----	2.5	(?)	.2	(?)	1.4	(?)
Stock clerks.....	.6	.728	.4	.824	1.7	.768	1.3	.548	1.1	.643	.1	(?)
Time clerks.....	1.1	.754	1.4	.803	-----	-----	2.1	(?)	.2	.540	.2	(?)
	.7	.765	.9	.797	-----	-----	-----	-----	-----	-----	1.1	(?)

¹ The average hourly earnings shown in this table are exclusive of premium overtime pay and shift-differential premiums.

* Number of plants insufficient to justify the computation of an average.

† Less than a tenth of 1 percent.

EARNINGS IN FABRICATION OF RUBBER WAR PRODUCTS

Table 4 shows straight-time average hourly earnings by occupation, sex, and region for workers engaged in the fabrication in tire and tube plants of self-sealing fuel tanks and inflatable rubber war products. Data can be shown only for Akron-Detroit, Far West, and for the three other regions combined.

In the fabrication of fuel tanks, 62 percent of the workers were males and 38 percent females. Average hourly earnings for all workers amounted to 93.7 cents in August 1942—approximately \$1.05 for men and 76 cents for women. About 12 percent of the total number of workers were classified as learners, and the existence of this appreciable proportion of learners served to depress somewhat the general level of earnings.

Among the male workers, stock cutters, metal-fuel-tank coverers, and builders averaged \$1.19, \$1.21, and \$1.18 an hour, respectively. In only 2 male occupations, buffer and curer, were average earnings less than \$1.00 an hour. Female builders, who constituted almost 22 percent of the labor force, averaged 80.3 cents an hour. It should be noted that fuel tanks are of various sizes and shapes, and the duties of builders differ in difficulty and responsibility. These differences may help to explain the wide spread between the earnings of male and of female builders. About half of the workers engaged in fuel-tank fabrication were being paid on an incentive basis at the time of the wage survey.

The hourly earnings of fuel-tank fabricators as a group amounted to more than \$1.10 in Akron-Detroit, almost 80 cents in the Far West, and about 70 cents elsewhere. Fuel-tank production outside of Akron-Detroit and the Far West is of distinctly minor importance.

TABLE 4.—Average Hourly Earnings¹ in Fabrication of Specified Rubber War Products, Tire and Tube Industry, by Product, Occupation, Sex, and Region, August 1942

Product, occupation, and sex	United States		Akron-Detroit		Far West		All other areas	
	Per- cent of work- ers	Aver- age hourly earn- ings	Per- cent of work- ers	Aver- age hourly earn- ings	Per- cent of work- ers	Aver- age hourly earn- ings	Per- cent of work- ers	Aver- age hourly earn- ings
Fuel tanks: All workers.....	100.0	\$0.937	100.0	\$1.106	100.0	\$0.796	100.0	\$0.697
Male workers.....	62.0	1.046	69.9	1.215	55.4	.861	50.1	.788
Buffers.....	.9	.893	.3	1.097	1.5	.857	.4	(?)
Builders.....	14.0	1.182	18.7	1.311	10.8	.966	1.3	(?)
Builders, learners.....	3.8	.719	.6	(?)	7.1	.701	2.9	(?)
Curers.....	2.8	.967	1.5	1.208	3.9	.890	3.4	.799
Finishers.....	7.2	1.095	10.6	1.180	3.6	.943	9.6	.786
Foreman, working.....	2.4	1.073	1.6	1.244	3.1	.993	2.2	.940
Form builders.....	1.1	1.104	1.0	(?)	1.2	1.035	1.6	(?)
Inspectors and testers.....	9.9	1.088	14.4	1.154	5.7	.956	7.5	.860
Learners, miscellaneous.....	3.2	.687	.2	1.080	5.8	.687	6.7	.611
Metal-fuel-tank coverers.....	3.4	1.215	6.5	1.251			6.5	.902
Repairmen, tanks.....	9.5	1.051	11.7	(?)	7.9	.920	4.9	(?)
Repairmen, tanks, learners.....	2.1	.618			4.2	.615	2.2	(?)
Stock cutters.....	1.7	1.186	2.8	1.268	.6	(?)	.9	(?)
Female workers.....	38.0	.760	30.1	.854	44.6	.716	49.9	.805
Builders.....	21.8	.803	22.4	.871	30.4	.758	27.7	.614
Builders, learners.....	5.3	.623	.3	(?)	10.5	.630	3.8	(?)
Foremen, working.....	.4	.828	.1	(?)	.8	(?)		
Inspectors and testers.....	1.5	.778	1.9	.821	1.3	(?)	.2	(?)
Learners, miscellaneous.....	1.3	.615	.1	(?)	2.1	.640	5.6	(?)
Metal-fuel-tank coverers.....	.3	.742					6.1	.742
Repairmen, tanks.....	2.8	.762			6.0	.762		
Repairmen, tanks, learners.....	1.2	.621			2.2	.638	1.8	(?)
Stock cutters.....	3.4	.786	5.3	.806	1.3	(?)	4.7	.674
Barrage balloons, rubber boats, pontoons, life belts, and rafts: All workers.....	100.0	.766	100.0	.796	(?)	(?)	100.0	.551
Male workers.....	19.9	1.021	21.2	1.047			10.8	.657
Assemblers.....	8.3	1.035	9.4	1.036			.2	(?)
Buffers.....	1.2	.935	1.1	.933			2.1	.850
Curers.....	1.0	1.255	1.1	1.277			.4	(?)
Fabric cutters.....	2.6	1.019	2.8	1.031			1.5	.864
Foremen, working.....	.9	1.243	1.0	1.248			.2	(?)
Inspectors and testers.....	.8	1.066	.9	1.066				
Learners.....	3.6	.865	3.3	.960			5.8	(?)
Rope splicers and servers.....	1.5	1.075	1.6	1.082			.6	.930
Female workers.....	80.1	.702	78.8	.728			89.2	.539
Assemblers.....	54.0	.754	60.4	.757			6.5	.585
Cementers, hand.....	2.5	.571					20.8	.571
Fabric cutters.....	.9	.648	.6	.661			3.3	.632
Inspectors and testers.....	1.6	.703	1.4	.762			2.9	.534
Lay-up girls.....	.6	.651	.6	.674			.6	(?)
Learners.....	19.9	.581	15.6	.615			51.3	.507
Markers.....	.6	.691	.2	(?)			3.8	.639

¹ The average hourly earnings shown in this table are exclusive of premium overtime pay and shift-differential premiums.

² Number of plants insufficient to justify the computation of an average.

³ Data for a small department of 1 plant in the Far West engaged in the fabrication of inflatable war products were combined with "all other areas."

Table 4 indicates that 80 percent of the workers engaged in fabricating barrage balloons, rubber boats, pontoons, life belts, and life rafts were women. It was originally intended to present data separately for some of these inflatable rubber products, but this did not prove feasible. It is not believed that the data are distorted by the combination that proved necessary.

Average hourly earnings of all workers, male and female, amounted to 76.6 cents in August 1942; male workers averaged about \$1.02 and female workers 70 cents. The level of earnings for women was pulled down measurably by the large proportion of learners (about 20 percent) on the pay rolls at the time of the wage survey. Moreover, less than 20 percent of the workers on inflatable rubber products were being paid on an incentive basis in August 1942.

The most numerous group of experienced workers on inflatable rubber war products, female assemblers, averaged 75.4 cents an hour; male assemblers averaged \$1.035. As in the case of fuel tanks, differences in duties probably exist between men and women in this occupation.

VARIATIONS IN REGIONAL WAGE LEVELS

Inspection of the data in tables 3 and 4 indicates that appreciable variations existed in August 1942 in regional wage levels in the tire and tube division of the industry. A more precise measure of the extent of these variations is given in this section.

It should first be pointed out, however, that the level of wages in the Akron area for many years has exceeded wage levels in tire and tube manufacture in other parts of the country. This fact appears clearly in the study of wages in this industry division made by the Bureau in 1923. The differences prevailing in 1923 in regional wage levels are shown in the following tabulation,¹⁵ which gives average hourly earnings in identical occupations in four areas, expressed as percentages of the Akron average in 1923. At that time there were no tire plants in the South, and the development of the industry on the west coast was just getting under way.

