

MANHOURS WORKED DURING 1965 BY
CARPENTERS IN THE 46 NORTHERN
CALIFORNIA COUNTIES

by

B. William Becker

with a Foreword by
Sara Behman

Center for Labor Research and Education
Institute of Industrial Relations
University of California, Berkeley

May 1968

Foreword

This study analyzes 1965 manhours¹ data for carpenters and associated workers provided to the Center for Labor Research and Education by the Carpenter Funds Administrative Office of Northern California, Inc. The data provided were for all carpenters covered by the Pension Plan which provides retirement benefits from the Building and Construction Industry in the 46 Counties of Northern California. "The pensions made available under the Plan were first payable for the month of July, 1958, for all carpenters covered by the Carpenters four Bay Counties Master Agreement and the Piledrivers Master Agreement. Pensions for carpenters covered by the 42 Northern California Counties Master Agreement became effective January 1, 1960."¹

Although the information in the body of this report is of necessity limited to available data, i.e., the data for 1965, I believe it is possible to use these data to raise questions regarding the nature of the construction industry, and, in particular, the nature of the carpenters' labor market. In order to put the issues that require examination in their proper perspective, I want to explore several fundamental notions regarding the industry and the employment of carpenters.

There is no question that the construction industry has seasonal variations in employment because of the importance of outdoor work.

1. The Pension Plan of the Carpenters Pension Trust Fund for Northern California, July 1, 1966 (Third Edition.) (A pamphlet published by the Board of Trustees of the Plan.)

Recent figures published by Robert J. Myers and Sol Swerdloff in The Monthly Labor Review in an article entitled "Seasonality and Construction," provide evidence regarding the seasonal elements in the industry generally.² Their data show that employment in contract construction has, on the average, been about one-third higher in August than in February for the nation as a whole. In 1966, this same factor of one-third held for the nation, but for California, the report states that the February-August difference was less than ten percent. My own judgment is that this ten percent variation in employment between February and August for California is not realistic as a general seasonal expansion factor because 1966 was a considerably depressed building year in California. For example, building permits for the State for all types of building construction were valued at \$3,444.2 millions in 1966. This figure was 68 percent of the comparable one for 1963. The sharp decline in building activity between these two years was concentrated in the building of new housing units with the building permit valuation for new housing units during 1966 at 44 percent of the 1963 figure. Consequently, the ten percent figure for California is probably an underestimate of the seasonal variation for the construction industry in this State.

The Myers and Swerdloff paper stresses the importance of the seasonal element because they view it as "...a source of economic waste and an obstacle in the campaign against inflation." The Bureau of Labor Statistics has underway a comprehensive report on seasonality,

2. Robert J. Myers and Sol Swerdloff, "Seasonality and Construction," Monthly Labor Review, September 1967. (Reprint No. 2548.)

so that in this brief review these authors touch only on the highlights. Included in their paper is an examination of various alternative methods by which seasonality could be reduced. However, they also state that the cost of reducing seasonality may be high.

The questions and issues that I believe need examination by members of this industry go beyond seasonal factors. Although I concur that the effect of seasonal changes in construction employment cannot be overlooked, in my judgment the issues of labor shortages and labor surpluses faced by this industry have a more fundamental origin. I will state the case I am making by an example. Agriculture is a seasonal industry -- and Myers and Swerdloff point out that "Except for agriculture, construction has the greatest seasonal variations of any major industry division." Even though agriculture has wider seasonal variations than construction, the unemployment rate for this industry has, on the average, since 1948, been about $1\frac{1}{2}$ times the unemployment rate for all persons over the same years. For the construction industry, the unemployment rate has averaged 2.1 times the rate for the total unemployed since 1948. These differences in the unemployment rates suggest that some force in addition to seasonality/work ^{may be at} in the construction industry. Hence, we must try to determine other forces that affect the level of unemployment in construction.

Contract construction is also affected by cyclical conditions, especially by the changes in the money market. However, other

industries, especially those in durable goods manufacturing, also respond sensitively to cyclical variations.

In summary, both seasonal layoffs and cyclical layoffs occur in contract construction. But these types of layoffs occur to a greater or lesser extent in other industries. What then is the basic difference between contract construction and other major industry groups? By its very nature, the construction industry has a casual-type labor market in the sense that employers and employees are continuously attached to the trades in the industry but jobs and job sites are continuously changing. While the demand for labor by a contractor ^{may be} continuous (if we assume that a contractor's bids are such that he can move from job to job without delay), so that he employs some men during every working day, the problem arises when considering how the labor needs are met for different jobs. The number of men needed for different jobs may fluctuate so that one contractor cannot provide a regular labor market in the same way, for example, as can a manufacturing firm. Consequently, one man may within one year be on the payroll of a number of different employers. During expanding building periods, it is probably safe to say that the time between jobs for each individual carpenter that chooses to work constantly should be minimal or even zero. Even during such building periods, however, some workers may choose to delay going to the next job out of choice. Further, even during expanding demand periods in general, it is not unreasonable to assume that some

contractors are between major jobs because preparations for the next job take time. During slack building periods -- outside of the seasonal slack -- it seems reasonable to assume that the time between jobs may be of a longer duration for many individuals. In a sense, most men in carpentry are faced by irregularity of employment because of the casual-labor-market characteristics.³ Hence, we have what can be called an industry that has "normal unemployment" built into its structure. A fair general statement, I believe, is that the structure of the industry, one in which jobs and jobs sites change continuously, has inherent in it a certain amount of unemployment because of the employment irregularities caused by time lags.

I have raised this method of looking at the industry because the data in the body of this report indicate that of the 40,374 men for whom manhours were reported in 1965, 13 percent (or 5,247) of them worked less than 340 hours. My guess would be that these men could have been the seasonal workers in the industry inasmuch as if a man works steadily for two months during the summer and assuming the work month has 164 hours, the total time worked during the year would be 328 hours, or close to the 340-hours figure above. We know further that of the group working less than 340 hours, 2104 (40 percent) were men for whom the Pension Trust Fund has no age information. Is this because these are the highly transient men,

3. It is, of course, true that many contractors keep key men on their payrolls year-round. Our discussion, however, refers to the expansion and contraction of crews that take place because of the variability in job contracts.

taking jobs when seasonal demand is high, and do not stay long enough with even one employer to get their records completed?

Suppose the reader agrees with me that the men working less than 340 hours could be the seasonal part of this labor supply needed to fill contractors' labor needs during 1965, then why is it that men even in their prime working years worked 1400 hours or less during 1965? As we can see below, about half of the men in their prime working years worked 1400 hours or less.

Percentage of Carpenters in Northern
California Who Worked:

Age Group	1400 or less hours during 1965	More than 1400 hours during 1965
Age Unknown	89.0	10.9
Under 21	82.3	17.7
21-30	49.5	50.5
31-40	42.6	57.4
41-50	42.0	58.0
51-60	51.9	48.0
61-64	63.9	36.1
Over 65	70.9	29.1

Source: Table 10.

As mentioned above, I do not believe seasonal factors alone can account for the manhour distribution shown above and I have suggested that the structure of the industry has built into it a normal unemployment phenomenon. Is it possible, however, that besides the casual nature of the labor market on the demand side certain characteristics on the supply side intensify the fact that about half the men, even

in their prime working years, are working less than full-time? Is it possible that each time the trade attracts more workers to meet periods of intensified demand that many of these workers remain attached to the industry so that the final result is increased work sharing among the available supply? Is it possible that the high wage rate in this craft of irregular employment as compared with average wage rates in regular employment industries⁴ become attractive enough to hold these men who were needed during boom building periods when labor supply was scarce to the industry? Is it possible that earning a high hourly rate when employed has more force on the individual's decision to stay in the occupation rather than the force of underemployment through reduced hours or even total unemployment? Is it possible that an important structural change has occurred in the attitude of the carpenter supply of labor so that the normal unemployment characteristic has been intensified? For example, are fewer and fewer carpenters following jobs from site to site than was the case years ago? If so, and carpenters are more and more inclined to settle in one community then their mobility pattern is constrained by a feasible commuting distance from their place of residence.

I have argued to here that various forces interact to affect the less-than-full-employment found among many carpenters. The 1965 data we have, however, cannot distinguish the differential impact of these forces, i.e., the forces on the demand side and those on the

4. Industries in which a firm has a fixed location and can offer regular employment to its workers.

supply side. However, regardless of which force dominates, for the individual carpenter the issue is clear: he may not have a full work year and hence his annual earnings will not equal the wage rate times the total manhours of work available during any year.

The 1965 hours data indicate that in all of Northern California the median work year in 1965 was 1,318 hours, i.e., 50 percent of the men worked more and 50 percent worked less than these hours. However, in the nine San Francisco Bay Area Counties the median work year was 1,422 hours, while in the remaining counties (37) the median work year was 1,196 hours. In the body of this report, detailed information is provided by geographic areas and we find that, in general, carpenters in the rural areas worked fewer hours than those in the metropolitan regions.

We should now turn to what I believe are basic issues that require examination by persons in the trade. At the end of the main body of this report, Mr. Becker shows that the total valuation of building permits issued in each of the nine Bay Area Counties was strongly related to the total number of manhours and the total number of workers. However, he also shows ^{that} the total valuation of building permits issued is not related to the average (mean) manhours per year per man. The question is why?

In any economic model, we can design a framework that should enable us to see the mechanism that may be at work. In the following case I will describe the situation as follows:

1. Employers demand a given number of manhours to produce some output, for example, houses.

2. Labor is supplied to meet this demand. It is, however, so many manhours that are needed to meet the demand, and manhours are defined as the number of workers (carpenters) times the average (mean) number of hours worked per man.

3. For the system to be in balance, manhours demanded must equal manhours supplied.

The interesting question is, "How is the balance achieved in the system?" Suppose the demand for manhours increases because more buildings of one sort or another are to be built. How will the required increase in manhours be met? Obviously, one way would be to say that we have a given number of men in the trade, and they will now be able to work more hours per year. If some men previously had less than full employment, they will benefit. If when the increased demand occurred every carpenter in the industry had been fully employed, then the added manhours needed would be met by overtime for the given labor force.

However, we cannot be sure that this method of expanding manhours is the only means of adjustment because, as shown above, total manhours worked are the result of multiplying two elements, carpenters (number of men) and the average hours worked by each man. Under the situation examined above, therefore, manhours could increase by adding more men to the work force. For example, the increased demand becomes known and men who had left the trade for some reason may

come back. Others may come from other regions into the area where demand has increased. In this case, we could encounter a situation of perhaps sharing the extra manhours needed with additional workers. How much sharing would occur depends, of course, on the relationship of the change in the total carpenter labor force to the change in the demand for carpenters.

