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**CRAFT WORKERS' EXPERIENCES
WITH AND ATTITUDES
TOWARDS MULTISKILLING**

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EXECUTIVE SUMMARY

This report presents research results from a project sponsored by the Alfred P. Sloan Foundation's Center for Construction Industry Studies. The purpose of this project is to determine construction craft worker's attitudes towards and experiences with the labor utilization strategy known as multiskilling. Over 1,100 craft workers across the United States were surveyed as part of this research effort. Of the workers surveyed, approximately 70% have worked outside of their primary trade. Over 79% are interested in learning more skills in their primary trade while 57% are interested in learning skills in other trades. In addition, workers feel that multiskilling will positively affect their work by allowing them to work more, stay on projects longer, receive better pay, create more mentally challenging jobs, and stay with the same company longer. Analysis also indicates that multiskilling allows merit and open shop workers to work more weeks per year and to achieve a better income.

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CHAPTER 1: BACKGROUND AND METHODOLOGY

1.1 Introduction

In a report by the Business Round Table (BRT), a shortage of skilled construction workers was cited as the primary problem facing the construction industry in the late 1990's (BRT, 1997). The poor image of the construction industry makes it difficult to attract skilled labor. Lack of continuous employment, low real wages, inability to complete entire job tasks, and large amounts of idle time are primary demotivators for workers causing them to leave construction in search of jobs in other industries. Other industries are more attractive because they have environments which are less harsh, cleaner, and safer. In order to retain current workers and to recruit new workers, it is necessary to find ways to improve the construction industry. One potential solution to this problem is multiskilling.

1.2 Multiskilling Defined

Multiskilling is a labor strategy which seeks to utilize the current workforce more effectively and to provide better career opportunities for construction workers by offering continuous employment on the site and within the company (Burleson, 1997). With multiskilling, "workers possess a range of skills that are appropriate for more than one work process and that are used flexibly on a project or within an organization" (Burleson, 1997). Preliminary research on this concept has shown that in addition to reducing the numbers of skilled workers needed, multiskilling has resulted in benefits to owner organizations, project managers, and workers (Stanley, 1997).

1.3 Objectives and Scope

The first objective of this study is to investigate craft workers' experiences with multiskilling. It is desired to determine the extent to which multiskilling is used currently on job sites.

The second objective of this study is to investigate craft workers' attitudes towards multiskilling. It is expected that an understanding of construction workers'

attitudes will help to better determine the potential of this strategy and help to implement it more effectively.

The scope of this study was limited to the US construction industry's workforce, but includes both the union and nonunion sectors of the industry.

1.4 Literature Review

While many studies on multiskilling have been conducted in related industries (Cross, 1994); (Haddad, 1996); (Ozaki, 1996); and (Parker, 1996), research studies on the subject of multiskilling in construction have been limited. Burleson's research focuses on the potential economic ramifications of using various levels of multiskilled workers on a hypothetical project, the CII Model Plant (Burleson, 1997). This model, which represents a typical petrochemical facility, was adopted for the research endeavor. Three large construction companies assisted in planning, scheduling, and staffing the CII Model Plant with materials, equipment, and labor resources to simulate a real grass-roots petrochemical project. The baseline model, with its labor resources, was entered into a scheduling software package. The software produced labor resource profiles for numerous skill combinations.

Four different multiskilled trade groups were defined. The multiskilled group which performed the best was a four-trades approach in which workers were placed in one of the following work categories: civil, mechanical, electrical, or general support. This strategy resulted in a 35% reduction in project workforce and a 47% increase in average employment duration. An economic model was produced which could estimate the potential savings using a multiskilled labor strategy opposed to a traditional labor strategy. Potential total project labor cost savings of 5% were reported. Additional potential labor productivity improvements were claimed but were not reported, because of a lack of statistically significant verification.

Three subsequent studies were completed at The University of Texas at Austin (Stanley, 1997); (Villalobos, 1997); and (Rodriguez, 1998). Stanley's research explores the potential benefits and limitations associated with the implementation and use of multiskilling. Two current practice surveys were administered to seven different

companies. In addition, a case study of multiskilling implementation was observed (Stanley, 1997).

Villalobos' research attempted to develop and model an implementation process for changing to a multiskilled labor strategy. The research built upon data from Burleson's research and used several literature sources to construct a conceptual model for the implementation process (Villalobos, 1997).

Lastly, Rodriguez's research focused on planning and scheduling techniques for a multiskilled workforce. Five companies who use a multiskilled workforce were located and their current practices were thoroughly evaluated and compared. A methodology for planning and scheduling a multiskilled workforce was developed based on this work (Rodriguez, 1998).

While these research efforts evaluated the multiskilling labor utilization strategy from the project, owner, and contractor perspectives, this study sought to evaluate multiskilling from the craft worker perspective.

1.5 Methodology

The methodology used in this study consisted of three main parts: interviews, pilot tests, and the primary survey. First, interviews were performed with craft workers on a construction job site in Austin, Texas. The purpose of the interviews was to obtain qualitative responses that provide rich, in-depth information. After completing 15 interviews, a survey was formulated using knowledge gained from the responses received in the interviews. To ensure the quality of the survey, the survey was pilot tested on three construction job sites, also located in Austin Texas. Necessary adjustments were made to the survey after each pilot test. After the third test, the survey version was finalized, then distributed by mail to companies across the U.S., and to the United Brotherhood of Carpenters & Joiners of America.

1.6 This Report

The following discussion in this report focuses on the survey methodology, a presentation and analysis of results, and conclusions and recommendations. Analysis of the survey data is not yet complete.

CHAPTER 2: SURVEY METHODOLOGY

2.1 Craft Worker Interviews

The purpose of the interviews was to obtain qualitative information on craft workers thoughts and attitudes towards learning additional skills and training. A series of fifteen interviews were conducted on a commercial job site located in Austin, Texas. The company provided minimal assistance with the interviews. Permission was granted to interview workers, but only during the workers' half-hour lunch break and only if the interviews were performed off-site. Previously defined interview principles were followed (Babbie, 1973).

Over the course of approximately 4 weeks, fifteen interviews took place. Two versions of the survey were drafted, one English and one Spanish. A second interviewer who speaks fluent Spanish assisted by interviewing those workers who did not speak English very well or at all. Due to regional influences, it was necessary to have the second interviewer. In Texas, there is a prevalence of construction workers who only speak Spanish. The interview questions are included in Appendix B.

2.2 Pilot survey

The design of a survey is difficult and yet crucial. Improper design of a survey causes the data to be skewed or biased and incorrect assumptions to be made. Therefore, the surveys were written, edited, and revised in an iterative process. The survey was written in a multiple choice and fill in the blank format to assist with later analysis of the data. The portion of the survey pertaining to demographic information about the workers is in the fill-in-the-blank format, while the questions pertaining to multiskilling have multiple-choice answers.

After completion of the survey formation, a pilot test was distributed to three different job sites in Austin, TX. The company used for the pilot testing assisted the research by distributing the survey to workers on-site. During the first pilot test, surveys were distributed to workers through their superintendents. Workers then submitted the completed surveys to the project manager within one week. During the second and third

pilot tests, the surveys were distributed and picked up during one lunch hour. Workers filled out the survey on-site during this time.

After the return of the surveys, the data was analyzed. A Microsoft Access database was designed to organize all of the survey data and report some statistical analyses. In addition, SPSS, a regression analysis program, was used to assist with further analysis.

2.3 Primary Survey

After completion of the beta tests, the survey was finalized and over 1400 surveys were mailed out to 11 sources. The companies used for the survey were contacted concurrently to the formation of the survey. It was determined that a diversity of workers must be ensured so as to not bias the results. Ten companies and one building trade union agreed to assist with the survey. Eight of the companies are located in the Gulf Coast region of the U.S. One company is located in the northeast region of the country, and the other company is located in the mid-west region of the U.S.

The participant organizations agreed to distribute a specified number of surveys at their project sites. The specified number of surveys was then sent to the participants along with a letter describing the preferred method of distributing and picking up the surveys, during one lunch hour. After workers had completed the survey, the surveys were then returned by mail. The data from the surveys was entered into a database and then analyzed. The participating organizations are shown in Table 2.1.

Table 2.1 Participating Organizations

Austin Commercial	Austin Industrial
BE&K	Brown & Root
Cianbro Corporation	Fru-Con Construction
HB Zachry Company	The Mundy Company
Phillips Petroleum	Turner Construction
The United Brotherhood of Carpenters & Joiners of America	

CHAPTER 3: PRESENTATION AND ANALYSIS OF RESULTS

3.1 Response Rate

Initially, contacts from 35 companies and organizations were sent a letter describing the research. Enclosed with the letter was a preliminary draft of the survey, so that contacts could observe the types of questions the survey would ask the craft workers. The company contact names were obtained through CII and CII-affiliated research teams. Due to the controversial nature of some of the questions, only 10 of the 35 organizations contacted agreed to assist with the survey. The survey is included in Appendix C.

Although the survey contacts were obtained through CII, this has limited influence on the survey's results. The craft workers who ultimately completed the survey were a random combination of the companies' workers and workers of the subcontractors used on projects.

Copies of the surveys were made and mailed to the companies. The exception to this procedure was the United Brotherhood of Carpenters and Joiners Union (UBC). The UBC agreed to distribute the survey at an annual instructor apprenticeship training conference, but time constraints did not permit the surveys to be copied and then mailed. Instead, a final copy of the survey was faxed to the UBC, and they duplicated and distributed the survey at the conference.

Of the 1400 surveys that were mailed to the nine companies, 806 were returned, providing a response rate of 57.6%. Two hundred and twenty-eight surveys were received from the annual carpenter's instructor apprenticeship training conference, which totals 1034 returned surveys. Subsequent to the drafting of this report, 55 additional surveys were received. They will be incorporated in future analyses.

3.2 Study Population

Demographic factors greatly influence the workforce. Age, gender, socioeconomic level, and education all affect a person's interests, decision making, and reactions. Therefore, it is important to determine the respondents' demographics because it is one key to understanding how and why respondents answer a particular way.

Secondly, by comparing the demographics of the study population to those of the U.S. population, it is possible to see if the sample is representative. The validity of the data is based in part on this factor.

3.2.1 Age, Race, and Gender

The average age of the entire sample is 39.3 years with a standard deviation of 11.2 years. It is 46.3 years for the union workers and 36.5 years for the nonunion workers. The overall average age of 39.3 years corresponds to the average age of 38 years for construction workers published in *The Construction Chart Book* (Center to Protect Workers' Rights, 1997). The difference in ages between union and nonunion workers can be explained by the following two reasons. First, fewer workers are entering apprenticeship training programs. Since the 1970s, there have been decreasing numbers in the building trades (Allen, 1994). Secondly, the majority of the union respondents from this sample were being trained to become instructors of apprenticeship programs. Of the 723 respondents to the question "Are you a union member," 240 responded yes while 483 responded no. Two hundred and twenty-eight of the 240 respondents were participants in the annual instructor apprenticeship training conference. Respondents in this training conference are older because they have already been through apprenticeship training and have worked in the field for several years. Some of those attending the conference are foremen. For these reasons, the average age of union members in the survey is higher.