	<i>Percent of Akron wage level, 1923</i>
Akron.....	100.0
Ohio (except Akron) and Michigan.....	84.7
Indiana and Wisconsin.....	70.8
Connecticut, Massachusetts, New York.....	78.2
New Jersey and Pennsylvania.....	73.9

The Bureau's 1940 questionnaire survey of wages in the rubber industry yielded regional comparisons on a plant basis; that is, the average earnings of all workers in the plants in a given area can be compared with the average earnings of all workers in the plants in other areas. This comparison is not so precise as one based upon common occupations and an assumed identity of occupational structure from region to region. For the 1940 period, however, usable comparisons can be made on this latter basis, since the plants in the industry were, with a few noteworthy exceptions, reasonably homogeneous as to product. The tabulation below shows the relation of plant wage levels in other areas to the level existing in the Akron-Detroit area in May 1940.¹⁶

	<i>Percent of Akron-Detroit wage level, May 1940</i>
Akron-Detroit.....	100.0
Other Midwest.....	73.1
California.....	87.7
East.....	73.1
South.....	57.1

In an effort to measure regional variations in wages in August 1942 with as much precision as possible, a group of 21 occupations was chosen from the list of occupations shown in table 3 for rubber prep-

¹⁵ The tabulation was constructed by first obtaining an average of occupational wages in Akron. Averages for the other areas shown in the 1923 study were obtained by weighting wages for each occupation in each area by the number of workers in that occupation in Akron plants. The purpose of this form of weighting is to eliminate the influence of differences in regional occupational structures on the wage averages. The basic data used may be found in U. S. Bureau of Labor Statistics Bulletin No. 353, table A (pp. 16-25).

¹⁶ Monthly Labor Review, June 1941 (p. 1494).

aration, tire and tube processing, and service and maintenance. Each of these occupations is found in all five areas for which data are shown in table 3, and the duties associated with each occupation are clear cut and vary little from plant to plant.¹⁷ Straight-time average hourly earnings in each of these occupations were weighted in each area by the number of workers employed in the occupation in the Akron-Detroit area. It was assumed, in other words, that each occupation had the same relative importance in the other areas as in the Akron-Detroit area. In this manner, an average of the earnings in the 21 occupations in August 1942 was computed for each area. The relationships thus developed are shown in the following tabulation:

	<i>Percent of Akron-Detroit wage level, August 1942</i>
Akron-Detroit.....	100.0
Other Midwest.....	83.0
Far West.....	85.9
East.....	80.9
South.....	63.7

These data indicate that tire and tube wage levels in August 1942 in the Other Midwest, Far West, and East were from about 81 percent to 86 percent of the Akron-Detroit level, and that the southern wage level was approximately 64 percent of this level.

Undoubtedly these variations are due to some extent to differences in size of city and differences in size of plant as well as to broader regional factors. In general, wages tend to be higher in large cities and large plants than in small ones. On the whole, plants in the Other Midwest, the East, and South are in relatively small communities and tend to be somewhat smaller in size than the plants in other areas. No effort is made in this report to analyze the various aspects of the regional differential problem.

Trend of Employment, Hours, and Earnings, 1939 to 1942

For the 32 plants in the tire and tube division, data were secured on total employment, man-hours, and pay rolls for representative payroll periods in 6 selected months from 1939 to 1942. Table 5 shows employment, average weekly earnings, average weekly hours, average hourly earnings including overtime premium payments for these six periods, and estimates of straight-time average hourly earnings.

These figures provide a rough general picture of the trend in employment, hours, and earnings in the industry from 1939 to 1942. Certain limitations are inherent in combined earnings data of the type shown in table 5. Comparison of one period with another, or even of one region with another, may be affected by changes or differences in occupational patterns. Thus, considerable differences exist between the occupational structure for the industry as a whole in the 1942 periods and in the 1939-41 periods. In addition to new occupations and appreciable change in the sex composition of the labor force, the proportion of learners was certainly greater in the 1942 periods than in the earlier years. It must be remembered, moreover, that even in normal times some of these plants manufacture products other than tires and tubes, and the wages paid to the workers on these other products are included within the aggregate figures.

¹⁷ These 21 carefully selected occupations contained 22.4 percent of the workers in rubber preparation, tire and tube processing, and service and maintenance.

As pointed out earlier, product diversification has increased as a result of the war. Despite these limitations, the material in table 5 is the most convenient and useful summary available of the trend of employment and pay rolls in the industry division.

TABLE 5.—Number of Workers and Average Hours and Earnings, in Tire and Tube Plants, by Region, August 1939—August 1942

Month and year	Em- ploy- ment	Aver- age weekly earn- ings	Aver- age weekly hours	Average hourly earnings with punitive overtime	Esti- mated straight- time average hourly earnings	Em- ploy- ment	Aver- age weekly earn- ings	Aver- age weekly hours	Average hourly earnings with punitive overtime	Esti- mated straight- time average hourly earnings
	United States					Akron-Detroit				
August 1939.....	49,162	\$33.51	35.5	\$0.944	\$0.936	30,442	\$35.53	33.2	\$1.069	\$1.066
July 1940.....	49,878	32.77	34.1	.962	.957	33,188	34.63	32.1	1.079	1.079
January 1941.....	56,909	36.63	38.4	.953	.936	38,430	38.49	37.0	1.040	1.026
July 1941.....	64,101	39.25	37.7	1.040	1.024	42,621	41.13	35.8	1.149	1.133
June 1942.....	60,214	44.50	40.5	*1.100	1.066	42,435	46.35	39.4	1.177	1.151
August 1942.....	66,721	46.17	41.7	1.106	1.061	45,367	48.59	40.7	1.194	1.156
	Other Midwest					Far West				
August 1939.....	5,655	\$30.33	39.2	\$0.775	\$0.759	3,805	\$38.11	39.4	\$0.968	\$0.947
July 1940.....	4,712	26.06	35.1	.742	.736	3,360	37.66	39.1	.964	.944
January 1941.....	4,982	28.25	36.8	.768	.758	3,860	38.60	39.3	.982	.960
July 1941.....	6,035	34.00	41.6	.818	.785	4,535	40.64	39.1	1.040	1.018
June 1942.....	4,173	39.41	41.3	.954	.918	5,905	44.58	46.1	.966	.895
August 1942.....	4,486	41.14	41.7	.987	.947	7,764	43.19	44.6	.969	.907
	East					South				
August 1939.....	5,685	\$27.44	36.8	\$0.746	\$0.736	3,575	\$26.18	43.1	\$0.607	\$0.575
July 1940.....	4,947	28.66	37.5	.764	.753	3,671	29.59	41.5	.617	.592
January 1941.....	5,595	32.28	41.4	.780	.750	3,942	33.30	49.3	.676	.611
July 1941.....	6,351	37.32	42.7	.874	.831	4,559	30.10	42.8	.703	.668
June 1942.....	4,197	39.63	41.7	.951	.912	3,504	33.91	41.6	.816	.783
August 1942.....	4,940	41.12	42.7	.963	.916	4,164	36.70	46.9	.783	.721

In the industry division as a whole, employment in the 32 plants increased from 49,162 in August 1939 to 66,721 three years later. It will be observed that employment rose very sharply from July 1940, when the national defense program got under way, to July 1941, at which time automobile production was at a high level and consumer incomes were rising rapidly. Employment in June 1942 was somewhat below the July 1941 level; by August 1942, however, the level of July 1941 had been exceeded.

Average weekly hours per worker reached 41.7 in August 1942, as compared with only 35.5 in August 1939. This represents an increase in average hours per worker per week of more than 17 percent and indicates, of course, that the data on increase in number of workers understates the real increase in employment between these two periods.

Average hourly earnings, including premium overtime pay, rose in the industry as a whole from 94.4 cents in August 1939 to \$1.106 in August 1942, an increase of approximately 17.1 percent. Average weekly earnings, which are affected not only by average earnings per hour but also by the number of hours worked per week, rose by

almost 38 percent over the 3-year period. Estimated straight-time hourly earnings rose from 93.6 cents to \$1.06—about 13 percent.¹⁸

Gross average hourly earnings in Akron-Detroit increased from \$1.069 to \$1.194 between August 1939 and August 1942, or by about 11.6 percent, and estimated straight-time average hourly earnings by 8.4 percent. Since the level of hourly earnings declined in the Akron-Detroit area between August 1939 and January 1941, the percentage change in hourly earnings between this latter month and August 1942 is greater than the change as measured from August 1939.