One result could be that the average manhours worked per man could be the same as before. Another could be an increase in average hours per man. Then, if the influx of carpenters is large enough, we could even observe a decrease in average hours per man per year.

I have gone through the above example because the statistical analysis of the 1965 data in this report suggest that such a mechanism may be at work. The insights into this line of reasoning were suggested by the relationships found between total building valuation and total manhours worked and total number of men working in the nine Bay Area Counties. However, the building permit valuation data are not related to mean manhours worked per man.

The results of the statistical analysis as shown in Table A are:

1. Every additional \$1,000,000 of total building value in 1965 in the nine Bay Area Counties required approximately 22,956 more manhours.
2. Every additional \$1,000,000 of total building value in 1965 in these same counties required the addition of approximately 18 men to the total labor supply.
3. However, the relationship between the total building valuation data and the mean manhours worked per man was not statistically

Table A

Relationship between the Total Value of All Building Construction Permits and (1) Total Manhours Worked, (2) Total Number of Workers, and (3) Mean Manhours Per Man Per Year, for the Nine-County San Francisco Bay Area, 1965

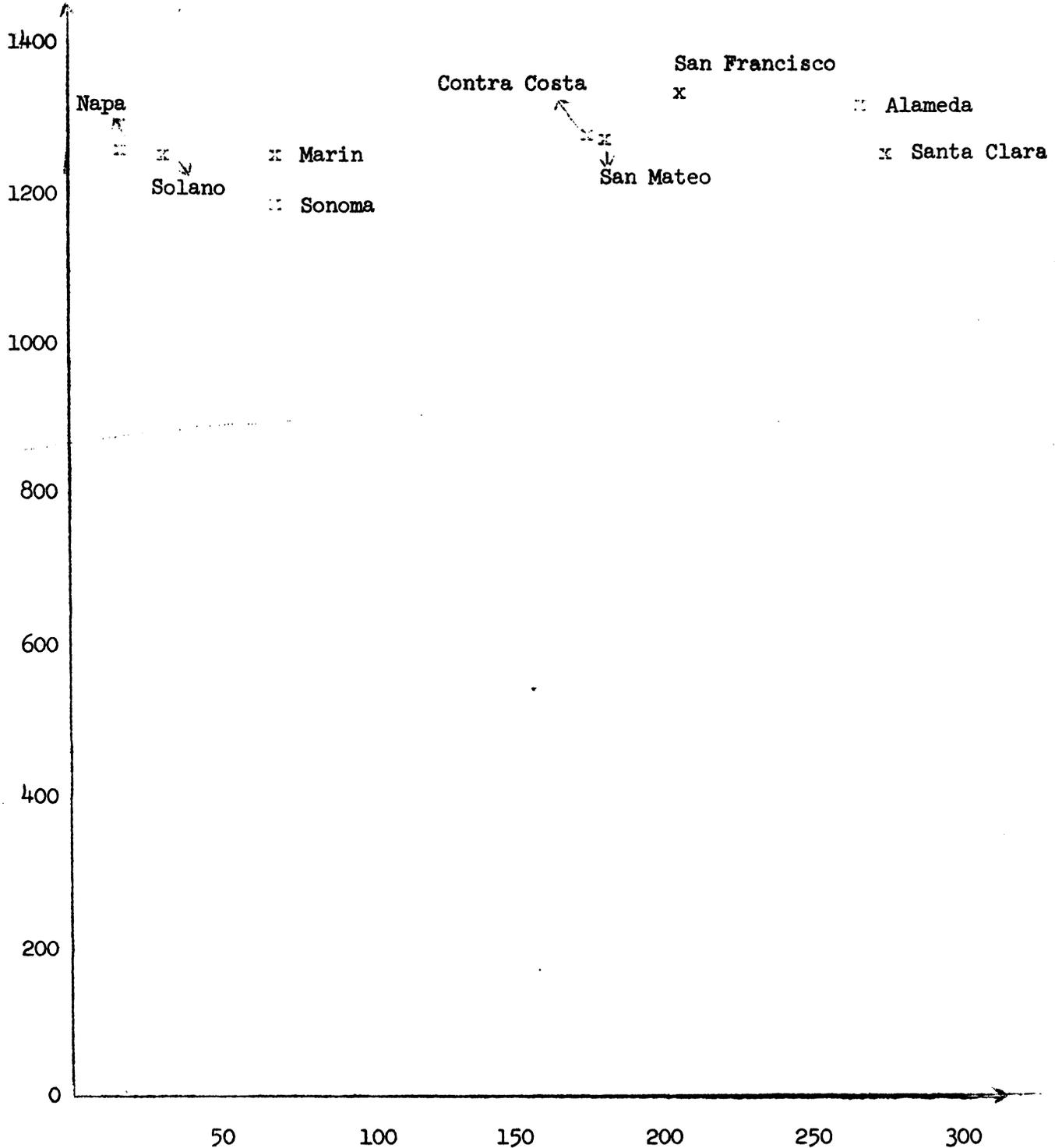
<u>Total Value of All Building Construction Permits Regressed on:</u>			
Regression Results	Total Manhours Worked	Actual Total Number of Workers	Mean Manhours Per Man Per Year
1. Constant term	-23,818 (-.091)	17.054 (.090)	1,229 (57.458)
2. Regression Coefficient	22,956* (14.944)	17.73* (15.908)	.2286 (1.811)
3. R ²	.9696	.9731	.3192

*Highly significant

Note: Figures in parentheses are T-statistics.

Mean Manhours Worked Per Man and Total Value of All Building Construction Permits, Nine Bay Area Counties, 1965

Mean Manhours Worked During 1965, Per Man



Total Value of All Building Construction Permits, 1965 (Millions of Dollars)

significant. (In Chart A we see that regardless of the spread in total building value, mean manhours are clustered in a narrow band between 1,182 for Sonoma County and 1,321 for San Francisco County.)

It should be made clear before proceeding further that all of our statements relate to one year, 1965. However, the significance of the findings for this year are consistent with our theoretical reasoning in this matter; i.e., total manhours are related to output (output here being defined as the total valuation of building permits). The results that did surprise us are that when the total manhours' figure is split into its two component parts, number of carpenters and mean manhours per man, the relationship continues to hold for the number of carpenters. Hence, we have concluded that adjustments in total manhours demanded probably occur by adjusting the average hours worked per year by each man.

On the basis of the above evidence, I believe that we can support the statement that average hours per man per year for carpenters is an issue that needs discussion because in each Bay Area county this average is lower than the full-time work year of 2,080 hours, and even 1800 hours, a figure used in some quarters as full-employment in the construction industry because of the influence of seasonal elements. In order to sharpen this issue so that meaningful discussions can take place by members of the industry, I am presenting for examination what I consider to be an academic exercise regarding the manhours worked in the nine county Bay Area Counties.

For all counties in the Nine-County Bay Area, Table 6 shows that the manhour averages fall below the full-time work year of 2,080 hours. We recognize that it is difficult to generalize about the extent of underemployment in this industry without basic survey evidence. For example, some individuals may prefer part-time work; some individuals may become available for jobs only during the summer when activity is high in the industry and when they are free, for example, from school attendance. Despite the unknowns in the situation, which cannot be underestimated, we have decided to go through the following exercise in order to provide a basis for future discussions. Persons familiar with the intricacies and problems of the industry will obviously have many reservations about the following exercise, as well they should. However, we believe that meaningful discussion can ensue if a problem is set forth in its gross and theoretical aspect.

The basis for the following analysis is Table B. The purpose of this table is to see how many workers could have been employed full-time during 1965 if the industry were: [1] not seasonal; [2] if the net inflows into the trade exactly equalled the net outflows from the trade, given the industry demand conditions that existed during 1965 [i.e., given the volume of building undertaken during 1965]; and (3) if all carpenters could have been shifted from job to job without intervening unemployment because of time lags.

Column 1 in this table shows the figure for total manhours worked in each county during 1965. Column 2 lists the actual number of workers reported for the locals in that county. Column 3 presents

Table B

Actual and ~~Full-Time~~ Work Force for Carpenters
in the Nine-County Bay Area, 1965

County	^a			Relative
	Total Manhours (1)	Actual Work Force (2)	Full-Time Work Force (3)	Difference Between Actual Work Force and Full-Time Work Force (4)
1. Alameda	6,434,500	4,920	3,324	48.0
2. Contra Costa	3,642,500	2,849	1,881	51.5
3. Marin	2,055,200	1,636	1,062	54.0
4. Napa	302,760	241	156	54.5
5. San Francisco	5,042,290	3,815	2,604	46.5
6. San Mateo	3,204,000	2,531	1,655	52.9
7. Santa Clara	6,256,222	5,006	3,231	54.9
8. Solano	723,320	582	373	56.0
9. Sonoma	1,398,400	1,183	722	63.9

^a Total manhours were calculated by multiplying the midpoint of each manhour category by the number of individuals in the category and adding over all categories. This procedure introduces some amount of bias as it implicitly assumes a normal distribution within each category. As a check on the figures shown above, total manhours were also computed by multiplying the number of men reported in each county by the mean manhours in the county. (From Table 6, Column 2 times Column 4.) These manhours' figures approximate those above. They are: Alameda, 6,430,440; Contra Costa, 3,641,022; Marin, 2,054,816; Napa, 302,696; San Francisco, 5,039,615; San Mateo, 3,204,246; Santa Clara, 6,257,500; Solano, 722,844; and Sonoma, 1,397,123.

what we are defining as the full-time work force needed for each county, given the 1965 construction activity. This figure was arrived at by dividing the total manhours in Column 1 by 1936 hours which we have stipulated as constituting a full-time work year in 1965 on the following basis:

40 hours per week times 52 weeks	=	2,080 hours ⁵
minus 8 paid holidays	=	64
minus 10 days of paid vacation	=	<u>80</u>
Total hours		1,936

As shown in Table B, the actual work force [i.e., the total number of persons attached to the industry at one time or another during 1965 regardless of the length of their voluntary attachment which is unknown] is larger than the full-time work force in each county. In relative terms, the percentage difference between the actual work force and the full-time work force ranges from 63.9 percent in Sonoma County to 46.5 percent in San Francisco County.

As explained above, this section has been included in this report simply to guide discussion. Among the questions that Table B raises are:

1. What proportion of the difference between the actual and the full-time work force is the result of seasonal factors?

2. What part of the difference between the actual and the full-time work force depends on layoffs generated by slack construction

5. It can be argued that 2,080 hours should not be used as the full-time work year in construction because of seasonality. For purposes of this analysis, however, I assume that the impact of seasonal forces can be eliminated.

demand caused by cyclical factors? ~~In other words~~, how many men remained attached to the industry even though new house construction was depressed in 1965 as compared with the two prior years?