The ethnicity of a sample can be closely linked to geographic factors. Respondents were asked "Which state are you currently working in?" Table 3.1 shows how the fifty states and the District of Columbia are represented in the survey results.

Table 3.1 States Represented in Survey Sample

State	No. of Responses	State	No. of Responses	State	No. of Responses
Alabama	37	Kentucky	1	North Dakota	1
Alaska	1	Lousiana	80	Ohio	14
Arizona	2	Maine	152	Oklahoma	0
Arkansas	0	Maryland	0	Oregon	5
California	11	Massachusetts	6	Pennsylvania	19
Colorado	2	Michigan	14	Rhode Island	1
Connecticut	6	Minnesota	3	South Carolina	0
Delaware	0	Mississippi	1	South Dakota	0
D.C.	1	Missouri	10	Tennessee	23
Florida	10	Montana	0	Texas	469
Georgia	1	Nebraska	0	Utah	0
Hawaii	0	Nevada	7	Vermont	0
Idaho	0	New Hampshire	10	Virginia	0
Illinois	9	New Jersey	8	Washington	16
Indiana	18	New Mexico	0	West Virginia	0
Iowa	9	New York	11	Wisconsin	0
Kansas	0	North Carolina	35	Wyoming	0

The table shows that 469 of the respondents were working in Texas at the time of the survey. The small numbers from some states are related to the union respondent's diverse representation at their training conference. Because of the large Hispanic population in Texas and the Gulf Coast region, the ethnicity of the survey sample should tend to be influenced by this fact. Figure 3.1, however, which shows the survey sample's ranges of ethnicity, is not as highly influenced as might be expected.

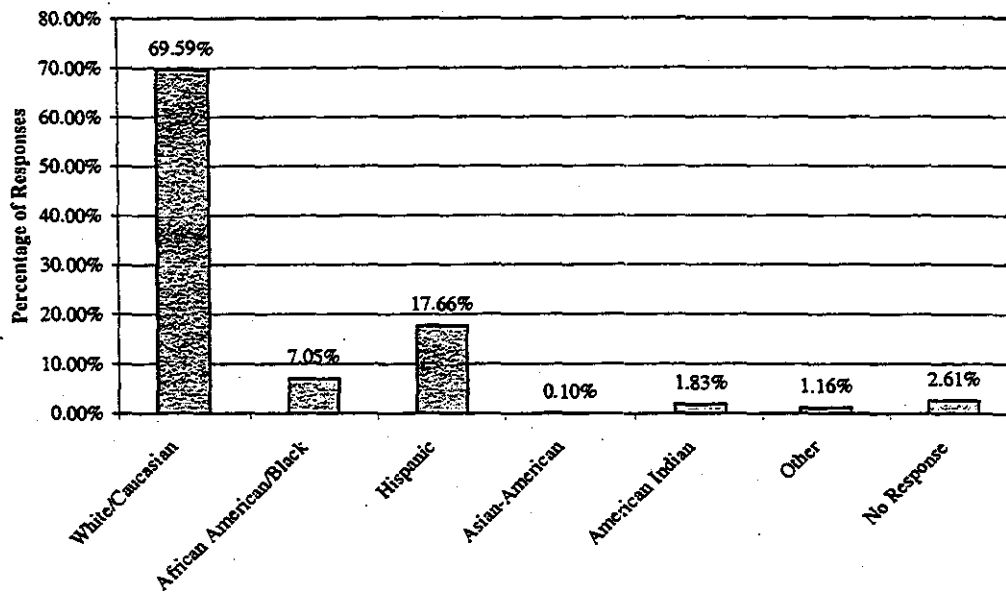


Figure 3.1 Craft Workers' Ethnicity

Only 17.7% of the respondents are Hispanic. It is expected that a larger percentage of the respondents would be Hispanic, because 45.3% of the craft workers in Texas are Hispanic. The discrepancy can be explained by the fact that the survey was only distributed in English and not Spanish. The project managers and field personnel distributing the survey were probably biased in distributing the survey to only those workers who can read and write in English, thereby reducing the number of Hispanic workers surveyed.

The percentages of respondents in the other ethnicity categories correspond well to the ethnic comparisons of the work force described by the Bureau of Labor Statistics and Hudson Institute projections (Judy and D'Amico, 1997). In these projections, the percentages of White, African-American, Hispanic, and Asian members of the year 2000 workforce are 74%, 11%, 10%, and 5%, respectively.

From the survey, only 4.2% of the respondents are female while 95.8% are male. The 1997 Center to Protect Workers' Rights (CPWR) survey found approximately 10% of the workers in construction to be women. Because the CPWR statistics include administrative support and management, while this survey focused on hourly workers, the numbers found in this survey are not surprising.

3.2.2 Workforce Skill Levels, Education, and Literacy Levels

Another aspect of the demographics of the workforce that should be considered is the education level of workers. In the 1992 National Adult Literacy Survey, it is reported that an estimated 40 million Americans over the age of 16 have only rudimentary reading and writing skills (National Center for Education Statistics, 1996). This accounts for approximately 21 % of the adult population in 1992. Another study related directly to the construction work force was performed in Birmingham, Alabama. This study found that the local construction work force's literacy levels were not significantly different from the national population's levels and in some respects slightly higher than average (Crowley, Lutz, and Burleson, 1997). Perhaps this fact would be consoling except that the literacy level of the nation as a whole is so low. These statistics directly affect the construction industry.

With the construction industry, general worker education level is important for several key reasons. Reading, drawing interpretation, and problem solving skills are involved at even the lowest levels of construction. Workers must be able to read and understand construction drawings from which they work. To make matters worse, the design professionals that construct these documents may expect literacy levels higher than what may be actually observed.

Figure 3.2 shows the level of education of the workers surveyed. Respondents were invited to answer as many times as was applicable. The chart shows that most workers have a high school diploma or GED equivalent and many have had "some college."

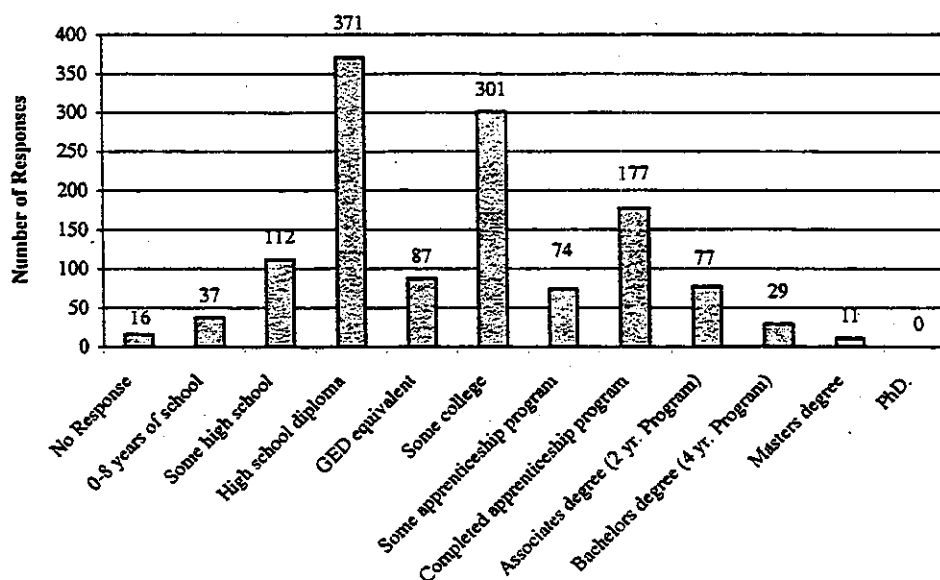


Figure 3.2 Workforce Skill Levels, Education, and Literacy Levels

In addition, the survey asked for a numeric response for number of years of education received. The average years of education are 12.3 years; they were 13.6 years for union and 11.8 years for non-union workers. While these statistics are positive, because they show that many workers have at minimum a high school diploma or GED equivalent education, what they do not show is those workers who did not or could not fill out the survey due to illiteracy. As mentioned earlier, the field personnel distributed the survey and may have been unintentionally discriminate, thus affecting survey results. Therefore, many non-English speaking employees and possibly some illiterate workers may not have filled out the survey. Also, the response rate for the survey was only 57.6% for those surveys mailed to companies, while 42.4% of the remaining surveys were either never distributed, or distributed and never returned to the field personnel for various reasons. Therefore, it is difficult to know the true education and literacy levels for workers in the construction industry. The statistics found in this survey, as well as others, tend to be flawed for these reasons.

3.3 Survey Questions

The following section discusses the workers' responses to the survey questions. Before distributing the survey, each of the companies had the opportunity to review it.

Due to the controversial nature of the first three questions, one company requested that those questions be omitted. Therefore, 309 of the returned surveys did not contain these questions.

The first question asked, "What type of construction projects do you work on?" Of those workers who were asked this question, approximately 30.1% work on only union projects, 59.9% work on only nonunion projects, and 9% perform on both types.

Question two asked, "Are you currently a union member?" Of those asked, 33.3% responded yes and 66.7% responded no. To support question two, question three asked if workers had "ever been a union member?" Over 44.6% said yes while 51.5% said no. Obviously many workers have participated in unions, but for one reason or another a small percentage do not any longer.

In order to determine if the sample had a random distribution of trades and skill levels represented, the following questions were asked, "What do you consider your primary trade," and "What do you consider your skill level to be in your primary trade?" Figure 3.3, Craft Workers' Primary Trade, shows the distribution of trades represented in the sample.