In the other areas, except the Far West, average hourly earnings increased more sharply than hourly earnings in Akron-Detroit. Between August 1939 and August 1942, the level of hourly earnings (both on an estimated straight-time basis and including premium pay for overtime) increased by more than 20 percent in the Other Midwest, East, and South. Except in the South, almost all of these increases took place after January 1941. In the Far West, the level of hourly earnings, including premium overtime, remained virtually unchanged from August 1939 to August 1942, and the level of straight-time earnings declined over this period. Between January 1941 and August 1942, the level of earnings in the Far West declined on the basis both of straight-time rates and of earnings including overtime.

It must be emphasized that changes in these general earnings data need to be interpreted with care. The data for the Far West provide a striking illustration. In 1939, the plants of this area were engaged largely in the production of tires and tubes; in 1942, these plants were engaged largely in the production of special rubber war goods. Between these two periods, the character of the occupational structure of the plants in the area changed materially. It will be recalled that in August 1942 the west coast plants had a higher proportion of female workers than plants in any other part of the country. Large numbers of learners also were employed at this time. The reduction in straight-time hourly earnings in these plants between August 1939 (or January 1941) and August 1942 appears to be adequately explained on the basis of changes in the composition of the labor force and in occupational requirements.

¹⁸ It will be recalled that the straight-time average hourly earnings for all of the workers for whom occupational wage data were secured amounted to \$1.037 in August 1942 (table 2). Estimated straight-time hourly earnings for August 1942 as shown for the plant employment in table 5 amounted to \$1.061. This is a difference of 2.4 cents. This relatively small difference is probably due in part to the fact that not all operations in these plants were included in the occupational data. Moreover, straight-time earnings in table 5 are estimated, and a portion of the difference may reflect this fact.

Part 2.—MECHANICAL RUBBER GOODS¹

Summary

MUCH of the normal output of the mechanical rubber goods division of the rubber-manufacturing industry serves essential industrial uses. Some of the plants in this division, moreover, are engaged in the fabrication of rubber products for direct military use. For these reasons, production and employment have been maintained at a relatively high level in the face of a grave rubber-supply problem.

Workers in plants primarily engaged in the production of mechanical rubber goods received average hourly earnings, exclusive of premium pay for overtime and night-shift work, of 78.8 cents in August 1942. Male factory workers averaged 84.7 cents an hour, as compared with an average of 59.1 cents for female employees. Average earnings in the mechanical-goods departments of tire and tube plants were substantially greater than in primary mechanical-goods establishments, and the inclusion of data for workers in these departments has the effect of raising the general level of earnings in mechanical-goods manufacture to 84 cents an hour—90.4 cents for men and 63.8 cents for women.

Some Characteristics of the Industry

PRODUCTS, SIZE OF PLANT, AND CONCENTRATION OF CONTROL

The term "mechanical rubber goods" has reference to the end-use of certain rubber products; that is, to their use for mechanical or industrial purposes. The rubber products that fit into the broad category of mechanical goods are extremely numerous. A few of the more significant types may be mentioned. Belting is an important product, and the belting produced in the industry ranges from very heavy conveyor belts to small V-belts used in motor vehicles and for other purposes. Rubber hose of all kinds—garden hose, air-brake and other pneumatic types, fire hose, oil and gasoline hose—account for an appreciable segment of production. Washers, gaskets, pump sleeves and similar products, and the familiar jar ring used by the housewife in canning are all mechanical rubber goods, as are also rubber tubing, packing, friction tape, rubber-covered rolls (for use in printing and for other purposes). The war has made rubber half-tracks for military tanks an item of some importance.

This variety of products may help to explain the great variation in size of the plants in the industry. The smallest plant covered by the survey employed fewer than 20 workers, and the largest plant employed more than 3,000. The average plant employed approximately

¹ For data on tire and tube plants, see Part 1. Some of the material in Part 1—notably the discussion of rubber requirements and raw material supply—is relevant also to the mechanical-goods division.

385 workers. The great range in size of plant provides some indication of the flexibility of production organization in the mechanical rubber goods division. It is technically and economically feasible to operate a small plant producing one or a few items. Large and diversified plants, producing hundreds of different mechanical rubber goods articles, are also found in the industry.

The question of concentration of control over output in this branch of the industry is of some interest. In the tire and tube division, four major companies control the bulk of the output. The influence of these four companies—Firestone Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co., and the United States Rubber Co.—is also felt significantly in the mechanical rubber goods branch. The influence of the “big four” companies, however, is not so great in this branch as in the tire and tube division. Of the 52 establishments included in the Bureau’s sample of plants primarily engaged in the manufacture of mechanical goods,² only four were operated by the major rubber companies. These 4 plants, however, employed more than one-third (37.4 percent) of the workers in all 52 establishments.

The full importance of the “big four” in the mechanical-goods field is not adequately expressed by the proportion of workers employed by these companies in plants devoted primarily to the manufacture of mechanical goods, since mechanical-goods production is carried on within some of the tire and tube plants operated by the major rubber companies. This is notably true in the case of the B. F. Goodrich Co. The major mechanical-goods operations of this company are still conducted in its works at Akron, Ohio. The mechanical-goods output of the other major Akron companies—Firestone and Goodyear—is found to a considerable extent in specialized plants, although a relatively large amount of mechanical-goods production at Goodyear is carried on at its main Akron establishment.

LOCATION OF THE INDUSTRY

The marked geographical concentration that characterizes the tire and tube division of the rubber-manufacturing industry is not found in the location of mechanical-goods plants. Most of the products manufactured in these latter plants are not standardized and seldom bear trade names; in general, they are not consumer goods and do not, like tires and tubes, move in a Nation-wide market. The location of mechanical-goods plants has undoubtedly been influenced to a large extent by the location of the industries that represent the primary market for mechanical rubber products.

In terms of employment, the eastern region of the industry is predominant. About 64 percent of the workers employed by plants primarily devoted to mechanical-goods production are found in New England and the Middle Atlantic States, principally in Massachusetts, New York, New Jersey, and Pennsylvania. Although only 23 percent of the employment in mechanical-goods plants is found in the Middle West, the manufacture of these products by tire and tube plants in this region may possibly place the Midwest in a predominant position in terms of actual production. The Far West,

² It should be noted that the sample is composed of plants normally engaged primarily in the production of mechanical rubber goods. At the time of the survey, mechanical goods accounted for less than half of the value of output in a few plants.

with the exception of the one large plant that dominates the region, is of minor importance in the industry. The number of mechanical rubber goods plants in the South is very small; no southern plants were covered in the present survey.

UNIONIZATION

At the time of the survey, primary mechanical-goods plants employing approximately 78 percent of the wage earners reported the existence of union agreements. The United Rubber Workers of America, affiliated with the C. I. O., exercised collective-bargaining rights in 27 plants in which 55 percent of the total number of workers were employed. Six plants employing almost 19 percent of the workers reported agreements with federal labor unions affiliated with the A. F. of L. The principal source of A. F. of L. representation was in the East. Two eastern plants reported agreements with unaffiliated unions. No union agreements were in effect at the time of the survey in 17 plants employing 23 percent of the workers. Typically, union agreements in this industry cover all factory workers.

CHARACTER OF THE LABOR FORCE

As in the tire and tube division of the industry, the labor force of mechanical-goods plants is composed predominantly of male workers. The proportion of women in the labor force is somewhat greater, however, in mechanical-goods establishments. In the sample of 52 plants primarily engaged in the manufacture of mechanical goods, 31 percent of the labor force consisted of female workers. More than 6,000 women were employed in these plants, principally as trimmers, finishers, assemblers, packers, and inspectors. The proportion of women in the labor force varied from 21 percent in the Far West to 34 percent in the East. The relatively high ratio in the East may be attributed, at least in part, to the manufacture of a greater proportion of special rubber war products in eastern plants.

The predominance of male workers in the mechanical-goods division of the rubber industry, as well as in the tire and tube branch, results largely from the nature of the productive processes. Although only a few of the direct production jobs are highly skilled, in the sense of requiring prolonged training, many tasks demand moderate skill and, in some cases, considerable physical stamina. Practically no women are found in rubber preparation departments, and the women employed in processing are engaged, for the most part, on light and repetitive tasks. Finishing and inspecting offer considerable scope for the employment of women. Maintenance and general plant labor, of course, is largely male.

Negro workers constituted less than 2 percent of the labor force. Most of them were employed in the East, principally as janitors and laborers and, to a minor extent, as millmen.

EFFECT OF THE WAR

In view of the nature of the majority of products of this industry division, the demands of war did not compel widespread conversion or drastic alteration of manufacturing practices. The pressure of

wartime requirements and restrictions on the use of rubber, however, have undoubtedly affected the type and volume of production and, to some extent, labor requirements in the industry.