3. Is the actual work force about half again as large as the full-time work force because of the influence of specialization in the trade? For example, how free is the transfer of carpenters between commercial, public, and residential construction? Is the mobility between these types of building activity high or low in regions where tract building is especially important in the total construction demand?

4. How much of the difference between the actual work force and the full-time work force is the result of variations in the way the labor supply is formed in the different counties?

5. What part of the difference is not underemployment in the craft but simply the preference of workers themselves? Do many men work at carpentry only during the summer and then work at some other occupation during the remainder of the year?

What is interesting to note is that if the industry were able to employ fully the men needed to sustain a full-time work force, then, given the 1965 demand conditions, for every additional \$1,000,000 of total building value the number of carpenters that would be added to the total work force would be about 12 men, or six fewer men than was

the case with the actual work force available during 1965 in the nine Bay Area Counties. The regression equation in this case is:

$$\text{Full-time work force} = -12,598 + 11.86 \sqrt{\text{Total 1965 Building Value}} \\ (-.094) \quad (14.937)$$

Figures in parentheses are T-statistics.

$$R^2 = .9696.$$

We hope these questions stimulate the reader to ask other questions and that this report provides insights into issues that have not been documented previously.

Before proceeding to the body of the report, several definitions need clarification.

1. Throughout the report we define "temporary" workers as those men working less than 340 hours. This definition, although arbitrary, is based on the assumption that if a man does not work a sufficient number of hours to qualify for pension credits, he would be classified as "temporary." Under the eligibility requirements now in effect, no pension credits are given to men under 55 years who work less than 350 hours per year. For men from 55-59, the minimum hours are 300. For those 60 years and over, the minimum is 250 hours. Weighting these minimum hours by the number of carpenters in each age group $\sqrt{\text{as}}$ distributed by the data furnished for 1965 by the Pension Trust Fund $\sqrt{\text{,}}$ we derived the average minimum hours as 340.

2. In the tables that appear in the body of the report we show both median and mean manhours' figures. The mean is obtained by dividing the total number of hours reported by the number of carpenters reported. This average thus takes into account extreme values that appear in the data. The median number of hours is the mid-point manhour value, or it is the value below which one-half of the manhours are distributed and also above which one-half of the value are distributed. We have given the reader both averages in order to show that in most cases differences do exist between these two types of averages. In general, in most of the tables, the mean value is less than the median. In this case, the distribution is negatively skewed which means that the pull towards the lower manhour values is great enough to keep the mean lower than the middle-value, the median.

B. William Becker, who worked under my direction, summarized the raw data received from the Pension Trust Fund and wrote the original draft of the following report. The computer program and methodology he used to summarize the information appear in Appendix B. Erwin Dreessen assisted in obtaining some of the information and in the computation of one of the tables. We wish to thank James Brundy who wrote the program that was used to load the IBM cards on to tape so that the information could be handled easily.

We wish to express our appreciation to Mr. C. R. Bartalini, Secretary, Bay Counties District Council of Carpenters and former

President of the California State Council of Carpenters, Mr. C. B. Sutherland, Secretary to the Board of Directors, Carpenter Funds Administrative Office of Northern California, Mr. Ralph M. Olig, Data Processing Manager of the Funds Office, and Mr. Don Vial, Chairman of the Center for Labor Research and Education, through whose efforts these data were made available. Without the interest of these men, this report would not have been possible.

Dr. Sara Behman
Director of Research
May 23, 1968

TABLE OF CONTENTS

	<u>PAGE</u>
Foreword	i
Summary of Findings	xxiv
I. Introduction	1
II. Regional Distribution of Hours Worked	6
A. Aggregated Data	6
B. Data by Major Economic Regions	11
C. Data for the Nine Counties of the San Francisco Bay Area	14
III. Hours Worked and Age Distribution	20
A. Age Distribution by Economic Region or Division	20
B. Manhours worked and Age for all Northern California	20
C. Manhours worked and Age for Economic Regions and Divisions	25
IV. Hours Worked and Building Value	30
Appendix A. Locals in the Carpenters' Union in 46 Northern California Counties	36
Appendix B. Computer Methodology.	40

TABLES

<u>Table</u>		<u>Page</u>
A	Relationship between the Total Value of All Building Construction Permits and [1] Total Manhours Worked, [2] Total Number of Workers, and [3] Mean Manhours Per Man Per Year, for the Nine-County San Francisco Bay Area, 1965	xi
B	Actual and Full-Time Work Force for Carpenters in the Nine-County Bay Area, 1965	xv
1	Distribution of Carpenters Working in Northern California by Location of the Local Union, 1965	3
2	Mean and Median Manhours Worked During 1965 by Carpenters in Northern California by Aggregate Divisions	7
3	Percentage Distribution of Workers by Manhours and Aggregate Divisions Northern California, 1965	8
4	Mean and Median Manhours Worked During 1965 by Carpenters in the Major Economic Regions of Northern California	12
5	Percentage Distribution of Workers by Manhours for Major Economic Regions of Northern California, 1965	13
6	Mean and Median Manhours Worked During 1965 by Carpenters in the Nine-County Bay Area	15
7	Percentage Distribution of Workers by Manhours for the Nine-County Bay Area, 1965	16
8	Mean and Median Manhours Worked During 1965 by Carpenters in the Nine-County Bay Area Adjusted by Excluding Temporary Workers [i.e., Men with Less than 340 Hours During the Year]	17
9	Percentage Distribution of Carpenters by Age for Regions and Other Divisions, 1965	21
10	Percentage Distribution of Carpenters by Manhours Worked and Age, for Northern California, 1965	24

TABLES

<u>Table</u>		<u>Page</u>
11	Median Manhours by Age and Economic Region and Divisions, Northern California, 1965	26
12	Mean Manhours by Age and Economic Region and Divisions, Northern California, 1965	27
13	Relative Mean Manhours by Age and Economic Region, and Division, Northern California, 1965	28
14	Total Manhours Worked and Value of Construction Permits, Nine Bay Area Counties, 1965	31
15	Comparative Rankings of Total Workers, Mean Manhours, and the Total Value of all Construction Permits, Nine Bay Area Counties, 1965	34

CHARTS

A	Mean Manhours Worked Per Man and Total Value of all Building Construction Permits, Nine Bay Area Counties, 1965	xii
1	Median Manhours by Aggregate Geographic Areas and other Divisions in the 46 Northern California Counties, 1965	10
2	Median Manhours Worked by Age of Worker, All Northern California, 1965	22
3	Total Manhours and Total Value of all Building Construction Permits, Nine Bay Area Counties, 1965	33

Summary of Findings

1. Manhours worked during 1965 by carpenters in the 46 Northern California Counties varied among the major economic regions and within the nine-county San Francisco Bay Area. For all of Northern California, the median work year was 1,314 hours in 1965. In the nine Bay Area Counties combined, however, the median was 1,422, higher than that for any of the other major economic regions. In the counties excluding the San Francisco Bay Area Region, the median work year was 1,196.

2. "Temporary" workers, those working less than 340 hours during 1965, accounted for 13 percent of all the carpenters in Northern California in 1965. In the Nine-County San Francisco Bay Area these workers accounted for 11.1 percent of all the carpenters in 1965. In contrast, in the Non-Bay counties they accounted for 13.2 percent.

3. In all of Northern California, 29 percent of all the carpenters worked 1,700 hours or more during 1965. In the Nine-County Bay Area, however, 32.9 percent of the carpenters worked 1,700 hours or more during 1965 as contrasted with 24.4 percent in the Non-Bay Area Counties.

4. In general, average hours worked by carpenters in the urban regions of Northern California were higher than those worked by carpenters in the rural regions.

5. A strong relation existed in 1965 between the total value of building permits and both the total manhours worked and the number of men for the nine counties of the San Francisco Bay Area. Mean manhours per worker, however, varied little among the counties despite the different amounts of building activity.

I. INTRODUCTION

This report summarizes information on manhours worked during 1965 by carpenters which was provided by the Carpenter Funds Administrative Office of Northern California, Inc. The Fund provided us with the following information on 40,374 carpenters who had worked for any period of time during 1965 for employers in Northern California who were parties to a collective bargaining agreement establishing the Carpenters Pension Trust Fund for Northern California: year of birth, local union affiliation, date of entry into the trade, and total manhours worked during 1965.¹

The date of entry into the trade was not available for many of the workers so that this item could not be utilized for purposes of this report. The data are, however, presented so that differences in manhours worked can be examined by age groups and by geographic regions. The geographic analysis is based on distributing the carpenters by the location of the local union in which each carpenter was a member.

In 1965, there were 79 locals in Northern California.² Of these we classified 69 as "general" carpenter locals. It is the membership of these 69 locals that is distributed by geographic region. The remaining 10 locals were in the following specialty trades: floorlayers, millwrights, millmen, shinglers, drydock workers, and pile drivers. The

1. These data were on IBM cards, with two cards of data for each carpenter. The method by which the information available on 80,748 IBM cards was reduced to manageable form is explained in Appendix B.

2. The list of locals was provided to us by the Carpenter Funds Administrative Office in a mimeographed form entitled "Union Directory."

data for these workers have been grouped under the title "Specialty Trades." This group was separated from the "general" carpenter locals on the assumption that their hours might not be affected by economic forces in the same way that the carpenters are affected. By separating this group from the main body of carpenters, it would then be possible to discern if any labor market differences exist between the two groups.

Besides the above categories, two other groups of carpenters are treated separately. In the data provided by the Fund office, no information regarding local affiliation was available for 3,071 carpenters. Information for this group, where provided, is under the title "No Local." In addition, for 1,380 carpenters the local affiliation given was for a local not included in the listing of locals for Northern California. These carpenters are classified in the category "All Other Locals." Such workers probably represent the group of men working in areas outside of their own jurisdiction on the basis of work permits.

The geographic regions used to summarize the data in the report are shown in Table 1.³ The four Bay Area Counties, Alameda, Marin, San Francisco and San Mateo are grouped separately where appropriate in this report because locals in these counties work under a separate labor-management agreement than members of locals in the remaining 42 Northern California counties who work under another labor-management agreement. However, data are also shown throughout the report for the nine-county Bay Area defined to include the nine counties surrounding San Francisco Bay

3. Appendix A shows in detail local numbers, the city and county location of the local, and the economic region to which the local is assigned. Also shown are the particular unions included under Specialty Trades.

which in our judgment represents the economic unit of relevance when discussing carpenters. Besides the nine-county Bay Region, data are provided for the remaining eight economic areas in Northern California, as defined by the State Department of Finance with one exception. Locals in Placer County have been divided between the Sierra Region and the Sacramento Metropolitan Region in order to provide a more realistic view of the feasible mobility pattern available to carpenters. In particular, the Kings Beach local [Local 2035] while in Placer County is situated northeast of Lake Tahoe and logically belongs in the Sierra Region on the basis of feasible patterns of geographic mobility.