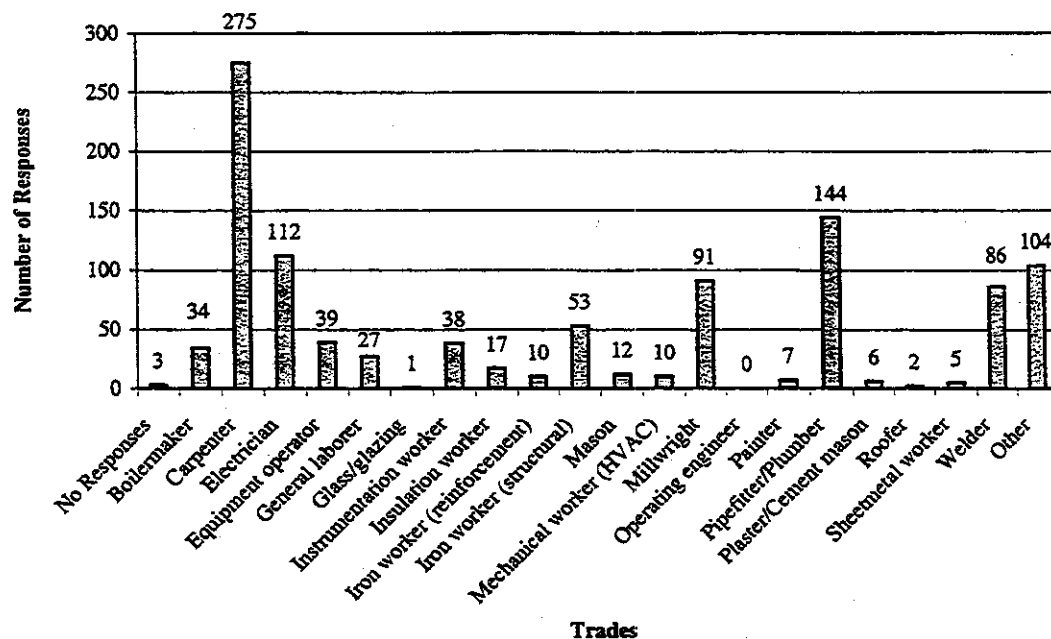


Figure 3.3 Craft Workers' Primary Trade

With the exception of carpenters, the sample is well distributed. The instructor apprenticeship training conference was for carpenters, thus explaining the large number of carpenters in the sample. When workers were asked their skill level in their primary trade, their choices were “unskilled,” “semi-skilled,” or “skilled” if they were non-union, and “apprenticeship” or “journeyman” if they were a union member. The category choices for union workers are definitive and more meaningful than those categories for non-union workers, but due to the lack of a standard training program for the nonunion sector, there were no other descriptive category choices. Approximately 1% of the respondents answered as unskilled, 17% semi-skilled, 55.8% skilled, 1.2% apprentices, and 24.5% journeyman. Workers were then asked, “Are you pleased at your current skill level?” Of the survey respondents, 66.6% replied that they were pleased at their current skill level and 32.5% replied that they were not pleased.

Training is an important part of whether or not people feel comfortable in their job and are interested in learning new skills. For this reason, workers were asked how they acquired skills in their primary trade. Figure 3.4 shows the workers' responses.

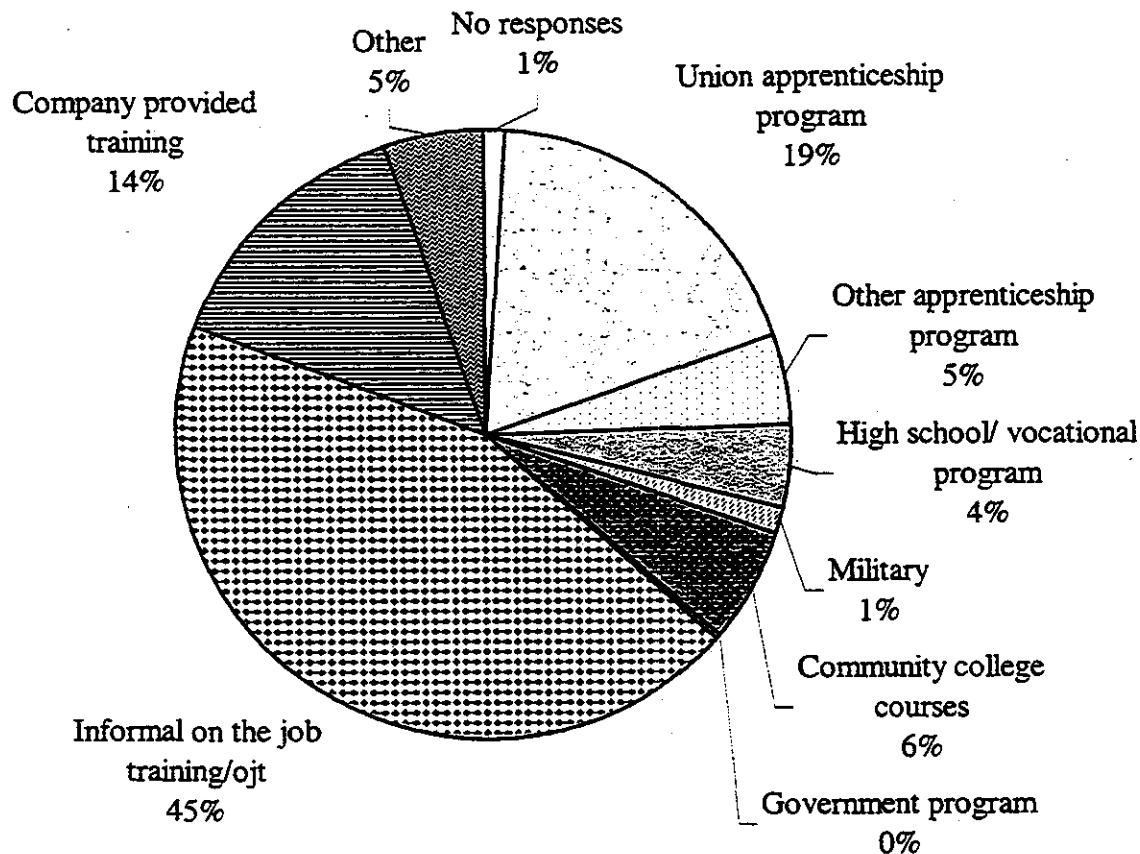


Figure 3.4 Craft Workers' Acquisition of Skills

Almost half of the workers received no formal job training, only informal on the job training. This response is expected because a majority of the sample is non-union and there are few formalized training programs in the non-union sector.

Questions eight and nine ask two questions which get to one of the main objectives of this research; are workers interested in multiskilling? Question eight asked workers if they are interested in learning more skills in their primary trade. More than 79% are interested in learning more skills in their primary trade, while 18% are not. Question nine asks more broadly if workers prefer to "Learn about one or a few skills, specialize, or learn about many skills." The workers responded that 28.5% prefer to specialize, 68.8% would like to learn about many skills, and 2.7% provided no answer. These two questions are similar, but the responses differ by over 10%, showing some inconsistency in the worker's responses.

Question 10 seeks to learn craft workers' experiences with multiskilling. It asked workers if they have "worked in trades other than [their] primary trade." Then the question proceeded to ask which other trades respondents have worked in and what their estimated skill level is in that trade. Approximately 70% of the respondents have worked in trades other than their primary trade, while 25% have not worked in other trades, and 5% did not respond to this question. The responses from this question show that multiskilling in one form or another already occurs on the job site. Although it was suspected that multiskilling has been occurring, the extent of it was unknown. Figure 3.5 shows the other trades that craft workers have participated in. It also shows what craft workers estimate their skill level to be in that trade. Some trades that are missing from the top 10, such as electrician, may be the most difficult to learn. Future analysis should seek to identify the most common combinations.

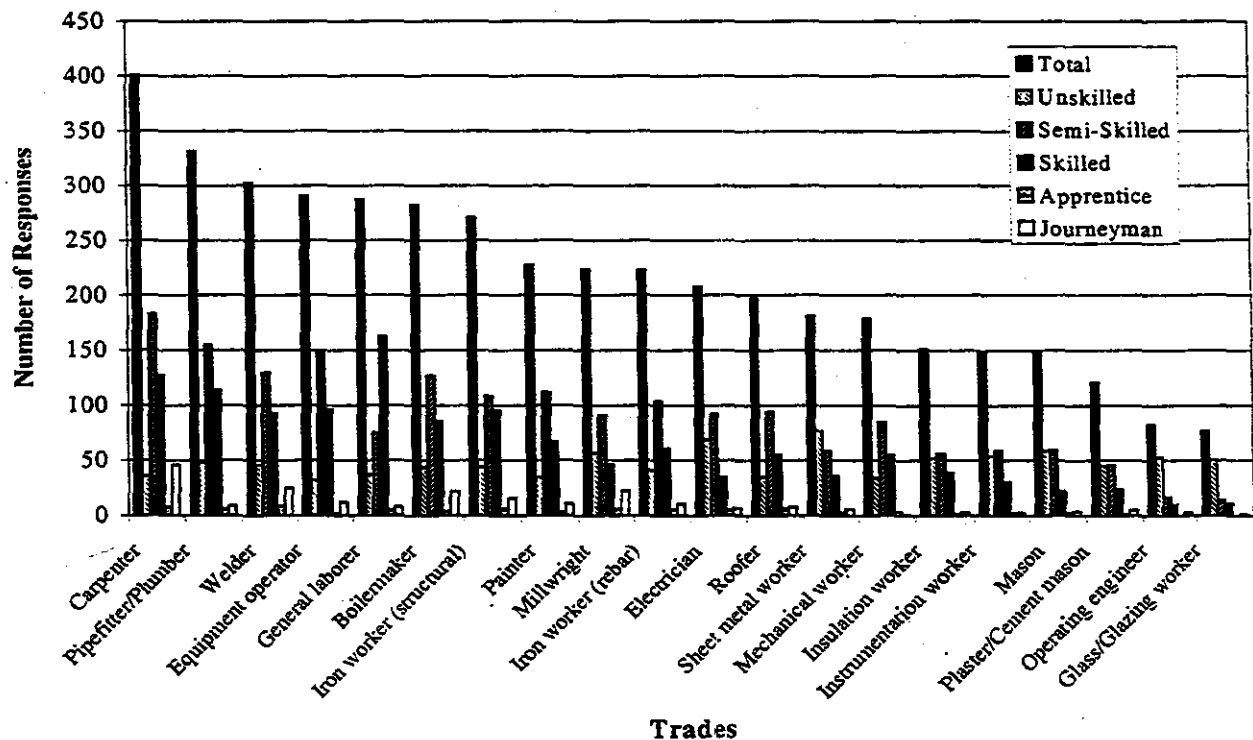


Figure 3.5 Craft Workers' Estimated Skill Level in Trades They Have Worked In Other Than Their Primary Trade

Workers estimate that they have worked in many trades and that their skill level in those trades are at a minimum “semi-skilled.” This is highly unlikely, but it is difficult to assess what workers real skill levels are without extensive testing.

Question 11 asks workers if they are “interested in learning skills in a trade other than [their] primary trade?” The response was that 57% are interested in learning skills in a trade other than their primary, while 34.9% are not. These statistics are within the range of responses to questions eight and nine. This shows a link and some logical consistency between the workers' responses. The phrasing of this question may have been interpreted as learning skills in another trade in order to switch trades. For clarity, the question should have asked workers if they were interested in learning skills in a trade in addition to their primary trade. Regardless, misinterpretation of this question may have only prevented some workers from responding positively to it. Therefore, at least 57% of the respondents are interested in learning skills in a trade in addition to their primary trade.

Workers were asked to pick which trades they would be interested in learning. Figure 3.6 shows the distribution of these trades.