It is probable that the staple commodities of mechanical-goods production (hose, belting, gaskets, and a number of other products) have been altered somewhat to meet specifications for use in tanks, airplanes, and other war machines. The war has required expansion in the production of specified items such as fire hose. Although data are not available for precise measurement, such changes probably have had effects on the size and composition of the labor force.

Additional labor-force changes have been occasioned by the manufacture in mechanical-goods plants of special rubber war goods not normally produced in the industry. It is pointed out elsewhere that 3 of the 52 plants covered in this study were engaged in the fabrication of such products as barrage balloons, rubber boats, and self-sealing fuel tanks at the time of the wage survey. Two additional plants were producing gas masks. These products accounted for at least 75 percent of the value of August 1942 output in 3 of the 5 plants.³ These five plants employed more than 6,000 workers, or more than one-fourth of all of the workers in the 52 plants covered. The nature of operations and the labor-force requirements in the fabrication of special war products have been discussed in some detail in the article on wages in the tire and tube division of the industry.

Scope and Method of Survey

The present survey of earnings in the manufacture of mechanical rubber goods represents the first detailed study of wages by occupation ever made by the Bureau in this industry division. In 1940, however, the Bureau conducted a mail questionnaire survey of hours and earnings in the entire rubber industry.⁴ Data were not obtained in that survey on occupational wages, but the study did yield valuable information on the distribution of workers by hourly earnings in the various divisions of the industry.

The data for the present survey were collected by trained field representatives of the Bureau from pay-roll and other plant records. In most instances, the pay-roll period covered was that ending nearest August 29, 1942. In a few plants, wage data were obtained for a representative week shortly before or shortly after this period.

The data obtained in the course of the survey include occupational average hourly earnings exclusive of premium payments for overtime hours and shift-differential payments. Information was obtained on method of wage payment for each occupation and on the sex of the workers. Data were also secured for each plant on the character of production, general wage changes since July 1940, plant minimum-wage policy, shift operation, unionization, and aggregate employment, man-hours, and earnings for selected periods from August 1939 to August 1942.

³ The relative importance in terms of employment of special war product output in mechanical-goods plants approaches the relative importance of such output in tire and tube plants. In absolute terms, of course, the employment on war-products fabrication in the latter plants greatly exceeds employment in the former.

⁴ *Monthly Labor Review*, June 1941 (p. 1490): *Earnings in the Manufacture of Rubber Products*, May 1940.

The survey was not intended to cover all plants engaged primarily in the manufacture of mechanical rubber goods. The study does cover a balanced sample of approximately half of the industry. The sample was selected to reflect as accurately as possible wages in plants of varying size, location, and product. The sample was chosen from the plant list derived from the Bureau's 1940 questionnaire survey, corrected and brought up to date on the basis of the records of the Rubber Division of the War Production Board. In addition to data on this representative sample of plants primarily engaged in the production of mechanical goods, occupational wage data were also obtained for the mechanical-goods departments of 8 tire and tube plants.⁵ In these plants, preparatory, general, and maintenance workers were prorated to mechanical-goods production on the basis of the relative value or volume of such production or upon the allocation of cost. The scope of the study is indicated in table 1, which shows, by region, the number of primary mechanical-goods plants included in the survey together with the total employment in those plants.

TABLE 1.—*Number of Primary Mechanical-Goods Plants and Total Number of Workers Covered by Survey, by Region, August 1942*¹

Region	Number of plants	Number of workers	Percent of plants	Percent of workers
United States.....	52	20,040	100	100
East ²	22	12,819	42	64
Midwest ³	23	4,657	45	23
Far West ⁴	7	2,564	13	13

¹ In addition to the plants shown in the table, the mechanical-goods departments of 8 tire and tube plants were also covered. The occupational data from these mechanical-goods departments are included in table 3, and in the summary of the occupational data in table 2.

² 1 plant in Connecticut, 5 in Massachusetts, 1 in Delaware, 7 in New Jersey, 2 in New York, 6 in Pennsylvania.

³ 11 plants in Ohio, 5 in Illinois, 4 in Indiana, 3 in Michigan.

⁴ 6 plants in California, 1 in Colorado.

Of the 52 plants primarily producing mechanical goods, 22 are in the East, 23 in the Midwest, and 7 in the Far West. Of the 20,040 workers employed in these plants, 64 percent were found in the eastern division, 23 percent in the Midwest, and 13 percent in the Far West. The 8 tire and tube plants, the mechanical-goods departments of which were covered in the survey, are all situated in the Midwest; it is estimated that these plants employed more than 6,000 workers in the production of mechanical rubber goods. Since total employment in the sample of primary mechanical-goods plants represents approximately one-half of the industry, it is apparent that only a minor proportion of all workers engaged in mechanical-goods production were employed in the 8 tire and tube plants.

The selection of occupations for coverage was based primarily on two criteria: (1) The importance of an occupation in terms of number of workers employed, and (2) the strategic importance of a job in the occupational structure. Mechanical-goods plants are homogeneous as to product only to a limited extent. Most preparatory occupations, of course, are common to all plants, and most of the general and maintenance occupations likewise are found in all establishments.

⁵ These 8 plants account for almost all of the mechanical-goods production found in tire and tube plants.

This statement should be qualified at least to the extent that differences in plant size affect occupational patterns even in rubber preparation and plant maintenance. Many direct processing occupations are not found in all plants, or even in a majority of plants.

In order to make the occupational data comparable from plant to plant, operations relating to the manufacture of metal products, rubber products⁶ other than mechanical goods, miscellaneous specialty goods, rubber reclaiming, and the construction of new plant equipment were not covered by the survey. In substance, the occupational data presented in this report relate to rubber preparatory operations, mechanical-goods processing, and general and plant maintenance occupations. Information was secured on wages in the production of specified rubber war products, including self-sealing fuel tanks, rubber boats, and pontoons. It was hoped that wage data could be shown for workers engaged in the fabrication of these products in mechanical-goods plants, just as data were shown for such workers in tire and tube plants. Significant wage data for these workers could not be shown, however, since fabrication of special rubber war products was found in too few plants⁷ to warrant the computation of averages.

One problem arose in connection with the combining of occupational wage data for workers in the mechanical-goods departments of tire and tube plants with data for workers in plants primarily engaged in the production of mechanical goods. The latter data represent approximately a 50-percent sample of the mechanical-goods division (defined as composed of plants primarily engaged in mechanical rubber goods production); the data for the mechanical-goods departments of tire and tube plants, on the other hand, represent virtually complete coverage for the occupations shown. Consequently, in combining these data to show average hourly earnings by occupation for the industry as a whole (as in table 3), employment in each occupation in the mechanical-goods departments of tire and tube plants was reduced by half to give these departments their proper weight in the total industry.

Methods of Wage Payment

USE OF INCENTIVE-WAGE SYSTEMS

The use of incentive methods of wage payment in primary mechanical-goods plants is not so extensive as in tire and tube establishments. Even in the mechanical-goods division, however, incentive-wage plans are widely employed. The use of incentives was reported in 35 of the 52 plants covered by the survey. Straight piece-rate systems predominated.

In plants primarily engaged in the manufacture of mechanical goods, approximately 47 percent of the workers for whom occupational data were obtained were paid on an incentive basis. The ratio of incentive workers to hourly or day rate workers varied greatly by department. Sixty-seven percent of all rubber preparatory workers, 59 percent of the processing workers, and 16 percent of the general, service, and maintenance workers were paid on an incentive basis. In the tire and tube division, by way of contrast, about 95 percent of

⁶ Such as heels and soles, drug sundries, boots and shoes, sponge-rubber products, and household goods.

⁷ Data for workers other than those engaged in special war-product fabrication in these plants are shown in this report.

the preparatory workers, 88 percent of the tire and tube processing workers, and about one-third of the general, service, and maintenance workers received incentive earnings.

OVERTIME-PAYMENT PRACTICES

All of the 52 mechanical-goods plants included in the survey reported the payment of time and a half for hours worked above 40 per week, but only 38 of the plants paid time and a half for hours in excess of 8 per day. Double time was reported as paid for work on Sunday and holidays in 12 plants. Nine plants reported the payment of time and a half for Saturday work, but it is not known whether this extra rate is paid if Saturday falls within the normal 40-hour workweek.