Table 1 below shows the distribution of carpenters working in any of the 46 Northern California Counties on the basis of the location of the locals. To complete the distribution, numbers are also provided for the Specialty Trade Locals, No Locals, and All Other Locals as has been discussed above.

Table 1

Distribution of Carpenters Working in Northern California
by Location of the Local Union, 1965

<u>Area or Other Divisions</u>	<u>Carpenters</u>	
	<u>Number</u>	<u>Percent of Northern California</u>
<u>46 Northern California Counties</u>	<u>40,374</u>	<u>100.0</u>
1. <u>Bay Counties District Council of Carpenters</u>	<u>12,902</u>	<u>32.0</u>
a. San Francisco County	3,815	9.4
b. San Mateo County	2,531	6.3
c. Marin County	1,636	4.1
d. Alameda County	4,920	12.2

2.	<u>Nine-County Bay Area</u>	<u>22,763</u>	<u>56.4</u>
	a. Four Bay Counties District Council	12,902	32.0
	b. Contra Costa County	2,849	7.1
	c. Solano County	582	1.4
	d. Napa County	241	0.6
	e. Sonoma County	1,183	2.9
	f. Santa Clara County	5,006	12.4
3.	<u>North Coast</u>	<u>869</u>	<u>2.2</u>
	a. Lake County		
	b. Mendocino County		
	c. Humboldt County		
	d. Del Norte County		
4.	<u>Sacramento Valley</u>	<u>1,536</u>	<u>3.8</u>
	a. Shasta County		
	b. Tehema County		
	c. Butte County		
	d. Sutter County		
5.	<u>Sierra</u>	<u>1,000</u>	<u>2.5</u>
	a. Plumas County		
	b. Placer County		
	c. El Dorado County		
	d. Nevada County		
	e. Amador County		
	f. Calaveras County		
6.	<u>Sacramento Metropolitan</u>	<u>3,140</u>	<u>7.8</u>
	a. Placer County		
	b. Sacramento County		
	c. Yolo County		
7.	<u>Stockton Metropolitan</u>	<u>1,543</u>	<u>3.8</u>
	a. San Joaquin County		
	b. Stanislaus County		
8.	<u>San Joaquin Valley</u>	<u>369</u>	<u>0.9</u>
	a. Madera County		
	b. Tulare County		
	c. Kings County		

9.	<u>Fresno Metropolitan</u>	<u>762</u>	<u>1.9</u>
	a. Fresno County		
10.	<u>South Central Coast</u>	<u>1,952</u>	<u>4.8</u>
	a. Monterey County		
	b. Santa Cruz County		
11.	<u>Speciality Trade Locals</u>	<u>1,989</u>	<u>4.9</u>
12.	<u>No Locals</u>	<u>3,071</u>	<u>7.6</u>
13.	<u>All Other Locals</u>	<u>1,380</u>	<u>3.4</u>

In the following pages, hours and age data are shown first for the largest geographic regions, then for the major economic regions, and finally for the nine Bay Area Counties separately. In the final section, the relationship between total value of construction permits [residential and nonresidential totals] and manhours worked is examined for the nine Bay Area Counties.

II. REGIONAL DISTRIBUTION OF HOURS WORKED

A. Aggregated Data

The discussion of manhour data in this section relates to the broadest categories into which the information has been divided.

Table 2 shows mean and median manhours worked during 1965 for the broadest economic regions, and the special divisions along with the total number of carpenters for whom hours were reported. As can be seen, regardless of which average measure is used, the relative rankings of the major groups remains the same. In column 3 of the table, however, the medians are larger than the means in all cases except for the No Local and All Other Local groups. In both of these latter groups, the medians and the means are less than the values shown for each of the other major divisions. Furthermore, in both cases, about two-thirds of the men worked less than 1,400 hours so that the mean and the median are more heavily weighted by the lower values of manhours.

Table 3 clarifies the differences among the areas by indicating the percentage of men working within the various ranges of manhours. In all of Northern California, 13 percent of the men worked less than 340 hours during 1965, as contrasted with 11 percent in the Bay Area counties. In the No Local and All Other Local groups, however, at least 20 percent of the men worked less than 340 hours. We have no information for the reason underlying these differences in the proportion of short-time workers to total workers. One guess might be that the men in the No Local and All Other Local Groups were highly transient workers or were strictly summer workers.

Table 2
 Mean and Median Manhours Worked During 1965
 by Carpenters in Northern California
 by Aggregate Divisions

Area	Median ^a Manhours (1)	Mean ^b Manhours (2)	Percentage Difference Between Median & Mean Manhours (3)	Total Number of Carpenters (4)
All Northern California	1,318	1,210	8.9	40,374
1. Nine-County Bay Area	1,422	1,277	11.4	22,763
2. Four-County Bay Area	1,454	1,297	12.1	12,902
3. Non-Bay Area Counties	1,196	1,151	3.9	11,171
4. Specialty Trades	1,377	1,245	10.6	1,989
5. No Local	945	991	-4.6	3,071
6. All Other Locals	990	1,015	-2.5	1,380

^aThe median is the middle value. One-half of the men worked fewer hours than this value; and, one-half worked more hours than this value.

^bThe mean is the sum of the total manhours worked divided by the total number of men. This value, unlike the median, is affected by extreme values.

Table 3

Percentage Distribution of Workers by Manhours
and Aggregate Divisions
Northern California, 1965

Area	Percentage distribution of workers by manhours											Sum
	1- 339 (2)	340- 499 (3)	500- 799 (4)	800- 1099 (5)	1100- 1399 (6)	1- 1399 (7)	1400- 1699 (8)	1700- 1999 (9)	2000- 2299 (10)	2300- 2799 (11)	1400- 2799 (12)	
All Northern California	100.0	13.0	5.8	10.4	11.3	13.1	53.6	17.2	23.0	5.7	0.3	46.2
1. Nine-County Bay Area	100.0	11.1	5.0	8.9	10.3	13.3	48.6	18.4	26.4	6.3	0.2	51.3
2. Four-County Bay Area	100.0	11.0	4.8	8.6	9.9	12.4	46.7	18.4	27.8	6.8	0.3	53.3
3. NonBay Area Counties	100.0	13.2	6.4	12.5	13.5	13.7	59.3	16.3	19.1	5.0	0.3	40.7
4. Specialty Trades	100.0	12.7	5.2	10.4	10.9	11.7	50.9	17.3	23.8	7.0	1.0	49.1
5. No Local	100.0	22.7	9.3	12.7	11.0	11.3	67.0	13.2	15.4	4.4	0.1	34.1
6. All Other Locals	100.0	20.8	8.3	13.2	12.2	11.8	66.3	13.8	15.6	4.1	0.2	33.7

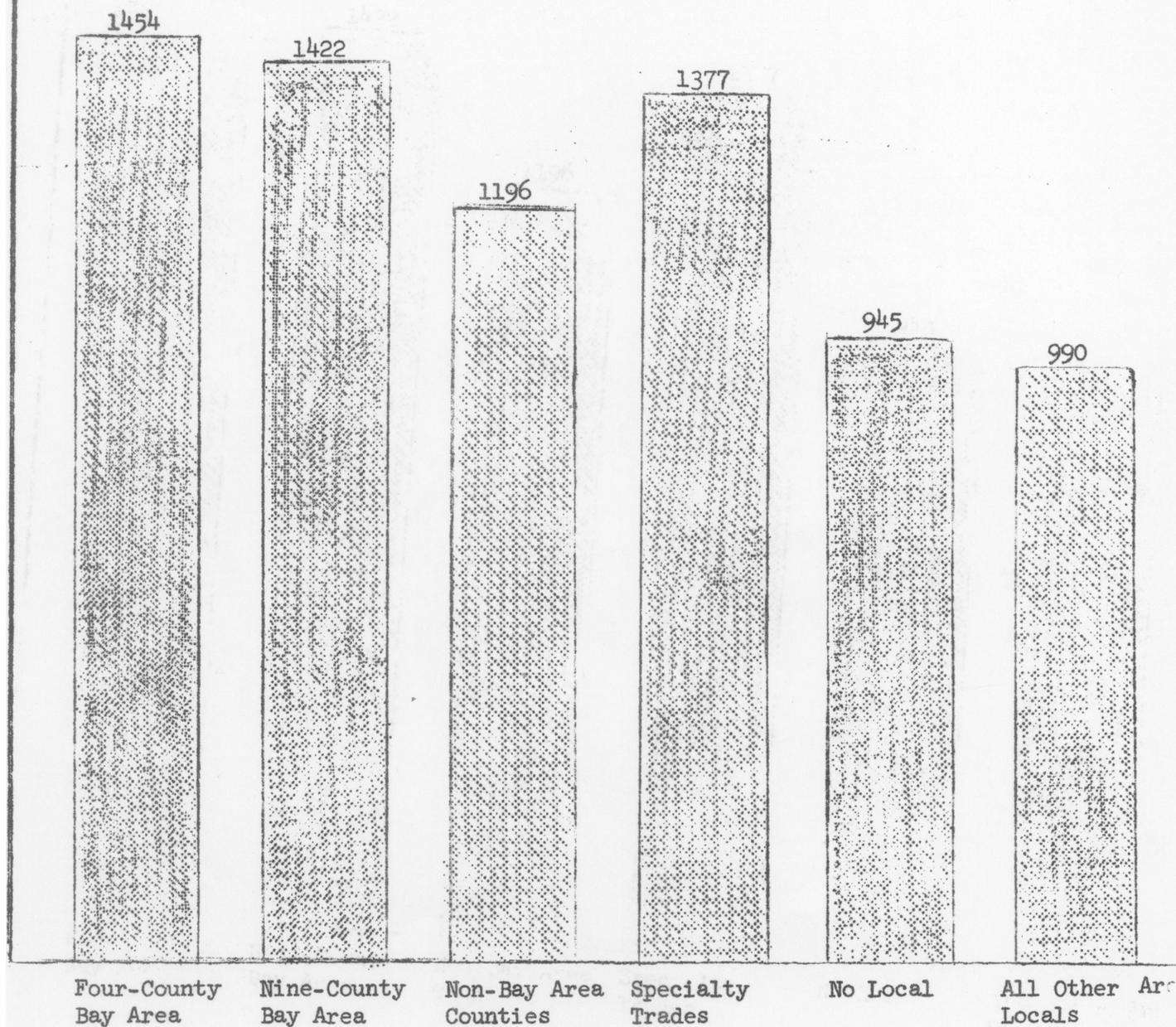
Note: Components may not add to 100.0 because of rounding.