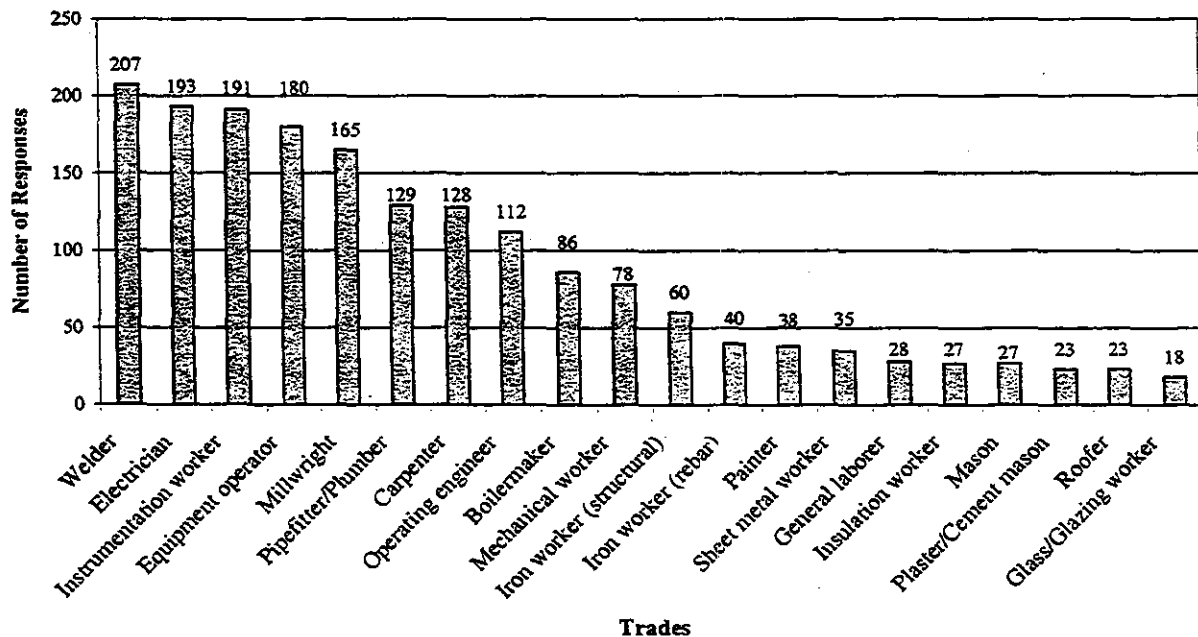


Figure 3.6 Trades Craft Workers are Interested in Learning

While some trades are more attractive to work in than others, such as instrumentation work and electrician work, it is clear from this figure that they are more difficult trades to enter. The next question determined why workers were interested in learning trades other than their primary trade. The top reasons can be seen in Figure 3.7 below.

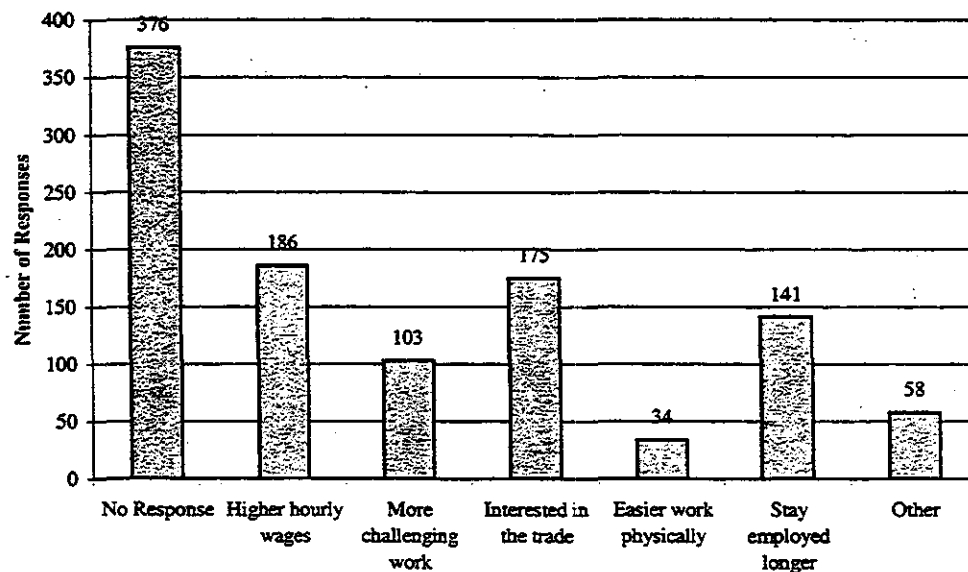


Figure 3.7 Reasons for Learning Another Trade

The top reasons were for higher pay and because of an interest in the trade. The fact that the number of responses for these two reasons is almost equal is encouraging because it shows that workers want more out of their jobs than just pay. They are interested in job satisfaction as well. There was potential for misinterpretation of this question due to the wording of the preceding question.

The next question asked workers "If you were offered the chance to train in another trade for free, would you be interested?" About 75% of the survey's respondents replied they would be interested, 21% said they would not be interested, and 4% did not respond. Free training would entice some of the workers to learn another trade. Question

13 related very closely to question seven. It asked workers "What do you feel is the best way to learn construction trade skills?" Figure 3.8 shows the workers' responses.

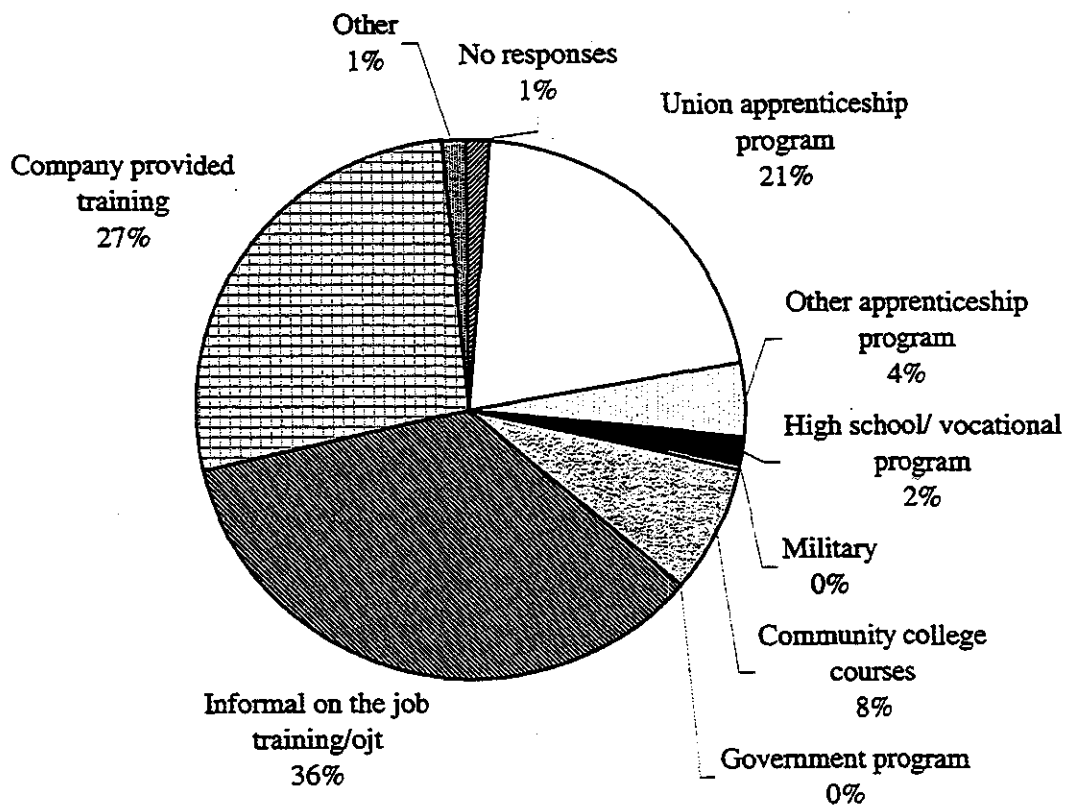


Figure 3.8 Preferred Method of Acquiring Skills

The purpose of this question is to compare how workers had received training, if any, to how they feel training should occur. The two charts are very similar except that many more workers believe that companies should provide training for their employees. This leads into question 14, "Who do you think should pay for construction training?" Of those who responded to the question, 18% believe the company (owner) should pay for construction training, 43.2% feel the contractor they work for should pay, 2% believe the workers should pay, and 34.5% believe that both workers and the contractor should pay

for training. Of the respondents surveyed, only 12.7% are currently being trained in another trade.

The next set of questions use a Likert scale to determine workers' feelings towards a statement. The scale is from one to five, one being strongly disagree and five being strongly agree. Table 3.2 shows the statements and the average scores for each statement. The average scores disregard those participants who did not respond. Some redundancy in the questions was built-in to facilitate analysis of the rationality and consistency of the responses. Generally, they are consistent.

Table 3.2 First Statement Set with Corresponding Average Scores

Statement	Average Score
I enjoy my work.	4.25
I would like a more challenging job.	3.49
I enjoy working on my current project.	4.07
I work too many hours each week.	2.47
I enjoy working outdoors.	3.95
I should receive better benefits for my work	4.04
I like my boss.	4.01
I receive good pay for my work.	3.38
I am given responsibility at work.	4.19
I would like to work more.	3.32
I receive good benefits for my work.	3.06
I should receive more pay for my work.	4.09
I enjoy my work schedule.	3.84
I am given too much responsibility at work.	2.42
My job challenges me.	3.70
I get plenty of hours to work.	3.45
I enjoy working with the other workers.	4.30
I enjoy working for my current company.	4.23

Many of the average scores are well above four, representing that workers strongly agree with those statements. From the responses above, one could assume that the craft workers:

1. Enjoy their work,
2. Enjoy their current project,
3. Like their boss,
4. Are given responsibility at work,
5. Enjoy working with the other workers,
6. Enjoy working for their current company,
7. Feel they should receive better benefits, and
8. Feel they should receive better pay for their work.

The next question on the survey is also a set of questions using the Likert scale. It is similar to the first, but prefaces the statements with the hypothetical expression, "If you were to learn additional skills in your primary trade or another trade, how would you feel about" the given statements. Table 3.3 shows the statements and the workers' average responses.

Table 3.3 Second Statement Set with Corresponding Average Scores

Statement	Average Score
I would enjoy my work more.	3.88
I would work on the same project longer.	3.62
I would be forced to work more hours.	2.82
I would have more responsibility with my job.	3.73
My job satisfaction would remain the same.	3.22
My job would be more mentally challenging.	3.79
I would receive better pay for my work.	3.63
My work would become more physically demanding.	3.01
My work would be more rewarding.	3.74
I would receive better benefits for my work.	3.25
I would receive the same pay.	3.03
I would have a better work schedule.	2.89
My boss would expect more work from me.	3.42
I would get to work more hours.	3.28
I would work for the same company longer.	3.66

Many of the average scores are well above three (3.50 - 3.99), indicating that workers agree with these statements. Workers believe that multiskilling would:

1. Allow them to enjoy their work more,
2. Stay on a project longer,
3. Allow for more responsibility with their job,
4. Create a more mentally challenging job,
5. Provide better pay for their work,
6. Provide for more rewarding work, and
7. Allow workers to work for the same company longer.

Although the scores may seem indecisive, frequency distribution diagrams indicate otherwise. Figure 3.9 illustrates the responses to the statement, "I would receive better pay for my work," which had an average score of 3.63.