SHIFT PRACTICES AND SHIFT DIFFERENTIALS

At the time of the survey, only 14 of the 52 mechanical-goods plants were operating on a single-shift basis, but 28 plants were operating three shifts, and 10 plants reported two-shift operation. In many multiple-shift plants, full operating crews were not employed on the extra shifts. In the 52 plants as a whole, approximately two-thirds of the workers were employed on the first daylight shift. The proportion of the labor force working on extra shifts was highest in the Midwest.

Shift-premium payments were not common in the industry in August 1942. Eleven plants reported the payment of night-shift differentials ranging from 2 to 10 cents an hour, but the number of workers receiving this extra pay constituted only 13 percent of those employed on second and third shifts in the plants surveyed.

Occupational Earnings and Regional Wage Levels, August 1942

The basic information derived from the survey consisted of average hourly earnings, exclusive of premium overtime pay and night-shift premiums, for a comprehensive group of occupations in mechanical rubber goods plants and in the mechanical-goods departments of tire and tube establishments. Occupational wage data are shown for more than two-thirds of the workers in the sample of 52 plants primarily engaged in the manufacture of mechanical goods,⁸ as well as for workers in mechanical-goods processing occupations in tire and tube plants and for the estimated proportion of preparatory and maintenance workers in such establishments allocable to mechanical-goods production.

Every effort was made to classify the occupations in the plants covered on the basis of duties performed and not merely on the basis of job titles. Field representatives of the Bureau were provided with an occupational glossary, for general guidance in the reporting of occupational data. Variations in plant size, production methods, and many other factors may make for small variations from plant to plant in the specific duties and responsibilities attaching to many occupations without seriously affecting their basic comparability.

⁸ Some of the workers for whom occupational wage data are not shown are engaged in the production of special rubber war products. Some mechanical-goods occupations were found in too few plants to warrant the presentation of average earnings data. Finally, some workers were engaged in forms of production falling outside the scope of the survey.

EARNINGS BY OCCUPATION

A summary of the data secured on occupational wages in the mechanical-goods division of the rubber-manufacturing industry is shown in table 2. Attention is called to the arrangement of this table which is similar to the arrangement of the detailed occupational table that follows. In the first column, the average earnings of workers by major plant division and sex are shown for the industry as a whole—that is, for workers in plants primarily engaged in the manufacture of mechanical goods as well as those employed in the mechanical-goods departments of tire and tube plants. The figures are representative of earnings in the total industry. The second column shows data for the industry exclusive of the mechanical-goods departments of tire and tube plants. The wage data in this column relate solely to workers in plants primarily engaged in the manufacture of mechanical goods, and the next three columns show data for these workers by region. In the final column, data for workers in mechanical-goods departments of tire and tube plants are shown.

As table 2 indicates, the straight-time average hourly earnings of all of the workers covered by the occupational data amounted to 84.0 cents in August 1942. In view of the comprehensive nature of the occupational coverage, this figure may be taken with confidence to reflect the general level of straight-time hourly earnings in the industry. The level of earnings of all workers employed in plants primarily engaged in the manufacture of mechanical goods was 78.8 cents. The difference between 84.0 cents and 78.8 cents measures the influence of the mechanical-goods departments of tire and tube plants on the general level of earnings in this industry division. Actually, as the general figures in table 2 reveal, the level of hourly earnings in the mechanical-goods departments of tire and tube plants was about 31 cents above the level in plants primarily producing mechanical goods. As previously stated, only a small fraction of the employment in the industry division is found in tire and tube plants.

TABLE 2.—Average Hourly Earnings¹ in the Mechanical Rubber Goods Industry, by Plant Division, Sex, and Region, August 1942

Division and sex	Average hourly earnings in—					
	United States	Plants primarily engaged in the manufacture of mechanical goods				Mechanical-goods departments of tire and tube plants
		United States	East	Mid-west	Far West	
All workers.....	\$0.840	\$0.788	\$0.813	\$0.748	\$0.744	\$1.099
Male.....	.804	.847	.872	.813	.793	1.209
Female.....	.638	.591	.611	.567	.543	.830
Rubber preparation (male).....	.970	.911	.936	.877	.843	1.278
Mechanical-goods processing.....	.829	.779	.814	.735	.724	1.076
Male.....	.925	.868	.911	.822	.791	1.241
Female.....	.641	.595	.619	.568	.541	.825
General service, and maintenance.....	.826	.771	.778	.745	.767	1.101
Male.....	.850	.793	.803	.761	.781	1.137
Female.....	.604	.565	.569	.542	.562	.791

¹ The average hourly earnings shown in this table are exclusive of premium overtime pay and shift-differential premiums.

The large difference between the level of earnings in the mechanical-goods departments of tire and tube plants and in plants primarily engaged in the manufacture of mechanical goods deserves brief comment. Most of the mechanical-goods production in tire and tube plants is found in the Akron area. As the Bureau's study of wages in the tire and tube division of the industry clearly reveals, wages in the Akron area (including Detroit) are substantially above wages in tire and tube plants in other regions. If important mechanical-goods output were found in tire and tube plants outside of the Akron area, the spread between wages in such plants and wages in primary mechanical-goods plants undoubtedly would be smaller than the difference shown in this article. An appreciable spread unquestionably would remain, however, because of the general tendency for wages, regardless of region, to be higher in tire and tube plants than in primary mechanical-goods plants.

The wage levels for workers in tire and tube production inevitably influence largely the wages of workers in the same plants engaged in the manufacture of mechanical goods. It is very difficult to segregate some categories of workers engaged in the two types of production in the same plant. The wages paid to preparatory, general, and maintenance workers engaged in tire and tube production have come to determine, at least in a substantial measure, the wages of similar workers in the same plants who are engaged in mechanical-goods production. In most cases, physical separation of these workers is not practiced. The influence of tire and tube wages is felt also in the mechanical-goods-processing departments, which generally are physically separate. It may be pointed out that the higher level of wages in mechanical-goods-processing departments in tire and tube plants is not a reflection, except to a minor extent, of differences in occupational structure as between mechanical-goods operations in tire and tube plants and in primary mechanical-goods plants. The wage differences are real. This helps greatly to explain the historical tendency for tire companies to dissociate tire and tube and mechanical-goods production.

Table 2 shows that there is a sharp difference in the level of earnings of men and women. Thus, male workers in the total industry averaged 90.4 cents an hour, as compared with an average of 63.8 cents for female employees. In plants primarily engaged in making mechanical goods, men averaged 84.7 cents an hour and women 59.1 cents. These figures, together with other average earnings data in table 2, provide a broad picture of wages in mechanical rubber goods manufacture. A detailed picture is shown in table 3.

Table 3 shows straight-time average hourly earnings for individual occupations by region and sex of workers in three broad plant divisions—rubber preparation, mechanical-goods processing, and general, service, and maintenance. The total number of workers in each division is taken as 100 percent, and the number of workers in each occupation is expressed as a percentage of this total. Thus, the relative importance of various kinds of workers in the occupational structure of a given plant division is indicated.

TABLE 3.—Average Hourly Earnings¹ in the Mechanical Rubber Goods Industry, by Division, Occupation, Sex, and Region, August 1942