Chart 1 illustrates that the median work year is substantially less than a full-time work year which has been variously defined as between 1800 and 2000 hours in the construction industries. Further, the geographical variation is clear, with a descending median as we move right from the bar for the Four-County Bay Area to the bar for the Non-Bay Area Counties. The Specialty Trades did almost as well as the Nine-County Bay Area average. The lowest median hours are found for those individuals for whom the Pension Fund either did not have information on the local for the carpenter or for members of locals not within the areas defined in Appendix A as comprising Northern California.

Chart 1

Median Manhours by Aggregate Geographic Areas and other Divisions in the 46 Northern California Counties, 1965

Median
Manhours



B. Data by Major Economic Regions

Regional manhour data are presented in summary form in both Tables 4 and 5. It is immediately apparent that there is a great deal of diversity among the areas shown as the Non-Bay Area in the preceding section. The lowest averages in Table 4 occur in the Sierra Region followed by the rural valley areas. Carpenters in the South Central Coast Region, however, ranked second only to the Bay Region in average hours worked.

The low figures for the Sierra Region may be the result of extreme climatic conditions there which would intensify the seasonal effect. It would seem reasonable to assume that a season of six months duration could apply to the Sierra Region where both snow and then melting of snow packs could impede outdoor construction activities. Furthermore, in this region building activity is related primarily to the tourist industry and summer-home groups. In view of these conditions, a 1,000-hour work year appears reasonable for the Sierra Region; in fact, the averages shown are close to 1,000 hours. Furthermore, this notion is consistent with the data shown in Table 5. As can be seen there, 75.6 percent of the carpenters worked less than 1400 hours in the Sierra Region, the largest percent for any of the major economic regions. This seasonal explanation, however, does not appear reasonable for the Sacramento and San Joaquin Valley Regions, both of which have mild winters but also low average manhours as compared with metropolitan areas. An alternative explanation for these areas that may have some validity is that some of the carpenters in the agricultural areas may be partially self-employed as farmers or may engage in some form of farming activity. They may either

Table 4

Mean and Median Manhours Worked During 1965 by
Carpenters in the Major Economic Regions of
Northern California

Area	Median Manhours (1)	Mean Manhours (2)	Percentage Difference between Median and Mean Manhours (3)	Total Number of Carpenters (4)
1. Nine-County Bay Area	1,422	1,277	11.4	22,763
2. Sacramento Metropolitan	1,305	1,213	7.6	3,140
3. Stockton Metropolitan	1,127	1,126	0	1,543
4. Fresno Metropolitan	1,287	1,206	6.7	762
5. South Central Coast	1,357	1,238	9.6	1,952
6. North Coast	1,156	1,125	2.8	869
7. Sacramento Valley	1,065	1,076	-1.0	1,536
8. Sierra	911	948	-3.9	1,000
9. San Joaquin Valley	1,050	1,064	-1.3	369

Table 5

Percentage Distribution of Workers by Manhours
for Major Economic Regions of
Northern California, 1965

Area	Percentage distribution of workers by manhours											
	1- 339 (2)	340- 499 (3)	500- 799 (4)	800- 1099 (5)	1100- 1399 (6)	1- 1399 (7)	1400- 1699 (8)	1700- 1999 (9)	2000- 2299 (10)	2300- 2799 (11)	1400- 2799 (12)	
Total (1)	100.0	11.1	5.0	8.9	10.3	13.3	48.6	18.4	26.4	6.3	0.2	51.3
Nine-County Bay Area	100.0	12.0	5.5	10.8	12.9	12.9	54.1	17.8	21.0	6.8	0.2	45.8
Sacramento Metropolitan	100.0	14.1	6.0	13.5	15.3	12.4	61.3	14.9	19.1	4.5	0.3	38.8
Fresno Metropolitan	100.0	13.1	5.5	10.9	11.8	14.0	55.3	15.7	20.9	7.9	0.1	44.6
South Central Coast	100.0	12.0	5.6	9.8	9.9	14.8	52.1	18.2	24.5	4.9	0.4	48.0
North Coast	100.0	12.9	7.4	14.4	13.1	12.4	60.2	16.2	20.3	3.0	0.3	39.8
Sacramento Valley	100.0	13.6	7.9	14.7	15.6	14.3	66.1	14.9	15.2	3.5	0.4	34.0
Sierra	100.0	17.3	9.2	17.5	16.2	15.4	75.6	13.3	8.7	2.1	0.3	24.4
San Joaquin Valley	100.0	14.9	6.5	13.3	18.4	15.2	68.3	13.8	12.7	4.6	0.5	31.6

Note: Components may not add because of rounding.

fill gaps in the availability of work as carpenters by farming, or conversely carpentry may be their occupation when farm duties diminish. Another possible explanation may be that construction demand in the less populated areas of the state is not as intense as in the metropolitan areas. This explanation is consistent with the data in Table 5. As can be seen in Column 7 of this table, in the San Joaquin Valley, 68.3 percent of the carpenters worked less than 1400 hours; in the Sacramento Valley, 66.1 percent; and, in the North Coast, 60.2 percent.

As mentioned above, the averages for the Southern Central Coast ranked second only to those in the Nine-County Bay Area. Part of the explanation for these comparatively high averages may be the increasing urbanization of the area. Partly, too, in 1964 but mainly in 1965, a wooden frame college was built on the Santa Cruz Campus of the University of California. Finally, in 1965 and partly in 1966, the Army training center at Fort Ord built 190 housing units. These demand factors undoubtedly had a strong impact on the carpenters' working hours and may explain the relatively high averages as compared with all the regions excluding the Nine-County Bay Area.

C. Data for the Nine Counties of the San Francisco Bay Area

Table 6 presents a summary of mean and median manhour data for the nine counties of the San Francisco Bay Area. In each county, the medians are larger than the means. These differences, ranging from 13.8 percent in Napa County to 4.5 percent in Sonoma County partially reflect the influence on the mean of the "temporary" worker percentages, i.e., the men working less than 340 hours. The extent to which the medians and

Table 6

Mean and Median Manhours Worked During 1965 by
Carpenters in the Nine-County Bay Area

County	Median Manhours (1)	Mean Manhours (2)	Percentage Difference Between Median & Mean Manhours (3)	Total Number of Carpenters (4)
1. Alameda	1,469	1,307	12.4	4,920
2. Contra Costa	1,418	1,278	11.0	2,849
3. Marin	1,411	1,256	12.3	1,636
4. Napa	1,429	1,256	13.8	241
5. San Francisco	1,483	1,321	12.3	3,815
6. San Mateo	1,420	1,266	12.2	2,531
7. Santa Clara	1,385	1,250	10.8	5,006
8. Solano	1,345	1,242	8.3	582
9. Sonoma	1,235	1,182	4.5	1,183
Nine-County Bay Area	1,422	1,277	11.4	22,763

Table 7

Percentage Distribution of Workers by Manhours
for the Nine-County Bay Area
1965

	Percentage distribution of workers by manhours										Sum	
	1- 339 (2)	340- 499 (3)	500- 799 (4)	800- 1099 (5)	1100- 1399 (6)	1- 1399 (7)	1400- 1699 (8)	1700- 1999 (9)	2000- 2299 (10)	2300- 2799 (11)		1400- 2799 (12)
Total (1)	100.0	10.5	4.4	8.5	10.4	11.9	45.7	18.8	29.0	6.3	0.2	54.3
Alameda	100.0	10.5	4.4	8.5	10.4	11.9	45.7	18.8	29.0	6.3	0.2	54.3
Contra Costa	100.0	10.3	5.3	8.8	10.8	13.7	48.9	18.1	27.1	5.6	0.1	50.9
Marin	100.0	10.6	5.3	9.0	10.5	13.8	49.2	22.1	24.8	3.6	0.2	50.7
Napa	100.0	14.5	5.4	7.1	6.2	14.9	48.1	19.5	27.0	5.4	0	51.9
San Francisco	100.0	11.1	4.6	8.6	9.1	12.2	45.6	15.9	29.1	8.9	0.5	54.4
San Mateo	100.0	12.0	5.6	8.7	9.8	12.6	48.7	19.1	25.2	6.6	0.5	51.4
Santa Clara	100.0	12.1	5.1	8.9	10.1	14.5	50.7	19.2	24.2	5.9	0.1	49.4
Solano	100.0	10.3	4.5	9.8	11.9	16.5	53.0	20.6	21.5	5.0	0	47.1
Sonoma	100.0	10.4	6.1	11.7	14.6	15.9	58.7	15.3	20.8	4.8	0.4	41.3
Nine-County Bay Area	100.0	11.1	5.0	8.9	10.3	13.3	48.6	18.4	26.4	6.3	0.2	51.3

Note: Components may not add to 100.0 because of rounding.

Table 8

Mean and Median Manhours Worked During 1965 by Carpenters
in the Nine-County Bay Area Adjusted by Excluding Temporary Workers
(i.e., Men with Less than 340 Hours During the Year)

<u>County</u>	<u>Adjusted Median Manhours</u>	<u>Adjusted Mean Manhours</u>	<u>Percentage Difference between Median and Mean Manhours</u>	
			<u>Adjusted Data (3)</u>	<u>Unadjusted Data (4)</u>
	(1)	(2)		
1. Alameda	1,552	1,462	6.1	12.4
2. Contra Costa	1,504	1,425	5.5	11.0
3. Marin	1,483	1,406	5.5	12.3
4. Napa	1,540	1,470	4.8	13.8
5. San Francisco	1,587	1,487	6.7	12.3
6. San Mateo	1,515	1,439	5.3	12.2
7. Santa Clara	1,484	1,421	4.4	10.8
8. Solano	1,431	1,386	8.3	3.2
9. Sonoma	1,343	1,319	1.8	4.5
Nine-County Bay Area	1,513	1,416	6.9	11.1

means are lowered by the inclusion of these "temporary" workers is shown clearly in Table 8. In this table, those men working less than 340 hours have been eliminated from the computation of the medians and the means. As can be seen in Column 3 of Table 8 the averages come closer together after the exclusion of the "temporary" workers.

While differences in average hours exist among the various counties, they are not as great as the differences noted earlier among the economic regions. San Francisco County carpenters had an unadjusted median of 1483 manhours [Table 6] to rank first. Five other counties had medians in excess of 1400 hours. The lowest mean and median was in Sonoma County. Climatic conditions are not too different among these counties, with all enjoying mild winters. Rainfall variations, however, do exist. It does not seem reasonable, however, to ascribe these differences in manhours to the influence of rainfall variations. For example, the manhour averages for Marin County about equal those for Santa Clara County, yet the annual average precipitation in Marin County is about three times that for Santa Clara County. It would seem that the most reasonable explanation of these differences lies in the relationship of labor demand and labor supply conditions in these counties. Unfortunately, we lack the information to clarify the precise nature of this relationship. In Section IV below we are able to show that total manhours in each county are closely related to the value of all construction building permits in the respective counties. In particular, we show in this section that the demand for labor [in terms of total manhours and in terms of number of workers] is highly related to construction output, with output measured by the dollar value of all

construction building permits. If this relationship shown for one year is representative of the situation that would exist in all other years, then the logical implication is that variations in meeting construction demand most likely occur on the supply side of the labor market.