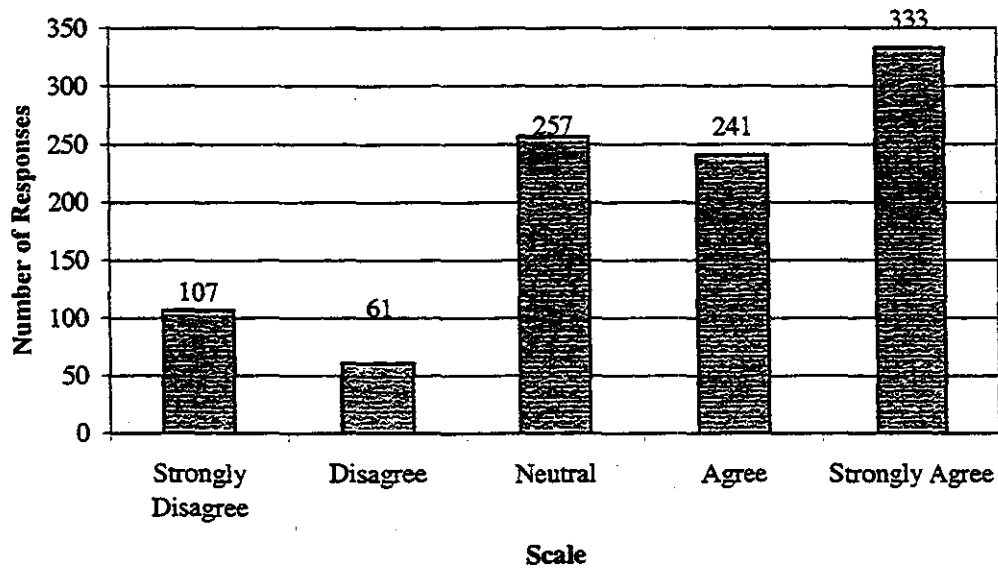


Figure 3.9 Frequency Distribution Diagram for "I Would Receive Better Pay For My Work"

Four of the statements fell into the range of 3.20 - 3.49. In this range of scores, slightly more workers agree than disagree with the statements, but primarily workers are undecided. For example, workers somewhat agree that they would work more hours, as shown in Figure 3.10.

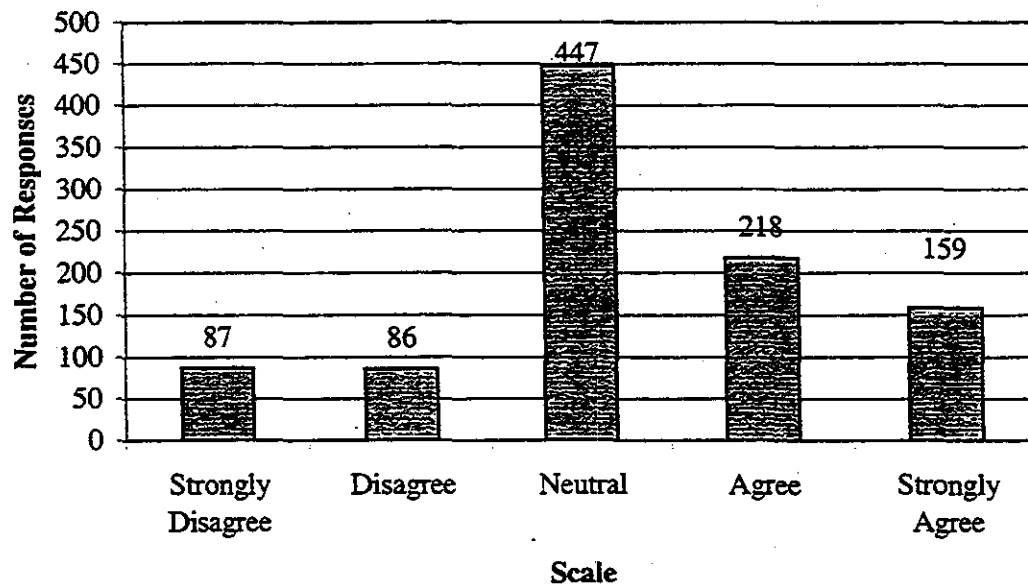


Figure 3.10 Frequency Distribution Diagram for "I Would Get To Work More Hours"

For the remaining statements, the average of the responses fell into the range of 2.80 - 3.19. Statements in this range either had numerous responses on both sides of the scale, or most of the responses were neutral. Workers were undecided if they would be forced to work more hours, if the work would become more physically demanding, if they would receive the same pay, and if they would have a better work schedule. A frequency distribution diagram from this range is Figure 3.11, Frequency Distribution Diagram for "I Would Receive the Same Pay," which has an average score of 3.03.

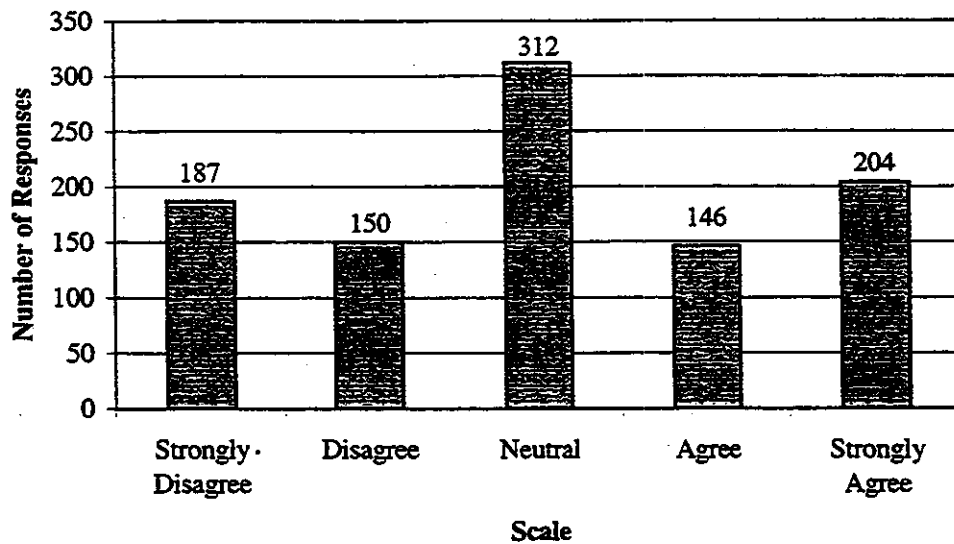


Figure 3.11 Frequency Distribution Diagram for "I Would Receive the Same Pay"

Question 18 asked workers if they believed they would work more if they had additional skills in their primary trade or another. Approximately 66.7% believed that they would work more and 31.7% did not.

The last three questions asked workers about leaving the construction industry. Question 19 asked, "Have you ever considered leaving the construction industry?" 62.5% replied that they had considered leaving and 36.6% replied they had not. The next question asked respondents if they had ever left the construction industry and later returned. 37.5% responded that they had left and returned. The last question asked, "Do you believe that you will leave the construction industry within the next year." 13.9% of the sample believed that they would leave. Reasons cited for leaving varied from the work being physically demanding to health problems.

Lastly, workers were asked to estimate their average hourly wage, average hours worked per week, and average number of weeks worked per year. The average hourly wage for the workers surveyed is \$16.21 with a standard deviation of 5.12. The wages ranged from \$4.35 to \$45.00 per hour. The average hours worked per week ranged from eight to 70 hours a week with the average being 44.17 hours, standard deviation 7.99. The average number of weeks worked per year is 48.28 weeks with a standard deviation of 25.27. The range was two to 52 weeks.

CHAPTER 4: PRELIMINARY DATA CORRELATIONS

4.1 Data Analysis

Having determined that multiskilling has been occurring in the field and that many workers are interested in pursuing multiskilling, the next logical question is, "Is multiskilling a beneficial strategy for workers?" Beneficial, used in this context, can mean increased pay, increased benefits, increased duration on a project, more challenging work, or more rewarding work. The second statement set of Likert scale questions determined that the craft workers believe that multiskilling could provide these benefits, but these are the workers' attitudes and not evidence that the strategy will be advantageous for the workers. Therefore, this section discusses some correlations that were calculated from the data to determine if multiskilling has yet created these benefits for workers.

The first correlation looks at the workers' estimated skill level compared to the number of trades in which the workers stated they have worked. The following graph, Figure 4.1, illustrates whether or not the number of trades that non-union workers participate in has any bearing on the workers' skill level in their primary trade.

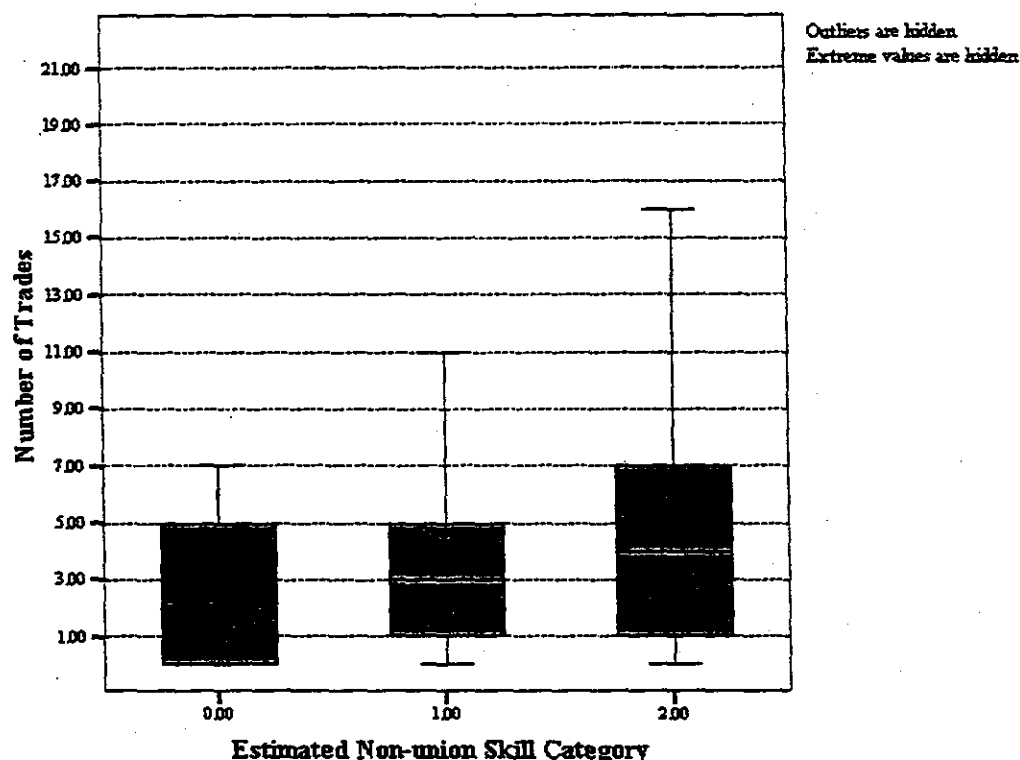


Figure 4.1 Estimated Non-union Skill Level vs. Number of Trades

This graph is a box plot. A box plot is defined as:

A summary plot based on the median, quartiles, and extreme values. The box represents the interquartile range, which contains the 50% of values. The whiskers are lines that extend from the box to the highest and lowest values, excluding outliers. A line across the box indicates the median (SPSS Inc., 1998).