Division, occupation, and sex	United States		Plants primarily engaged in the manufacture of mechanical goods								Mechanical-goods departments of tire and tube plants	
	Per cent of workers	Average hourly earnings	United States		East		Midwest		Far West		Per cent of workers	Average hourly earnings
			Per cent of workers	Average hourly earnings	Per cent of workers	Average hourly earnings	Per cent of workers	Average hourly earnings	Per cent of workers	Average hourly earnings		
<i>Preparatory</i>												
All workers (male).....	100.0	\$0.970	100.0	\$0.912	100.0	\$0.936	100.0	\$0.877	100.0	\$0.843	100.0	\$1.278
Banbury mixers.....	6.3	.958	7.1	.940	5.9	.993	6.7	.906	14.8	.849	2.3	1.256
Calendar operators.....	13.6	1.093	14.1	1.037	15.1	1.074	11.0	.909	15.6	1.025	11.0	1.475
Helpers.....	14.9	.955	14.1	.870	16.2	.880	9.5	.883	12.5	.778	19.3	1.285
Millmen, miscellaneous.....	10.4	.865	10.3	.797	12.0	.808	5.3	.738	10.9	.789	11.0	1.204
Millmen, mixing.....	17.1	.961	16.1	.885	11.9	.925	26.9	.864	17.3	.794	22.4	1.252
Millmen, sheeting.....	3.0	1.013	3.1	.975	2.8	.971	4.6	.990	1.6	(?)	2.3	1.240
Millmen, warm-up.....	22.3	.984	22.4	.938	24.0	.952	20.5	.931	16.4	.837	21.5	1.238
Rubber compounders.....	10.9	.927	11.2	.870	10.4	.917	13.4	.807	10.9	.781	9.2	1.297
Rubber cutters.....	1.5	.867	1.6	.852	1.7	.874	2.1	.805	.....	.....	.....	(?)
<i>Processing</i>												
All workers.....	100.0	.829	100.0	.779	100.0	.814	100.0	.735	100.0	.724	100.0	1.076
Male workers.....	66.1	.925	67.3	.868	66.8	.911	65.6	.822	73.2	.791	60.0	1.241
Assemblers:												
Classes A and B.....	2.7	1.027	2.4	.922	2.8	.969	2.7	.831	.....	.....	4.4	1.304
Class C.....	.6	.802	.7	.777	.....	.....	2.0	.765	.5	.870	.5	.979
Belt builders, large.....	1.8	1.061	1.7	.959	2.6	.973	4	(?)	.4	(?)	2.2	1.433
Belt-mold assemblers.....	.5	1.192	.1	.693	(?)	.....	.....	.....	.....	.....	2.5	1.250
Bias cutters.....	.3	1.067	.2	.953	.2	1.010	.....	.....	1.0	(?)	.7	1.267
Braider and loom operators.....	2.7	.819	2.9	.770	3.3	.822	1.0	.692	5.2	.658	1.8	1.196
Buffers.....	.8	.846	.8	.763	.9	.828	.6	.688	.9	(?)	.7	1.309
Cutting-machine operators.....	2.5	.868	2.7	.841	2.6	.815	3.7	.900	1.1	.645	1.2	1.186
Fabric cutters.....	.5	.751	.5	.751	.7	.759	.4	.691	.4	.850	.....	.....
Foremen, working:												
Class A.....	1.1	1.096	1.2	1.070	1.1	1.082	3.8	1.215	2.4	.939	.7	1.295
Class B.....	3.5	.915	4.0	.901	4.1	.913	3.1	.916	6.0	(?)	.9	1.231
Helpers, machine operators.....	4.1	.826	4.2	.782	6.3	.799	1.3	.678	1.8	.697	3.6	1.087
Hose couplers.....	.8	.906	.7	.799	.9	.766	.7	(?)	.1	(?)	1.2	1.250
Hose makers.....	5.9	.972	6.1	.926	7.5	.983	1.6	.830	10.2	.774	4.6	1.274
Hose strippers.....	2.1	.903	2.2	.875	3.6	.888	.2	(?)	1.1	(?)	1.3	(?)
Hose wrappers.....	.9	.959	.7	.807	.5	.826	.2	.710	2.4	.805	1.8	1.244
Inspectors and testers:												
Class A.....	1.0	1.159	.4	1.057	.7	1.039	.2	1.180	.....	.....	3.7	1.217
Class B.....	1.7	.896	2.1	.886	2.6	.913	.9	.835	2.5	.809	.....	.....
Class C.....	.9	.741	1.1	.741	1.5	.759	.7	.672	.....	.....	.....	.....
Learners, miscellaneous.....	.9	.660	.9	.634	.2	(?)	.9	.636	4.2	.634	.9	.789
Linens, tank, pipe, and valve.....	.3	1.222	.....	.....	.....	.....	.....	.....	.....	.....	1.8	1.222
Pressmen.....	14.7	.960	15.8	.925	13.9	.998	23.5	.846	6.8	.893	9.7	1.296
Pressmen, learners.....	1.1	.590	1.3	.580	.8	.550	2.4	.607	.8	(?)	.2	.742
Slitting-machine operators.....	.6	.915	.7	.855	.9	.814	.2	(?)	.4	.686	.5	1.295
Soapstoners.....	.4	.927	.5	.913	.6	.905	.2	(?)	.2	(?)	.1	1.191
Stock preparers, press. Trimmers and finishers.....	.8	.723	.9	.724	.3	(?)	.5	.658	3.7	.675	.1	(?)
Tube cutters.....	3.7	.867	3.5	.781	1.1	.886	7.6	.778	4.6	.687	4.7	1.180
Tube-machine operators.....	1.0	.894	1.0	.804	.3	.845	2.3	.801	.7	.745	.9	1.364
V-belt builders.....	3.6	.957	3.8	.899	3.7	.910	4.6	.881	2.4	.900	2.8	1.342
Vulcanizers, miscellaneous.....	.9	1.022	.7	.918	(?)	.....	.5	.952	4.2	.916	1.8	1.227
Wrapper rollers.....	3.1	.960	3.1	.892	2.5	.955	2.0	.752	8.2	.886	3.0	1.308
.....	.6	.904	.4	.735	.6	.764	.....	.....	1.0	.663	1.7	1.125

See footnotes at end of table.

TABLE 3.—Average Hourly Earnings¹ in the Mechanical Rubber Goods Industry, by Division, Occupation, Sex, and Region, August 1942—Continued

Division, occupation, and sex	United States		Plants primarily engaged in the manufacture of mechanical goods								Mechanical goods departments of tire and tube plants	
			United States		East		Midwest		Far West			
	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings	Per- cent of work- ers	Aver- age hour- ly earn- ings
<i>Processing—Continued</i>												
Female workers.....	33.9	\$0.641	32.7	\$0.595	33.2	\$0.619	34.4	\$0.568	26.8	\$0.541	40.0	\$0.828
Assemblers, class C.....	2.2	.777	.7	.577	.....	.....	2.2	.576	.....	.....	9.6	.845
Belt coverers.....	.6	.740	.2	.607	.3	(?)	.1	(?)	.....	.....	2.7	.791
Braider and loom operators.....	3.7	.698	3.7	.653	4.9	.679	.9	(?)	4.9	.605	3.9	.914
Buffers.....	1.4	.688	1.2	.609	1.4	.595	1.2	.655	.4	(?)	2.5	(?)
Creel tenders.....	.3	.739	.2	.595	.3	.636	.2	(?)	.....	.....	.9	.931
Cutting-machine operators.....	1.0	.573	1.1	.556	1.5	.538	.4	.612	.8	(?)	.5	.767
Forewomen, working, class B.....	.6	.646	.7	.646	1.1	.647	(?)	.....	.1	(?)	.....	.....
Helpers, machine operators.....	.5	.713	.5	.680	.6	.711	.3	(?)	.....	.....	.5	.857
Inspectors and testers.....	8.4	.619	8.3	.576	9.3	.592	6.5	.557	7.9	.528	8.9	.816
Learners, miscellaneous.....	2.8	.490	2.9	.470	1.9	.508	4.2	.436	4.0	.471	2.5	.602
Sewing-machine operators.....	.8	.604	.9	.596	.4	.646	2.3	(?)	.....	.....	.1	(?)
Trimmers and finishers.....	11.5	.640	12.2	.615	11.4	.638	16.1	.603	8.4	.536	7.7	.837
Wrapper rollers.....	.1	.628	.1	.581	.....	.....	.....	.....	.3	(?)	.2	.711
<i>General, service, and maintenance</i>												
All workers.....	100.0	.826	100.0	.771	100.0	.778	100.0	.745	100.0	.767	100.0	1.101
Male workers.....	90.2	.850	90.3	.793	89.2	.803	92.7	.761	93.7	.781	89.7	1.137
Carpenters:												
Class A.....	1.0	1.072	.9	1.028	.9	1.035	.9	.982	1.4	1.042	1.5	1.220
Class B.....	1.2	.896	1.3	.896	1.2	.937	.7	.785	3.3	.836	.1	(?)
Cement mixers.....	.8	.866	.9	.843	1.1	.811	.6	(?)	2.2	(?)	.4	1.141
Cleaners, equipment.....	1.4	.741	1.3	.638	1.2	.665	.3	(?)	3.5	(?)	2.2	1.050
Electricians:												
Class A.....	1.7	1.152	1.3	1.118	1.4	1.138	1.1	1.033	1.6	1.110	3.3	1.224
Class B.....	.3	.841	.4	.841	.3	.833	.4	(?)	.9	(?)	.....	.....
Elevator operators.....	2.3	.781	1.5	.684	1.7	.679	.7	(?)	1.4	(?)	6.6	.897
Factory clerks.....	13.1	.848	12.6	.763	12.2	.776	10.1	.699	19.0	.763	15.9	1.199
Firemen.....	2.8	.863	3.1	.834	2.6	.842	5.7	.800	2.1	.913	1.2	1.218
Helpers, journeymen's.....	3.0	.757	3.4	.737	3.9	.744	1.1	(?)	3.5	.728	1.2	1.045
Janitors.....	6.8	.706	7.0	.675	6.8	.694	6.7	.627	8.6	.633	5.4	.915
Laborers.....	14.5	.740	16.8	.741	18.3	.762	10.4	.653	16.0	.635	2.8	1.013
Learners, miscellaneous.....	.7	.684	.6	.622	.5	.615	1.4	.628	.2	(?)	1.3	.841
Loaders and unloaders, racks and conveyors.....	1.3	.831	1.3	.746	.7	.840	4.0	(?)	.9	(?)	1.3	1.284
Millwrights:												
Class A.....	1.4	.990	1.6	.982	1.3	.975	2.7	.984	1.6	1.017	.3	(?)
Class B.....	1.1	.860	1.2	.858	1.3	.875	1.6	.820	2.2	(?)	.1	.940
Packers and craters.....	5.6	.907	4.9	.811	6.0	.831	3.0	.698	1.4	.645	9.0	1.190
Pipefitters.....	2.7	1.060	2.4	1.006	2.5	1.031	2.4	.880	1.9	1.066	4.1	1.224
Repairmen, machine.....	8.4	1.001	8.1	.940	6.2	.962	12.0	.849	12.9	1.019	11.0	1.232
Tool and die makers.....	2.0	1.042	2.4	1.042	2.0	1.119	5.1	.920	.9	1.050	.....	.....
Truck drivers.....	1.2	.803	1.3	.793	.9	.823	1.9	.770	3.3	.727	.4	(?)
Truckers, hand.....	3.5	.836	7.8	.750	8.8	.747	8.5	.763	.2	(?)	12.3	1.124
Truckers, power.....	2.5	1.034	1.5	.818	1.5	.819	1.9	.822	1.2	.808	7.8	1.250
Watchmen.....	5.9	.708	6.7	.699	5.9	.691	9.5	.683	7.5	.769	1.5	.927
Female workers.....	9.8	.604	9.7	.565	10.8	.569	7.3	.542	6.3	.562	10.3	.791
Factory clerks.....	2.8	.626	2.4	.552	1.9	.593	2.3	.420	5.8	.549	5.0	.807
Janitors.....	1.2	.563	1.2	.537	1.2	.508	2.0	.607	.....	.....	.9	.744
Packers.....	5.8	.601	6.1	.576	7.7	.573	3.0	.591	.5	(?)	4.4	.783