There are several things we do know about the nature of the labor supply in these nine Bay Area counties. First, in the Nine-County Bay Area relatively more carpenters worked 1700 hours or more than was the case for the other major economic regions. For the nine-county group, one-third [33 percent] of the carpenters worked 1700 hours or more. In the rural regions combined, about one-fifth [22 percent] worked over 1700 hours as contrasted with almost one-third [31.7 percent] for the urban regions combined. Second, when the extremes in the nine-county Bay Area are pinpointed, almost 40 percent [38.5] of the San Francisco County carpenters worked 1700 hours or more, the highest percent. In Sonoma County, the lowest, about one-fourth of the carpenters worked 1700 hours or more.

One possible explanation for the large proportion of men working 1700 hours or more in San Francisco County versus the other counties is the large volume of nonresidential construction taking place there. For example, in 1965, 73.5 percent of all the building permit valuation was for nonresidential building and residential remodeling and repair. In the remaining eight counties this figure averaged 36.8 percent. Casual observation indicates that the flow of jobs in the nonresidential aspect of the industry may have provided a steadier job picture for those men working in San Francisco County. If the reader agrees with this presumption, then we would be able to justify to some extent the higher averages of hours worked in the San Francisco County locals as a group.

III. HOURS WORKED AND AGE DISTRIBUTION

A. Age Distribution by Economic Region or Division

Before showing the hours worked by age distribution, Table 9 is included so that the reader may be aware of the differences in the age distribution among the economic regions or other specified divisions.

From Table 9 we see that the percentage of men for whom age information was not available varies significantly, from 30 percent for the No Local group to 9.7 percent for the Sacramento Metropolitan Area. We do not know how the exclusion of the 5,502 men from the age distribution percentages [the men for whom no age was reported and who represented 13.6 percent of all the carpenters in Northern California] biases the balance of the distribution.

On the basis of the data that could be distributed, it is interesting to note that the wide disparities are shown for the urban-rural division between the percentage of men less than 40 years and those over 40 years. In all the urban areas, 42 percent of the men were in the under 21 to 40 year group; for the rural areas, the same percentage was 35 percent. In the over 40 groups, the rural areas had 49.1 percent of the men, while the urban areas had 46.1 percent of the men. These figures must be qualified, however, because for the rural areas a larger percentage of the men had the age unknown than is the case for the urban areas.

B. Manhours Worked and Age for All Northern California

Chart 2 represents the summary relationship by age and median manhours for all 40,374 carpenters in Northern California. As can be seen,

Table 9

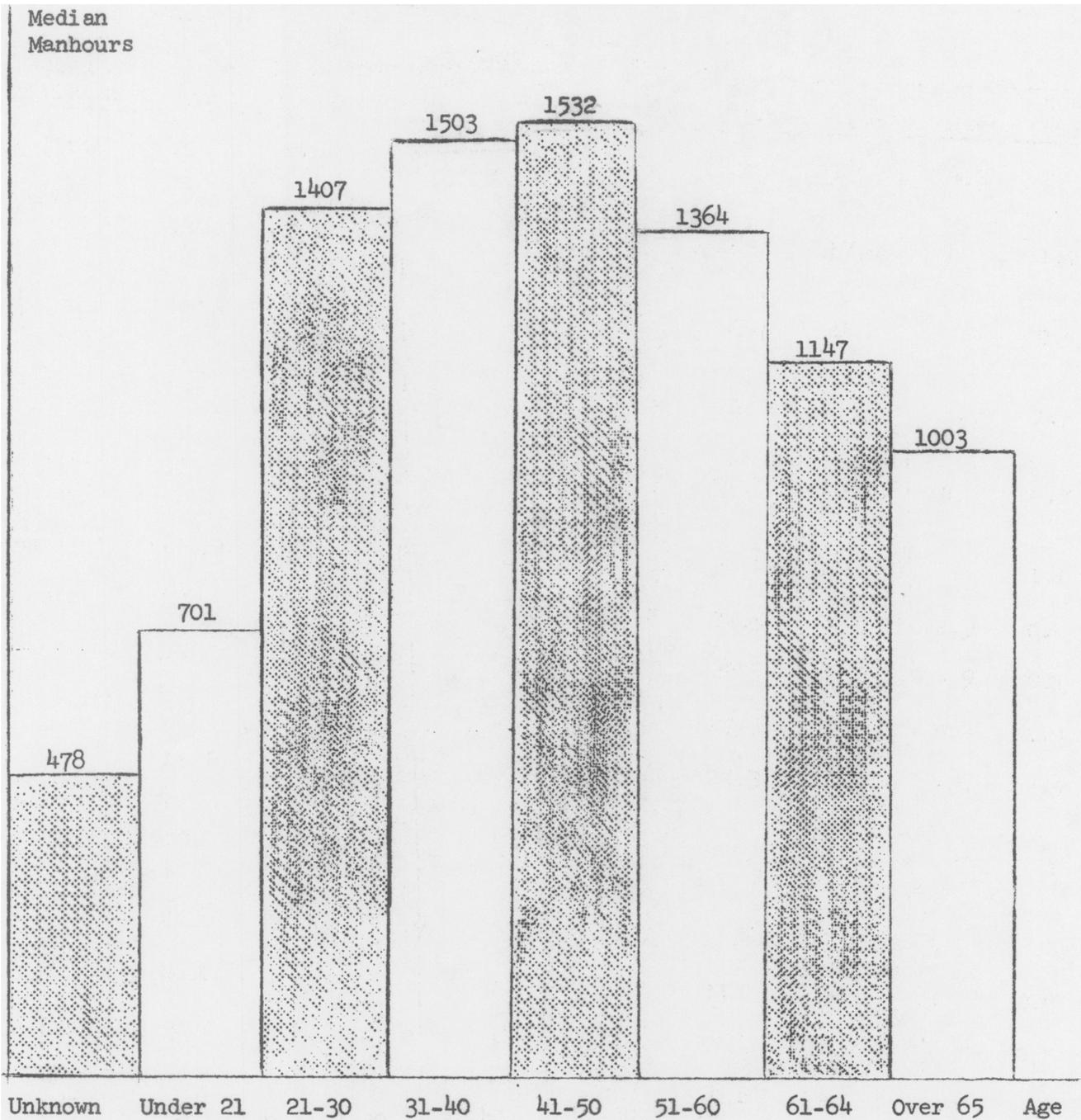
Percentage Distribution of Carpenters by Age
for Regions and Other Divisions, 1965

Region or Division	Percentage distribution by age								
	Total	Age Unknown	Under 21	21-30	31-40	41-50	51-60	61-64	Over 65
Urban - Total	100.0	10.8	2.3	20.0	19.7	23.8	18.1	4.2	1.0
Nine-County Bay Area	100.0	10.6	2.4	20.7	20.0	23.6	17.4	4.2	1.1
Sacramento Metropolitan	100.0	9.7	1.4	18.3	20.1	25.4	21.2	3.4	0.4
Stockton Metropolitan	100.0	15.0	2.0	18.0	15.9	21.3	21.5	5.2	1.3
Fresno Metropolitan	100.0	16.1	1.2	10.9	17.7	29.1	20.3	4.0	0.7
Four-County Bay Area*	100.0	10.6	2.8	20.5	19.9	23.9	16.8	4.5	1.1
Rural - Total	100.0	16.0	1.6	16.0	17.4	23.5	20.9	3.9	0.8
North Coast	100.0	19.2	1.5	12.9	16.7	22.9	21.2	4.9	0.7
Sacramento Valley	100.0	12.7	1.1	13.9	18.8	23.5	24.5	4.4	1.0
Sierra	100.0	20.3	1.9	15.2	15.9	22.3	21.1	2.8	0.5
San Joaquin Valley	100.0	12.7	1.9	13.0	13.6	28.2	23.9	5.7	1.1
South Central Coast	100.0	15.5	1.9	19.9	18.0	23.6	17.2	3.3	0.6
Specialty Trades	100.0	16.3	1.3	15.9	20.2	23.0	19.4	3.0	0.9
All Other Locals	100.0	21.0	0.9	14.5	18.5	22.4	18.9	3.3	0.5
No Locals	100.0	30.0	1.6	16.2	15.9	19.4	13.4	3.1	0.6
All Northern California	100.0	13.6	2.0	18.8	19.1	23.4	18.2	4.0	0.9

Note: Detail may not add to 100.0 percent because of rounding.
*Shown separately for informational purposes only. This group
is part of the Nine-County Bay Area.

Chart 2

Median Manhours Worked by Age of Worker,
All Northern California, 1965



median manhours rise progressively from the 21-30 age group through the 41-50 age group. After 50, median manhours worked decline progressively. This distribution seems reasonable inasmuch as the highest median manhours are worked by men in their prime working years, particularly the 31-50 age groups.

The low average shown in Chart 2 for the under 21 group [701 manhours] may be caused by several factors. Probably a large proportion of this group consists of high school and college students working during their summer vacations. Also, some of the individuals in this age group may be apprentices who might have more trouble than journeymen in securing full-time employment. At the other end of the age spectrum we find that the over-65 group also had fewer manhours, on the average, than men in their prime working years. One guess for this situation is that many of these men may be casual workers who come out of semi-retirement if the opportunity presents itself. Table 10 supports these presumptions. In the less-than-340-hours group, including those of unknown age at 38.2 percent, 23.8 percent of the under-21 age group is in this category. Further, 21.1 percent of the over-65 group worked less than 340 hours in 1965. In contrast, 13.0 percent of all carpenters of all ages in Northern California worked less than 340 hours.

At the high end of the manhours spectrum we find that almost 40 percent of the men between ages 31 and 50 worked 1700 hours or more in 1965 as compared with 29 percent for all carpenters.

C. Manhours Worked and Age for Economic Regions and Divisions

In Tables 11 and 12 detailed information on manhours worked by age categories is provided for the economic regions and the specific divisions. Again, as earlier in this report, average manhours are given in terms of the means and the medians so that the reader has the opportunity to examine the information from two aspects.

The information on these tables is summarized by the differences in mean manhours shown between the urban and rural regions in Table 12. The relevant figures are tabulated below to facilitate the comparison.