On the x-axis of this box plot, 0 represents those workers who considered themselves unskilled, 1 semi-skilled, and 2 skilled. For a majority of the non-union workers, skill level and number of trades they have worked in outside of their primary trade are not related. Skill level does not seem to have affected the number of other trades in which the workers have participated. Figure 4.2 is a box plot showing the responses of estimated skill level and number of trades from unionized workers.

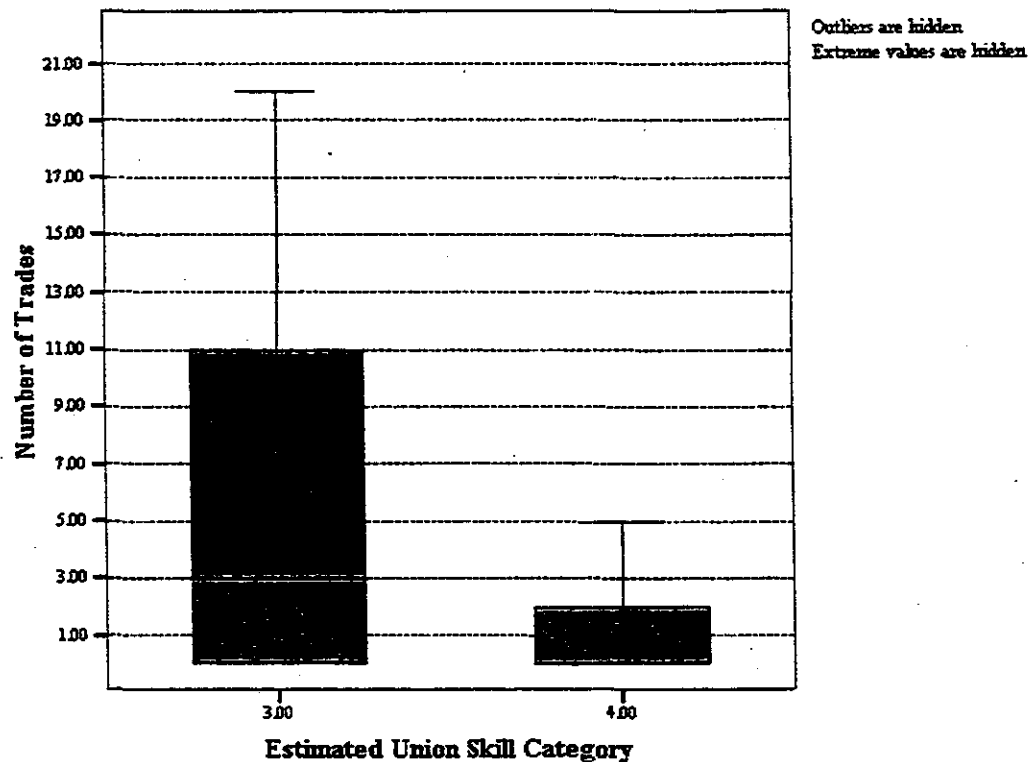


Figure 4.2 Estimated Union Skill Level vs. Number of Trades

In this graph, category 3 and 4 are represented by apprentices and journeyman, respectively. The main idea gathered from this graph is that union apprentice-level workers estimated to have worked in many more trades than their journeyman counterparts. For unionized workers, skill level has an obvious impact on the number of trades in which workers have experience. From these two box plots, a number of different conclusions can be drawn. One conclusion is that older, more experienced unionized workers only work in their primary trade due to their expertise. Along with this conclusion is the idea that younger, less experienced unionized workers must work in a variety of trades due to market demands. The decline of union jurisdictional boundaries dictates that workers must help a total project succeed to have a better chance of obtaining steady employment.

The next graph, Figure 4.3, shows the number of trades workers labor in vs. the workers' average hourly wage.

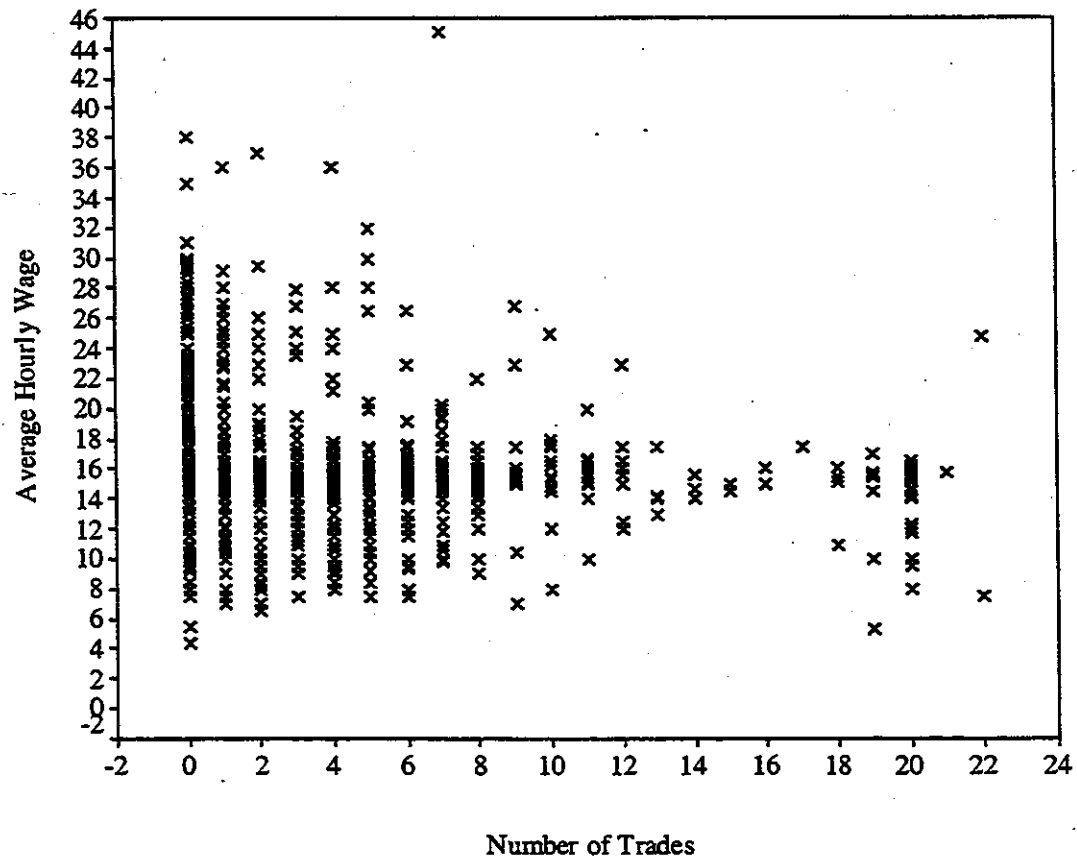


Figure 4.3 Number of Trades vs. Average Hourly Wage

This graph shows that many workers responded that they have worked in almost all of the trades. Because of the weight of the union responses at the low number of trades end of the scale, and because of their relatively high pay level, it is unclear what relationship exists between number of trades and average hourly wage.

Lastly, an examination was made to see if there was a correlation between a worker's job satisfaction and the number of trades in which that worker has labored. Figure 4.4 illustrates this relationship.

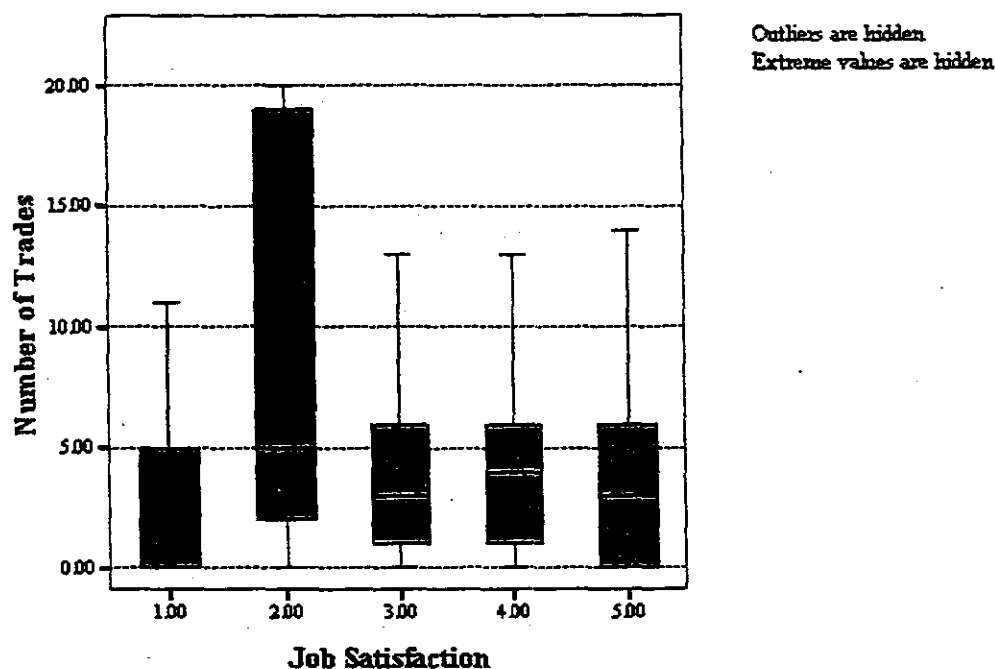


Figure 4.4 Job Satisfaction vs. Number of Trades

In the figure above, job satisfaction was rated on a scale of one to five. Workers were asked to rate the statement, "I enjoy my work." A response of one represents strongly disagree and five represents strongly agree. Those workers who disagree with the statement, but not strongly disagree, are the respondents who maintain that they work in a very large number of trades. It is possible that these are workers who have not settled into one or a few trades at some higher level of skill compensation. All of the other job satisfaction categories show the workers labor in approximately the same number range of trades. From the data, there does not appear to be a correlation between job satisfaction and the number of trades in which a worker has worked.

The preliminary correlation analysis showed significant ambiguity. This does not mean that there are no benefits for multiskilled workers. Currently, it is likely that most workers become multiskilled indirectly and are not hired for this purpose. Many companies are not implementing multiskilling directly and hence are not explicitly compensating their workers for being multiskilled. Certainly the data requires further analysis before any significant conclusions can be drawn in this regard.

4.2 Further Data Analysis and Correlations

The data received from the carpenters' union is invaluable, but it biases the sample in many ways. For this reason, the data received from the carpenters' union was removed from the sample. Then, two key relationships previously evaluated were reevaluated to see if there were any significant changes. Those relationships reevaluated include how average weeks worked per year and average hourly wages vary by the number of trades a worker learns. By omitting the carpenters' union data from the sample, the sample is almost entirely non-union. This should be kept in mind throughout the rest of this section.