¹ The average hourly earnings shown in this table are exclusive of premium overtime pay and shift-differential premiums.

² Number of plants insufficient to justify the computation of an average.

³ Less than a tenth of 1 percent.

Wages are relatively high in rubber preparatory occupations. These are all male occupations. A very large proportion of the workers, as pointed out earlier, are paid on an incentive basis. Average hourly earnings in August 1942 in the entire industry division ranged from 86.5 cents for miscellaneous millmen to about \$1.09 for calender operators. Average earnings in the same occupations in plants primarily engaged in mechanical-goods manufacture ranged from almost 80 cents to approximately \$1.04. In addition to calender operators, only sheeting millmen averaged more than \$1.00 an hour in the total industry; these latter workers in primary mechanical-goods plants averaged 97.5 cents.

For the mechanical-goods industry as a whole, processing workers averaged 82.9 cents an hour in August 1942, the average for men being 92.5 cents as compared with 64.1 cents for women. The corresponding averages in plants primarily engaged in the manufacture of mechanical goods were 77.9 for all workers, 86.8 cents for men and 59.5 cents for women.

Earnings for experienced male processing workers in the total industry ranged from 72.3 cents for stock preparers to \$1.22 for pipe, valve, and tank liners. The most numerous group of male workers, pressmen, averaged 96.6 cents an hour; average earnings in 19 occupations, employing approximately 66 percent of the male processing workers, were 90 cents or more an hour; in only 3 occupations, with 3.4 percent of the male workers, were average earnings less than 80 cents an hour. In plants primarily manufacturing mechanical goods, pressmen averaged 92.5 cents. Average hourly earnings of 90 cents or more were found in 10 occupations containing almost 50 percent of the male processing workers. In 11 occupations, hourly earnings for experienced workers averaged less than 80 cents; 23 percent of the male processing workers were included within these occupations.

The hourly earnings of experienced female processing workers in the industry as a whole ranged from 57.3 cents for cutting-machine operators to 77.7 cents for class C assemblers. Trimmers and finishers, the most numerous group of female employees, averaged 64 cents. These workers averaged 61.5 cents in plants primarily engaged in the manufacture of mechanical goods. The average hourly earnings in the primary mechanical-goods plants in all female occupations, exclusive of the learner category, fell within the range of 55.6 cents to 68.0 cents.

In the industry as a whole, workers classified in the general, service, and maintenance categories averaged 82.6 cents, the average for men being 85.0 cents as compared with 60.4 cents for women. The average for all workers in this group in primary mechanical-goods plants was 77.1 cents an hour, the averages for men and women being 79.3 cents and 56.5 cents, respectively.

Among experienced male workers, skilled maintenance men (class A carpenters, electricians, millwrights, pipefitters, machine repairmen) earned approximately \$1.00 an hour or more in the total industry; in primary mechanical-goods plants, average earnings in these occupations ranged from 94 cents for machine repairmen to almost \$1.12 cents for first-class electricians. Tool and die makers received average earnings of more than \$1.00 an hour in primary mechanical-goods plants. Common laborers and factory clerks,

numerically the most important occupational groups in the general and maintenance category, averaged 74.9 cents and 84.8 cents, respectively, in the total industry; the corresponding averages in primary mechanical-goods plants were 74.1 cents and 76.3 cents.

The most important occupational group among experienced female employees was composed of packers. These workers averaged 60.1 cents in the total industry and 57.6 cents in primary mechanical-goods plants. The earnings of female factory clerks were very similar to those of inspectors and testers.

REGIONAL WAGE LEVELS IN PRIMARY MECHANICAL-GOODS PLANTS

It is possible to give a measure of general regional variations in earnings that is perhaps somewhat more precise than the measures derived from table 2. The regional averages shown in table 2 are affected to some extent, for example, by differences among regions in the composition of the mechanical-goods labor force and in occupational structures. The following procedure was devised to eliminate the influence of this factor. A group of very clear-cut occupations, represented in each of the three regions in which the primary mechanical-goods plants are situated, was selected.⁹ The average wage in each occupation in each of the three regions was weighted by the number of workers in that occupation in the industry. In this way, general averages were computed for each of the three regions. It was assumed, in other words, that each region had the same occupational structure as the industry as a whole. The averages themselves are unimportant. It is the relationship of the regional averages that may have significance. The general level of wages in the Midwest in August 1942, on the basis of these computations, was about 89 percent of the eastern level; the level in the Far West was about 90 percent of the eastern level.

The above procedure yields results that are roughly similar to the wage relationships among regions indicated by the data in table 2. That is, in plants primarily engaged in the manufacture of mechanical goods, the general level of earnings does not differ materially in the Midwest and the Far West. Wages in both of these regions are somewhat below average wages in the East. The indication is that the level of earnings in the eastern plants is in the neighborhood of 10 percent greater than the level in the middle western and far western plants.

Trend of Employment, Hours, and Earnings, 1939 to 1942

For the sample of plants primarily engaged in the manufacture of mechanical rubber goods, data were secured on total employment, man-hours, and pay rolls for representative pay-roll periods in 6 selected months from 1939 to 1942. These data were not available for 11 of the 52 plants covered by the survey for the August 1939 period, and from one to three plants in four of the other periods.

Table 4 shows number of plants, employment, average weekly earnings, average weekly hours, and average hourly earnings, including overtime premium pay and night-shift premiums, for these six periods

⁹ These occupations contained almost 42 percent of the workers for whom occupational data are shown in table 3.

for the industry division as a whole and separately for the industry in three regions. Estimates of average hourly earnings exclusive of overtime premium pay likewise are set forth in this table. Although it was possible to estimate the effect of overtime premium pay on hourly earnings, data were not available for an estimate of the influence on hourly earnings of premium pay for night-shift work. The effect of night-shift premiums, however, appears to be small. Since some plants did not report for certain of the periods shown in table 4, chain indexes of employment were constructed to eliminate the influence of differences in the number of reporting plants. These indexes are shown separately in table 5.