<u>Age Group</u>	<u>Mean Manhours, Urban Minus Rural</u>
1. All Ages	144
2. Age unknown	34
3. Under 21	69
4. 21-30	158
5. 31-40	128
6. 41-50	140
7. 51-60	130
8. 61-64	152
9. Over 65	307

As shown above, rural-urban differences are narrowest for the under-21 age group and widest for the over-65 group. The major difference, in fact, is that for the over-65 group. We have no way of knowing why this difference exists for the oldest age group. Persons with insights into this craft and industry may perhaps be able to provide the answer.

To make the data on Table 12 easier to read, we have produced Table 13. In this table, all mean manhours figures are shown relative to those for the Four-County Bay Area where the means were highest for all

Table 11

Median Manhours by Age and Economic Region
and Divisions, Northern California, 1965

Region or Division	Age groups								All Ages
	Age Unknown	Under 21	21-30	31-40	41-50	51-60	61-64	Over 65	
Rural									
North Coast	627	602	985	1,442	1,404	1,412	1,183	950	1,156
Sacramento Valley	615	613	1,077	1,260	1,271	1,078	750	420	1,065
Sierra	455	650	944	1,244	1,120	1,046	700	420	911
San Joaquin Valley	440	465	1,040	1,063	1,366	1,100	650	500	1,050
South Central Coast	577	841	1,440	1,552	1,576	1,394	1,231	1,000	1,357
Urban									
Nine-County Bay Area	507	697	1,467	1,571	1,591	1,439	1,253	1,073	1,422
Four-County Bay Area*	827	863	1,493	1,609	1,628	1,627	1,475	1,284	1,454
Sacramento Metropolitan	478	971	1,331	1,508	1,459	1,316	1,065	950	1,305
Stockton Metropolitan	528	993	1,195	1,314	1,539	1,152	879	500	1,127
Fresno Metropolitan	424	460	1,285	1,543	1,573	1,360	1,025	950	1,287
All Other Locals	376	875	1,127	1,277	1,408	1,171	1,150	950	990
No Locals	375	613	1,151	1,348	1,401	1,238	835	650	944
Specialty Trades	861	446	1,413	1,597	1,618	1,448	1,250	1,050	1,377
All Northern California	477	701	1,406	1,519	1,532	1,362	1,160	1,003	1,318

*Included in the Nine-County Bay Area.

Table 12

Mean Manhours by Age and Economic Region and Division,
Northern California, 1965

Region or Division	Age groups							Over 65	All-Ages
	Age Unknown	Under 21	21-30	31-40	41-50	51-60	61-64		
Rural-Total	674	746	1,146	1,279	1,283	1,168	997	737	1,115
North Coast	726	746	1,020	1,306	1,304	1,246	1,161	938	1,125
Sacramento Valley	713	655	1,101	1,196	1,225	1,078	907	578	1,076
Sierra	552	648	973	1,166	1,092	1,063	768	532	948
San Joaquin Valley	536	613	1,032	1,511	1,319	1,132	779	922	1,064
South Central Coast	724	863	1,289	1,404	1,403	1,302	1,150	890	1,238
Urban-Total	708	815	1,304	1,406	1,423	1,297	1,148	1,044	1,260
Nine-County Bay Area	669	802	1,326	1,419	1,436	1,318	1,180	1,066	1,277
Four-County Bay Area*	688	727	1,340	1,452	1,460	1,345	1,208	1,104	1,297
Sacramento Metropolitan	1,156	920	1,209	1,369	1,336	1,247	1,055	1,022	1,213
Stockton Metropolitan	618	976	1,149	1,257	1,413	1,412	958	822	1,126
Fresno Metropolitan	544	571	1,239	1,413	1,429	1,309	968	938	1,206
Urban minus rural	37	69	158	128	140	130	152	307	144
All Other Locals	470	870	1,071	1,220	1,245	1,105	1,045	952	1,015
No Locals	547	760	1,127	1,218	1,275	1,175	946	814	992
Specialty Trades	695	566	1,279	1,429	1,438	1,327	1,180	1,024	1,245
All Northern California	632	796	1,266	1,372	1,386	1,262	1,114	993	1,207

*Included in the Nine-County Bay Area.

Note: These data were computed by Erwin Dreessen.

Table 13

Relative Mean Manhours by Age and Economic Region,
and Division, Northern California, 1965

(Four-County Bay Area = 100)

Region & Division	Age groups								
	All Ages	Unknown	Under 21	21-30	31-40	41-50	51-60	61-64	Over 65
1. Four-County Bay Area	100	100	100	100	100	100	100	100	100
2. Total Northern California	93	92	110	94	94	95	94	92	90
3. Nine-County Bay Area	98	97	110	99	98	98	98	98	96
4. Sacramento Metropolitan	94	168	127	90	94	91	93	87	93
5. Stockton Metropolitan	87	90	134	86	87	97	85	79	74
6. Fresno Metropolitan	93	79	79	92	97	98	97	80	85
7. All Urban (3-6)	97	103	112	97	97	97	96	95	95
8. North Coast	87	106	103	76	90	89	93	96	85
9. Sacramento Valley	83	104	90	82	82	84	80	75	52
10. Sierra	73	80	89	73	80	75	79	64	48
11. San Joaquin Valley	82	78	84	77	79	90	84	64	84
12. South Central Coast	95	105	119	96	97	96	97	95	81
13. All Rural (8-12)	86	98	103	85	88	88	87	82	67
14. No Locals	77	80	105	84	84	87	87	78	74
15. All Other Locals	78	68	120	80	84	85	82	86	86
16. Specialty Trades	96	101	78	95	98	98	99	98	93

the age groups except the under-21 age group and the age-unknown group. In particular, each figure in Table 12 has been divided by that for the Four-County Bay Area. Consequently, in Table 13, mean manhours for the Four-County Bay Area are set equal to 100.

This table clearly raises the question: Why should the carpenters in the Four-County Bay Area have higher mean manhours than carpenters in other regions and in the specialty trades?

Again, we cannot answer this question precisely in this report because of the lack of information on labor-supply demand interrelationships. However, the next section takes a look at the demand side of the labor market and we believe provides some insights into the nature of the demand side of the labor market for carpenters, and indirectly on how supply adjustments may be made to the given labor demand.

IV. HOURS WORKED AND BUILDING VALUE

In this section we examine the relationship between the work force and the amount of work available. Work available is measured by using the value of building construction permits issued during the entire year of 1965 in the nine Bay Area counties. The assumption made here, of course, is that construction of projects got underway as soon as the permits were issued. In reality, permits most likely are issued before construction actually starts. Inasmuch as we cannot be sure of the lead time for permits, the permit value figures must be considered as a close approximation of the actual building that was undertaken during 1965.

Table 14 shows total manhours and the total value of all building construction permits issued which includes both residential and nonresidential construction permits for both new units built and for alterations and repairs to both types of structures. Also shown in the table is the value of residential construction for new dwelling units, which is published in the Construction Reports. This figure for new residential units has been included here for informational purposes only in order to indicate differences that exist among the counties. The relevant figure to which manhours must be related is, of course, the total value of all building construction permits [Column 2] because carpenters are used in all types of construction activities. As is shown in Table 14, except for San Francisco County, the valuation of permits for new residential dwellings accounted for most of the total building construction, varying from almost 58 percent in Alameda to almost

Table 14

Total Manhours Worked and Value of Construction
Permits, Nine Bay Area Counties, 1965

<u>County</u>	<u>Total Manhours</u>	Value of Construction Permits ¹ (Millions of Dollars)			Ranks	
		<u>All Building</u>	<u>New Dwelling Units</u>		<u>Total Man- hours</u> (5)	<u>Value of all Bldg. Const.</u> (6)
			<u>Value</u> (3)	<u>As a Percent of Total Building Value</u> (4)		
	(1)	(2)	(3)	(4)	(5)	(6)
Alameda	6,434,500	265,337	152,950	57.6	1	2
Contra Costa	3,642,550	173,330	112,740	65.0	4	5
Marin	2,055,200	68,415	47,536	69.5	6	6
Napa	302,760	16,908	10,668	63.1	9	9
San Francisco	5,042,290	205,329	54,310	26.5	3	3
San Mateo	3,204,000	176,007	110,831	63.0	5	4
Santa Clara	6,256,222	273,911	164,229	60.0	2	1
Solano	723,320	30,118	18,195	60.4	8	8
Sonoma	1,398,400	65,845	44,052	67.0	7	7

¹Source: U. S. Department of Commerce, San Francisco Field Office, San Francisco Bay Area Construction Report. (Monthly data were added to arrive at a total 1965 figure for each county.)

70 percent in Marin. San Francisco, third in total building valuation, had a completely different pattern from the remaining counties. There, new dwelling construction value accounted for only 26.5 percent of the entire building construction value.

In Chart 3 a marked relationship is shown between the total value of all building construction permits issued in 1965 and total manhours worked in 1965. Each cross on this chart represents the figures observed for each of the counties. In Columns 5 and 6 of Table 14, both of these variables have been ranked in order of magnitude, from the highest to the lowest numbers. As can be seen, both figures have the same rank in five of the nine counties. In the remaining four counties, the ranks differ by only one place. By comparing these ranks a correlation coefficient can be derived, i.e., a figure which shows the closeness of the relationship. In this case, the Spearman correlation coefficient is 0.97, which is high.⁴

From Table 15 we also find that the total construction permit valuations are highly related to the number of men working. In this case, the rank correlation is 0.98. However, there is not a significant relationship between building-value rank and the mean hours worked per man. For these two variables the rank correlation coefficient is 0.45 which is not statistically significant.

4. If the ranks in Columns 5 and 6 were identical, then the correlation coefficient would be 1.00, or perfect rank correlation.