The first relationship between average weeks worked per year and number of trades a worker has labored in, omitting the carpenters' union data, is shown in Figure 4.5. This graph is a scatterplot of the remaining data. Because of the discrete increments of weeks, density of responses at the higher level of weeks is under-represented by the graphics. A nonlinear relationship is apparent, therefore the data was fitted with a best fit nonlinear regression line. Quadratic and cubic regression lines provided nearly identical results. The quadratic regression line had a more conservative slope and peak, thus the reason for its use.

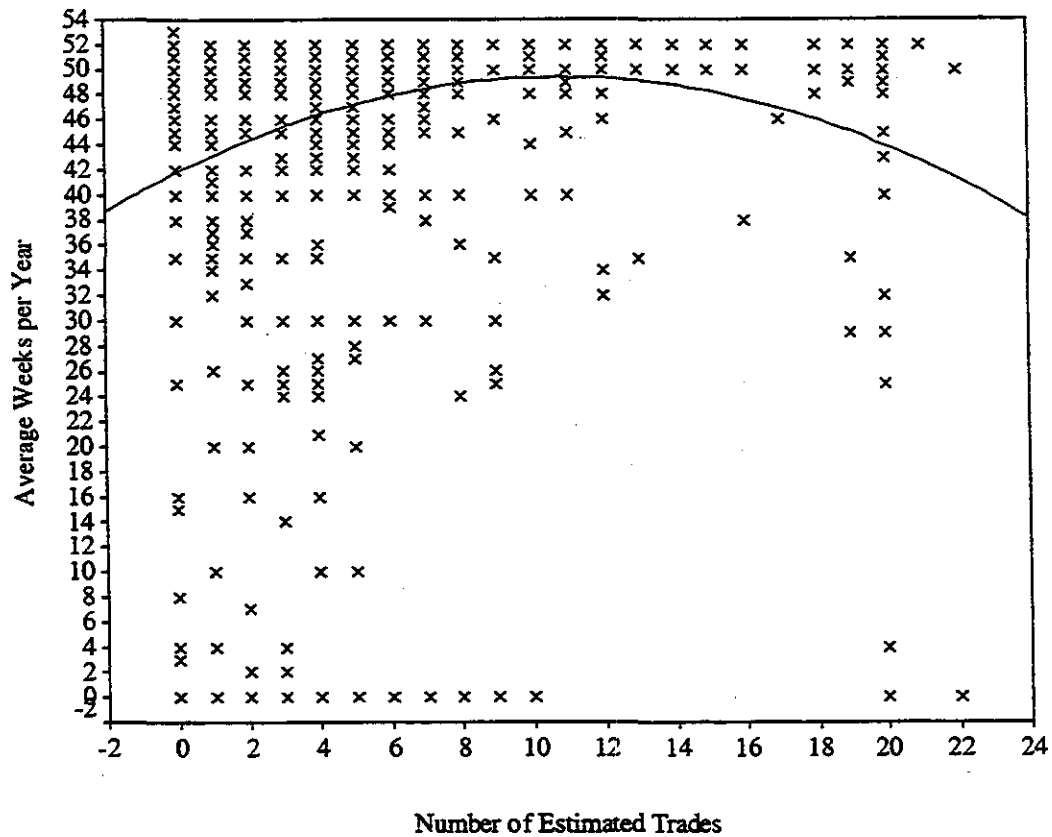


Figure 4.5 Number of Trades vs. Average Weeks per Year, Omitting the Carpenters' Union Data

From the graph, it can be concluded that knowledge in additional trades, up to an optimum number of trades, allows workers to labor more weeks per year. The data shows this optimum number of trades to be 11. The difference between knowing zero additional trades as opposed to 11, is working 7 more weeks every year. From the data, multiskilling can benefit workers by allowing them to work up to 14.3% longer per year.

Figure 4.6 shows the relationship between average hourly wages and number of trades, reevaluated by omitting the carpenters' union data. Again, the scatterplot was fitted with nonlinear best fit regression lines. Because the lines were nearly identical, a quadratic regression line was chosen due to its more conservative nature.

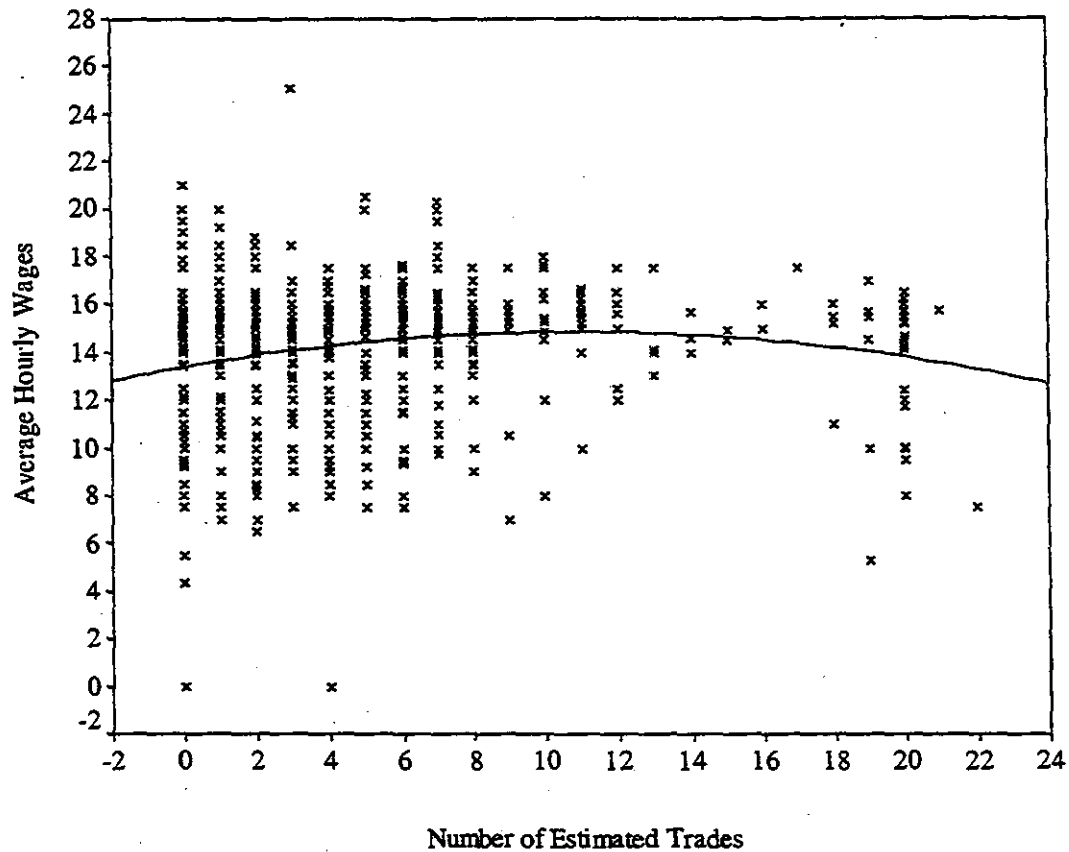


Figure 4.6 Number of Trades vs. Average Hourly Wages, Omitting the Carpenters' Union Data

The data shows that multiskilling increases workers' wages up to an optimum number of trades. From the graph, the optimum number of trades to have knowledge in is 10 trades. Knowing skills in 10 trades, as opposed to zero, increases average hourly wages by approximately 8.5%. Therefore, this data shows that multiskilling can benefit workers by providing significantly higher average hourly wages.

It is interesting to note the cluster around 20 trades. It is possible that these represent general laborers. Further investigation is required for confirmation.

CHAPTER 5: OBSERVATIONS

5.1 Survey Observations

After completing the survey, the workers were given the opportunity to make comments about the survey and its contents. All of the workers' comments were recorded exactly as they were written on the surveys. A total of 236 of the 1034 workers wrote in the comment section. The comments were rated as being positive or negative, based on tone and language, regarding the survey and the construction industry. Eighty-two of the comments were positive while 152 were negative.

Overall, the general feeling from the survey is that workers believe they should be treated better and should be paid more. Many workers have a negative attitude, which is apparent from the last questions asking about leaving the industry and the comments section.

5.2 Data Validation

It is exceptionally difficult to obtain reliable statistics for the construction industry, because the industry is fragmented, poorly documented, and project based. This section reviews the survey's data with respect to validation.

In many respects, the sample is representative. The race and gender categories match with those of the construction workforce population. In addition, the average worker age is similar to those for other sources that compile statistics for the construction industry. These facts help to make the workers' responses to the other questions more valuable because they are typical of the workforce.

In other ways, this survey sample is not as representative of the construction industry. There are fewer union responses and the union workers that did respond were from a single trade and were training to become instructors for apprenticeship programs. Only the most skilled workers are asked to teach apprentices. These responses skew the data upward on age and education levels. Workers that are training to become instructors are obviously older than workers in the field because they are experienced enough at working in the field to teach others. In addition, a person's perspectives change with age.

Their responses to the questions would tend to be different due to their level of experience.

The data is also skewed because of the distribution of the workers' trades. There are many more carpenters in the sample than any other trade, which could influence the data. Most of the carpenters are also union members. For these reasons, in many instances, averages were calculated for union and non-union sector, to show the differences between the groups.

It is possible that a higher proportion of the respondents to this survey work for companies that explicitly use multiskilling than is the norm for the industry. Whether this would skew responses toward or against multiskilling may depend on such companies' efficacy with multiskilling.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The following conclusions were determined from this research effort.

- 1. Workers have been working outside of their primary trade:** Approximately 70% of the survey's respondents have worked in trades other than their primary trade while 25% have not worked outside of their primary trade.
- 2. Workers are interested in learning more skills in their primary trade:** Over 79% of those workers sampled are interested in learning more skills in their primary trade, while 18% are not.
- 3. Workers would rather learn about many skills than specialize:** Over 68.5% of workers surveyed would like to learn many skills and 28.5% prefer to specialize.
- 4. A majority of workers are interested in other trades:** Approximately 57% are interested in learning another trade, while 34.9% of the workers are not.
- 5. Those workers who have worked in trades outside of their primary trade have worked in a range of different trades.**
- 6. Workers are interested in learning those trades that require much skill and that are physically less demanding than other construction trades.** These trades and types of work include instrumentation, welding, and electrical work.
- 7. Workers believe that multiskilling will significantly affect their work.** Workers believe that multiskilling will allow them to enjoy their work more, stay on a project longer, allow for more responsibility within their job, create a more

mentally challenging job, receive better pay for their work, provide for more rewarding work, and allow them to work for the same company longer.

8. Workers are willing to learn additional skills if they are compensated for the work. Suggested incentives for motivating workers to learn additional skills included additional pay, increased benefits, challenging work assignments, and more responsibility.

9. Multiskilling, within trades and between trades, is a viable option for the construction industry from the standpoint of open shop labor. Multiskilling would also be beneficial to union labor, yet considerable changes in the structure of building trades unions would be necessary to take full advantage of multiskilling.