The data in table 4, in conjunction with the employment indexes in table 5, provide a general picture of the trend in employment, hours, and earnings in the industry from 1939 to 1942. The use of aggregate earnings data for comparison over periods of time, or even for comparison of one region with another, may be affected by changes or differences in occupational patterns. The first of these factors—that is, changes in occupational pattern—has been of some importance, especially in the East, since 1939. On the basis of the occupational data in table 3 for August 1942, the pattern of occupations among regions appears to be reasonably comparable for mechanical-goods operations, but this table does not show the new occupations that have developed in the production of special war goods.

TABLE 4.—Number of Workers and Average Hours and Earnings in Primary Mechanical-Goods Plants, by Region, August 1939–August 1942

Region, month, and year	Number of plants reporting	Employment	Average weekly earnings	Average weekly hours	Average hourly earnings including overtime	Estimated average hourly earnings excluding overtime ¹
United States:						
August 1939.....	41	9,981	\$25.87	40.1	\$0.645	\$0.627
July 1940.....	49	13,655	24.43	39.2	.623	.610
January 1941.....	50	18,150	24.16	38.5	.627	.616
July 1941.....	50	21,130	27.00	39.9	.676	.658
June 1942.....	51	19,113	34.13	42.3	.806	.769
August 1942.....	52	20,040	35.77	43.6	.820	.774
East:						
August 1939.....	18	5,855	26.34	39.8	.662	.645
July 1940.....	20	7,745	25.51	40.1	.636	.618
January 1941.....	21	10,281	25.38	39.1	.649	.635
July 1941.....	21	12,462	26.42	39.1	.676	.662
June 1942.....	22	12,439	34.88	43.2	.808	.764
August 1942.....	22	12,819	35.99	43.4	.828	.782
Midwest:						
August 1939.....	16	2,088	24.84	39.1	.635	.622
July 1940.....	22	3,664	22.27	37.8	.589	.580
January 1941.....	22	5,634	21.89	37.4	.585	.577
July 1941.....	22	5,964	26.26	40.2	.654	.635
June 1942.....	22	4,361	30.67	38.7	.793	.778
August 1942.....	23	4,657	34.51	42.8	.806	.766
Far West:						
August 1939.....	7	2,038	25.60	42.2	.607	.580
July 1940.....	7	2,246	24.23	38.2	.634	.623
January 1941.....	7	2,235	24.27	38.6	.629	.617
July 1941.....	7	2,704	31.34	43.4	.723	.683
June 1942.....	7	2,313	36.57	44.8	.816	.762
August 1942.....	7	2,564	36.94	46.0	.802	.743

¹ No correction has been made for the influence of shift-differential premium pay. The influence of premium pay for night work on wage levels is believed to be very small.

In the industry division as a whole, as table 5 shows, employment increased by about 56 percent between August 1939 and August 1942. Employment advanced very sharply from July 1940, shortly after the inauguration of the national defense program, to July 1941. The high level of employment in July 1941 reflects the intense economic activity growing out of the defense program at a time, moreover, when rubber supply was not a problem. Employment in August 1942 was approximately 6 percent below the July 1941 level, but this decline, as pointed out below, has been more than balanced by an increase in the length of the average workweek.

The percentage increase in employment between 1939 and 1942 was much greater in the East than in either the Midwest or Far West. A very large gain in employment in a single eastern plant had considerable influence on the general level of employment in the eastern region.

TABLE 5.—*Indexes of Employment in Primary Mechanical Rubber Goods Plants, by Region, August 1939–August 1942*

[August 1939=100]

Month and year	United States	East	Midwest	Far West
August 1939.....	100.0	100.0	100.0	100.0
July 1940.....	106.9	107.8	101.2	110.2
January 1941.....	141.9	142.7	155.4	109.7
July 1941.....	165.3	173.1	164.6	132.7
June 1942.....	148.8	171.4	120.3	113.5
August 1942.....	155.9	176.7	128.2	125.8

Average weekly hours per worker (table 4) amounted to 43.6 in August 1942, an increase of 9.5 percent as compared with August 1939, and to approximately the same percentage if the comparison is made with July 1941. In fact, employment measured in terms of man-hours was greater in August 1942 than in July 1941, despite some decline in the number of workers employed.

Average hourly earnings, including premium pay for overtime and shift-differential premiums, in the industry as a whole increased from 64.5 cents in August 1939 to 82 cents in August 1942, or by 27 percent. Average weekly earnings, which are affected not only by average earnings per hour but also by the number of hours worked per week, increased from \$25.87 in August 1939 to \$35.77 in August 1942, an advance of 38 percent. Estimated average hourly earnings exclusive of premium pay for overtime rose from 62.7 cents to 77.4 cents during this 3-year period.¹⁰ An inspection of the table indicates that the greater part of the increase in earnings occurred after July 1941. This statement appears to be true not only for the industry as a whole but for the industry in each of the three regions shown separately.

¹⁰ Straight-time average hourly earnings in primary mechanical-goods plants for all of the workers for whom occupational wage data are shown amounted to 73.8 cents in August 1942 (table 2). Estimated straight-time hourly earnings for August 1942 as shown for the total plant employment in table 4 amounted to 77.4 cents. This relatively small difference of 1.4 cents is probably due largely to the fact that not all of the occupations in these plants, notably those found in special war-goods production, were included in the occupational data. Moreover, the straight-time earnings in table 4 are estimated, and a portion of the difference may reflect this fact. It should be pointed out that the average earnings of all workers for whom occupational data are shown were 74.4 cents (table 2) in the Far West; the estimated straight-time earnings of all workers in these plants were 74.3 cents (table 4), a difference of only 0.1 cent. The respective averages in the Midwest were 74.8 cents and 76.6 cents, a difference of 1.8 cents. The appreciable difference (3.1 cents) between the two averages in the East probably reflects the influence of the omitted special war-products occupations.

Earnings by Size of Plant and Unionization

Table 6 shows average hourly earnings, inclusive of premium overtime pay and night-shift premiums, for four groups of plants classified on the basis of size and for union and nonunion plants similarly classified. Average weekly hours for each plant group are also shown, so that allowance can be made for the influence on hourly earnings of premium pay for overtime worked.¹¹

An inspection of table 6 suggests that there is no consistent relationship between plant size and the general level of earnings. It is obvious, for example, that if premium pay for overtime were eliminated, the level of earnings in plants employing from 251 to 500 workers would be lower than the level of earnings in plants employing fewer than 100 workers. The level of earnings in plants employing more than 500 workers is more influenced by hours worked than the level in plants employing 101 to 250 workers. If overtime premium payments were removed, it is probable that the level of earnings in the latter group of plants would exceed the level of earnings in the former group.

Table 6 does show, however, that a distinct difference exists in average hourly earnings between organized and unorganized plants in each of the size classes. The level of earnings in union plants as a whole is consistently above the level of earnings in nonunion plants as a whole in the same size groups. Since average weekly hours were also higher in the nonunion groups of plants, the exclusion of punitive overtime pay would undoubtedly increase the differences in hourly earnings shown in table 6.

TABLE 6.—Average Hourly Earnings¹ and Average Weekly Hours in Primary Mechanical Rubber Goods Plants, by Size of Plant and Unionization, August 1942

Size of plant	Number of plants	Number of workers	Average hourly earnings	Average weekly hours
All plants.....	52	20,040	\$.820	43.6
100 workers and under.....	21	852	.743	40.8
101 to 250 workers.....	12	1,969	.823	41.2
251 to 500 workers.....	6	2,165	.750	45.2
501 workers and over.....	13	15,054	.830	43.8
Union plants.....	35	15,473	.839	43.1
100 workers and under.....	11	518	.775	39.2
101 to 250 workers.....	10	1,605	.839	41.1
251 to 500 workers.....	3	1,080	.816	43.3
501 workers and over.....	11	12,270	.844	43.5
Nonunion plants.....	17	4,567	.740	45.4
100 workers and under.....	10	334	.707	43.3
101 to 250 workers.....	2	364	.751	41.6
251 to 500 workers.....	3	1,085	.684	47.0
501 workers and over.....	2	2,784	.765	45.5

¹ Premium overtime pay and shift-differential premiums included.

¹¹ It is possible to estimate straight-time average hourly earnings for these groups of plants. Such estimates, however, might not be reliable because of the relatively small number of plants and workers in some of the plant groupings. For large groups of plants the importance of overtime premium pay can be estimated with reasonable accuracy.