Chart 3

Total Manhours and Total Value of all Building Construction Permits, Nine Bay Area Counties, 1965

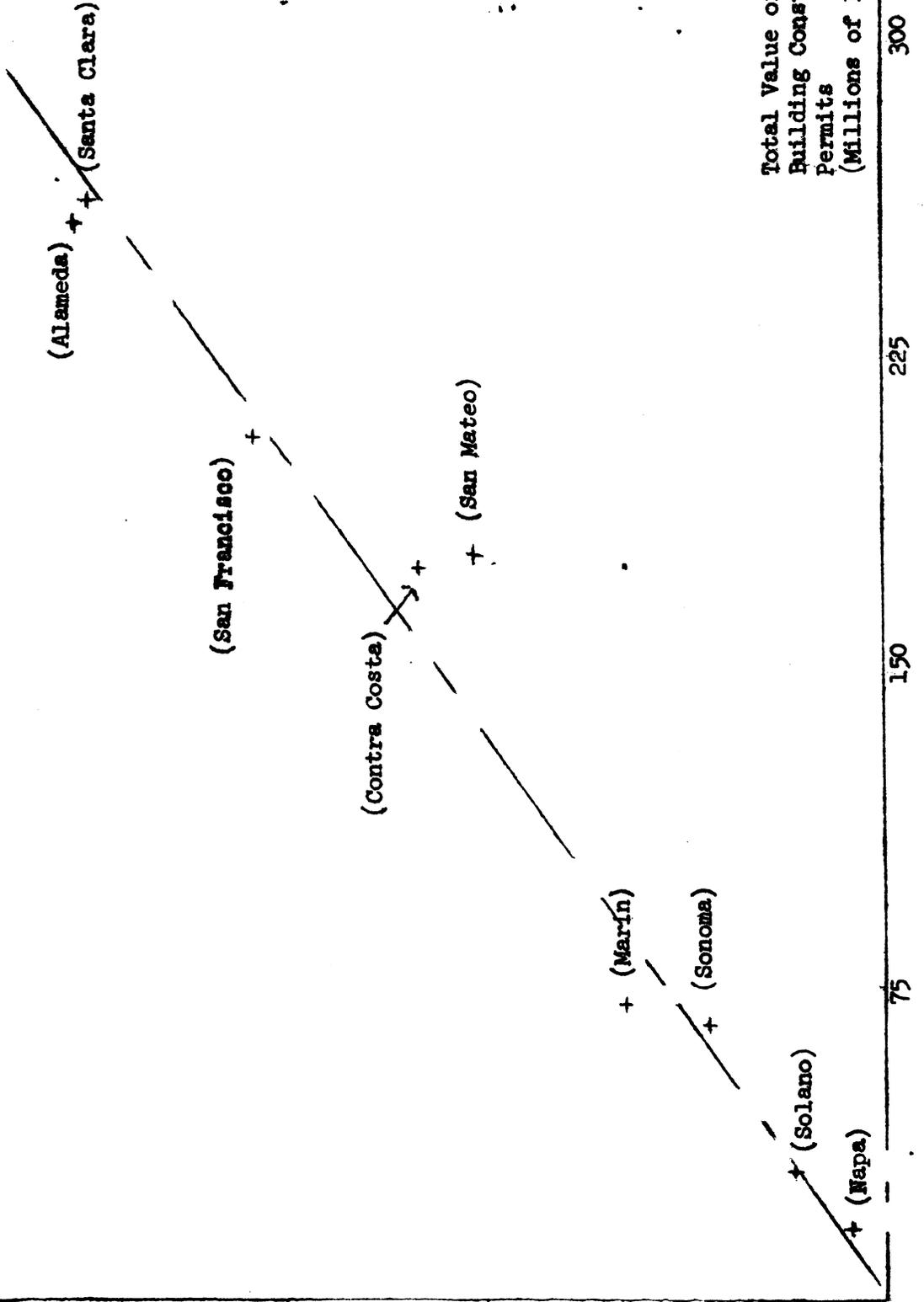
Millions of Manhours Worked

7.5

5.0

2.5

0



Total Value of all Building Construction Permits (Millions of Dollars)

300

225

150

75

Table 15

Comparative Rankings of Total Workers, Mean Manhours, and
the Total Value of all Construction Permits,
Nine Bay Area Counties, 1965

County	Total Number of Workers (1)	Ranks		
		Total Workers (2)	Mean Manhours (3)	Total Construction Permit Value (4)
Alameda	4,920	2	2	2
Contra Costa	2,849	4	3	5
Marin	1,636	6	5.5	6
Napa	241	9	5.5	9
San Francisco	3,815	3	1	3
San Mateo	2,531	5	4	4
Santa Clara	5,006	1	7	1
Solano	582	8	8	8
Sonoma	1,183	7	9	7

The above analysis indicates that ~~at least for 1965~~ both the total number of manhours and the number of men were highly related to total construction permit value. Mean manhours, however, did not reflect the wide variation in building value.

Appendix A

Locals in the Carpenter's Union in 46 Northern California Counties

I. General Carpenter Locals

<u>Local #</u>	<u>City</u>	<u>County</u>	<u>Region</u>
316	San Jose	Santa Clara	San Francisco Bay
668	Palo Alto	Santa Clara	San Francisco Bay
1280	Mountain View	Santa Clara	San Francisco Bay
2006	Los Gatos	Santa Clara	San Francisco Bay
354	Gilroy	Santa Clara	San Francisco Bay
2478	Gilroy	Santa Clara	San Francisco Bay
162	San Mateo	San Mateo	San Francisco Bay
828	Menlo Park	San Mateo	San Francisco Bay
848	San Bruno	San Mateo	San Francisco Bay
1408	Redwood City	San Mateo	San Francisco Bay
22	San Francisco	San Francisco	San Francisco Bay
483	San Francisco	San Francisco	San Francisco Bay
1047	San Francisco	San Francisco	San Francisco Bay
2164	San Francisco	San Francisco	San Francisco Bay
35	San Rafael	Marin	San Francisco Bay
1710	San Rafael	Marin	San Francisco Bay
36	Oakland	Alameda	San Francisco Bay
194	San Lorenzo	Alameda	San Francisco Bay
1158	Oakland	Alameda	San Francisco Bay
1473	Oakland	Alameda	San Francisco Bay
1622	Hayward	Alameda	San Francisco Bay
642	Richmond	Contra Costa	San Francisco Bay
2038	Antioch	Contra Costa	San Francisco Bay

<u>Local #</u>	<u>City</u>	<u>County</u>	<u>Region</u>
2046	Martinez	Contra Costa	San Francisco Bay
180	Vallejo	Solano	San Francisco Bay
2114	Napa	Napa	San Francisco Bay
751	Santa Rosa	Sonoma	San Francisco Bay
981	Petaluma	Sonoma	San Francisco Bay
2422	Sonoma	Sonoma	San Francisco Bay
2056	Kelseyville	Lake	North Coast
2143	Ukiah	Mendocino	North Coast
1376	Ft. Bragg	Mendocino	North Coast
960	Fortuna	Humboldt	North Coast
1040	Eureka	Humboldt	North Coast
2455	Crescent City	Del Norte	North Coast
1599	Redding	Shasta	Sacramento Valley
1254	Red Bluff	Tehama	Sacramento Valley
2043	Chico	Butte	Sacramento Valley
1240	Oroville	Butte	Sacramento Valley
1570	Yuba City	Sutter	Sacramento Valley
1970	Greenville	Plumas	Sierra
2035	Kings Beach	Placer	Sierra
1789	Al Tahoe	El Dorado	Sierra
1903	Grass Valley	Nevada	Sierra
1992	Placerville	El Dorado	Sierra
1522	Sacramento (Sutter Creek)	Amador	Sierra
386	Angels Camp	Calaveras	Sierra

<u>Local #</u>	<u>City</u>	<u>County</u>	<u>Region</u>
1486	Auburn	Placer	Sacramento Metro.
1147	Roseville	Placer	Sacramento Metro.
586	Sacramento	Sacramento	Sacramento Metro.
2170	Sacramento	Sacramento	Sacramento Metro..
1381	Sacramento (Woodland)	Yolo	Sacramento Metro.
266	Stockton	San Joaquin	Stockton Metro.
1418	Lodi	San Joaquin	Stockton Metro.
1869	Manteca	San Joaquin	Stockton Metro.
1235	Modesto	Stanislaus	Stockton Metro.
2189	Madera	Madera	San Joaquin Valley
1484	Visalia	Tulare	San Joaquin Valley
1578	Visalia	Tulare	San Joaquin Valley
2126	Porterville	Tulare	San Joaquin Valley
1043	Hanford	Kings	San Joaquin Valley
2233	Avenal	Kings	San Joaquin Valley
701	Fresno	Fresno	Fresno Metro.
1004	Selma	Fresno	Fresno Metro.
1323	Monterey	Monterey	South Central Coast
925	Salinas	Monterey	South Central Coast
1279	Salinas	Monterey	South Central Coast
771	Watsonville	Santa Cruz	South Central Coast
829	Santa Cruz	Santa Cruz	South Central Coast

II. Specialty Trade Locals

<u>Local #</u>	<u>Name</u>
34	San Francisco Pile Drivers
42	San Francisco Mill Cabinet
102	Oakland Millwrights
478	Oakland Shinglers
550	Oakland Millmen
1861	Oakland Floorlayers
3116	Oakland Drydock, etc.
3107	Mt. View Hardwood Floor
1051	Sacramento Millwrights
1288	Chico Millwrights

Appendix B

Computer Methodology

The raw data on which this report is based were received in the form of IBM data cards from the Carpenters Funds Administrative office of Northern California. There were two cards which specified all the available information for each individual carpenter. The cards were loaded to tape on the (IBM) 7040-7090 system at the Computer Center of the University of California. It is recommended that in future work of this type an effort should be made to get the raw data already on tape, thereby eliminating an expensive, time-consuming and physically difficult step.

The union locals were renumbered and regrouped by a three-digit code to facilitate manipulation of the data. The first digit of the three numbers, from one to five, divided individuals as follows:

1. San Francisco Bay Area
2. Non-San Francisco Bay Area
3. Specialty Trades
4. Blank, no local number
5. Other locals, not within the Northern California region

The second digit, from one to nine, divided the San Francisco Bay Area into nine constituent counties and divided the non-San Francisco Area into nine regions.

The third digit of the code represented the number of the local within the larger categories.

The number of manhours was divided into nine categories. The first grouping, "less than 340 hours," was used for reasons stated earlier in this report.* The other categories, with the exception

*See page xviii.

of the highest, are of equal size, or 300 manhours. The final category was selected to provide a finite upper limit of ~~2800~~ manhours; it was found that no carpenter worked in excess of that number of hours in 1965.

Age was divided into eight categories, including one category for those of unknown age; in some cases the Pension Fund data do not give the worker's age. The raw data show birth data, rather than age; it was simple, however, to translate birth date into age by subtracting the former from 65. It should be pointed out that birth date (which was given in the raw data as the last two digits of the birth year) was converted into age after the data were tabulated; this eliminated the need for a machine recoding of the basic data. The age categories were based on what were considered a priori reasonable groupings. It must be noted here that those born in 1900 (i.e., those of age 65) had to be included in the "unknown" category because the program employed could not differentiate between a double blank and a double zero. But a count of the first 1,000 individuals found only 5 born in the year 1900; thus the error in final result from this source is probably not over the order of one-half of one percent.

Percentages were calculated to the nearest one-tenth of one percent. Both row and column percentages could be calculated simultaneously for all tables, resulting in a substantial saving of time and money.

The tabulations were performed using the General Statistical Report Program (Modification 4) developed by the Division of Research, Data Processing Center, California State Department of Public Health.