10. Multiskilling allows merit and open shop workers to work more weeks per year and to obtain better wages. Belonging to a union can potentially result in much better income, but that is not a desirable or realistic option for many workers in many cases.

11. Workers' attitudes towards the construction industry and their employers are negative. Workers feel that they are not being paid sufficiently and are treated unfairly. A high percentage of construction workers are interested in leaving construction or have already left the industry only to return later.

6.2 Recommendations for Future Work

Based on this research and the data collected in this survey, there is additional analysis that should be performed. This section discusses various recommendations for related future work. Other means of data manipulation for the survey's responses are described and related topics are considered.

The analysis for this report only determined basic average responses, means, standard deviations, and key relationships. Other desirable analyses include the following:

1. Separate the carpenters' data from the rest of the sample and further analyze both groups.
2. Separate the Texas data from the rest of the sample, then analyze both groups.
3. Separate the union and non-union groups, then analyze both groups.
4. Statistically relate the questions of "Are you planning to leave the industry?" to workers' skill levels.
5. Develop a predictive model of craft workers' interest level in learning additional skills and training through the use of demographic factors.
6. Compare surveys by each participating organization.
7. Research further into unionized workers' attitudes towards multiskilling by working with and through unions.
8. Determine a compensation scheme for workers that learn additional skills.
9. Separate the multiskilled companies' data from this sample and obtain additional data from other multiskilled companies. Analyze this data for correlations to verify interview studies that indicate multiskilling helps workers through higher pay, more work per year, and better benefits.
10. Determine who should pay for training. This needs to be evaluated before this labor strategy will work properly.
11. Identify the frequency and efficacy of skill combinations.

APPENDIX A: ANNOTATED BIBLIOGRAPHY

Allen, S. G. (1994). "Developments in Collective Bargaining in Construction in the 1980s and 1990s." *Working Paper Series No. 4674*, National Bureau of Economic Research, Inc., 1-33.

This paper discusses the differences between the open shop and union shop, the history of unions, reasons for union density declining, and the strategies that unions are using to win back market share.

Babbie, E. R. (1973). *Survey Research Methods*, Wadsworth Publishing Company, Belmont, CA.

An all purpose guide book describing research methods for interviewing, questionnaires, and telephone surveys.

Burleson, R. C. (1997). "An Analysis of Multiskilled Labor Strategies in Construction," Ph.D. thesis, The University of Texas at Austin.

This dissertation analyzes a baseline labor utilization of a model CII petrochemical plant and develops five other multiskilling labor strategies. It shows that multiskilling strategies have project, worker and industry benefits.

The Business Roundtable. (1997). *Confronting the Skilled Work Force Shortage*, The Business Roundtable, New York, N.Y.

The Business Roundtable discusses the construction industry's workforce shortage problem caused by poor image and lack of a method to retain workers. Solutions were suggested for the industry, owners, contractors, labor organizations, and local user councils.

The Center to Protect Workers' Rights. (1997). *The Construction Chart Book: The U.S. Construction Industry and Its Workers*, The Center to Protect Workers' Rights, Washington, D.C.

A collection of charts, tables, and figures which depict the following aspects of the construction industry: industry summaries, employment, income, unionization, education, training, safety, and health. Most of the data was found from the Bureau of Labor Statistics and Census Bureau.

Cross, M. (1994). "Enhancing Process Operator Skills." *Process Engineering*, 72(11), 51-53.

A UK process facility tests out multiskilling with its operators. The training consisted of 20 days training and 20 days of practical work to become dual skilled and 15 days

training and 15 days of practical work to become multiskilled. The plant found determined training modules needed to be shortened. Better training could reduce most mistakes made by operators.

Crowley, L. G., Lutz, J. D., and Burleson, R. C. (1997). "Functional Illiteracy in Construction Industry." *Journal of Construction Engineering and Construction Management*, 123(2), 162-170.

A sample of the construction workforce in Birmingham, Alabama was studied to determine the workforce's literacy levels. The study discovered that the construction workforce did not differ significantly from the national population.

Haddad, C. J. (1996). "Employee Attitudes Toward New Technology in a Unionized Manufacturing Plant." *Journal of Engineering and Technology Management*, 13(2), 145-163.

The article discusses unionized employees attitudes towards a new technological change implemented in a manufacturing plant. A number of hypotheses affecting workers' attitudes are examined including: employee job position, training on new technology, advanced notification of technological change, and leadership in local union.

Judy, R. W. and D'Amico, C. (1997). *Workforce 2020*, Hudson Institute, Inc.

The Hudson Institute predicted work force changes up through the year 2020 regarding technology and demographics, then made recommendations based on those predictions.

National Center for Education Statistics (1996). "1992 National Adult Literacy Survey." Internet. [Http://nces.ed.gov/nadlit/overview.html#overall](http://nces.ed.gov/nadlit/overview.html#overall). Access date: March 4, 1998.

The NCES reports average literacy rates for the nation.

Ozaki, M. (1996). "Labor Relations and Work Organization in Industrialized Countries." *International Labour Review*, 135(1), 37-59.

The article discusses unions in various industrialized countries, their relationships to employers, and their use in helping employers to change work organizations to better employees and increase quality and productivity for companies.

Parker, S. K. (1996). "An Investigation of Attitudes Amongst Production Employees." *The International Journal of Human Factors in Manufacturing*, 6(3), 281-303.

In addition to investigating production workers' attitudes, this study characterizes the types of attitudes suggested to facilitate high performance. The study found that production workers attitudes are not conducive to modern production strategies.

Rodriguez, A. M. (1998). "Planning and Scheduling a Multiskilled Workforce," Master's thesis, The University of Texas at Austin.

This research focuses on planning and scheduling techniques for a multiskilled workforce. A methodology for planning and scheduling with a multiskilled workforce was developed based on current practices of companies that used multiskilled workforces.

SPSS Inc. (1998). *SPSS 8.0 for Windows: Brief Guide/SPSS*, SPSS Inc., Chicago, IL.

This software user manual assists in learning SPSS, a statistical analysis program.

Stanley, A. (1997). "Benefits, Impediments, and Limitations Associated with the Use of Multiskilled Labor Strategies in Construction," Master's thesis, The University of Texas at Austin.

This thesis documents the benefits and limitations of multiskilling to construction projects and workers. It also discusses a case study of multiskilling.

Villalobos, J. A. (1997). "Implementation of Multiskilling in the Construction Industry," Master's thesis, The University of Texas at Austin.

The thesis creates guidelines for a systematic approach to implement multiskilling of labor for an open shop company.

APPENDIX B: INTERVIEW QUESTIONS FOR CRAFT WORKERS

Name_____ Date_____
Home Phone Number_____ Company Name_____
Job Site_____ General Contactor_____
Age_____ Interviewer_____

1. How did you get started working in construction?
 - 1a. Why did you start working in construction?
2. What type of work does your crew do?
3. What type of work do you do?
4. What is your current job title?
5. How long have you been in construction?
6. How long have you been doing this kind of work?
7. What do you like most about your work?
8. What do you like least about your work?
9. How did you learn the skills necessary to do your job?
10. What do you consider your skill level at this time?
11. How long did it take to become this skilled?
12. Are you happy at your current skill level?
13. At what skill level would you like to be at?
14. What are the most labor intensive tasks you do in your work? Why?
 - 14a. What are the most difficult tasks you do in your work? Why?
15. What tasks take the longest to do in your work? Why?
16. What other tasks do you think would be good to learn for your work? Why?

17. Do you have skills in other crafts?
If yes, which other crafts?
How did you learn these other skills?
18. Would you be interested in learning more skills in your current craft?
If yes, which skill(s) and why?
19. Would you be interested in learning skills in another craft?
If yes, which craft(s) and why?
20. How much do you get paid an hour?
21. Does the company pay you enough for your efforts?
If no, what are you worth?
22. If you were to learn additional skills in your craft or another, would you expect the company to compensate you for these skills?
If yes, how?
If pay, how much?
23. Do you feel as though there are a shortage of skilled construction workers?
If yes, why do you believe this is so?
What do you believe could be done to solve this problem?
24. Do you believe there are many workers leaving the construction industry?
If yes, why do you believe they are leaving the industry?

Other Notes?

APPENDIX C: CONSTRUCTION CRAFT WORKER SURVEY

CONSTRUCTION WORKFORCE SURVEY

INTRODUCTION

The survey that you are about to take part in is part of a research project at The University of Texas at Austin. The research project focuses on determining how workers acquire skills and on determining workers' attitudes on the best method of construction training. In addition, the research is aimed at understanding construction craft workers' attitudes on specializing in one trade or learning skills in several trades.

This survey is intended for construction craft workers. Foreman, superintendents, field engineers, and project managers are **not** within the scope of this survey and should **not** complete the survey. Responses from these individuals will bias the survey's results.

Your participation in this survey is very important. It is with your help that we will be able to understand your experiences. In time, this research will be used to help the construction industry workforce.

Please notify someone who is administering the survey if any part of this survey is unclear. This includes any words that are used or the wording of the questions. **Your responses in this survey will be kept confidential.** At no point in time will your answers to these questions be told to your boss or your fellow workers. So, please be as candid as possible. Your assistance with this survey is greatly appreciated.

SURVEY QUESTIONS

Please answer every question by checking the box next to your answer. Unless otherwise instructed, please check only one answer per question.

1. What type of construction projects do you work on?

- ☐ a. Union
- ☐ b. Non-union
- ☐ c. Both

2. Are you currently a union member?

- ☐ a. Yes
- ☐ b. No

3. Have you ever been a union member?

- ☐ a. Yes
- ☐ b. No

4. What do you consider your primary trade? **Mark only one answer.**

- ☐ a. Boilermaker
- ☐ b. Carpenter
- ☐ c. Electrician
- ☐ d. Equipment operator
- ☐ e. General laborer
- ☐ f. Glass/glazing
- ☐ g. Instrumentation worker
- ☐ h. Insulation worker
- ☐ i. Iron worker (reinforcement)
- ☐ j. Iron worker (structural)
- ☐ k. Mason
- ☐ l. Mechanical (HVAC)
- ☐ m. Millwright
- ☐ n. Operating engineer
- ☐ o. Painter
- ☐ p. Pipefitter/Plumber
- ☐ q. Plaster/Cement mason
- ☐ r. Roofer
- ☐ s. Sheetmetal worker
- ☐ t. Welder
- ☐ u. Other _____

5. What do you consider your skill level to be in your primary trade? **Please mark only one answer.**

If you are not in a union,



- ☐ a. Unskilled
- ☐ b. Semi-skilled
- ☐ c. Skilled

If you are a union member



- ☐ d. Apprentice
- ☐ e. Journeyman

6. Are you pleased at your current skill level?

☐ a. Yes

☐ b. No

7. How did you acquire skills in your primary trade? **Please mark only one answer.**

- ☐ a. Union apprenticeship program
- ☐ b. Other apprenticeship program
- ☐ c. High school/voc program
- ☐ d. Military
- ☐ e. Community college courses
- ☐ f. Government program
- ☐ g. Informal on the job training/ojt
- ☐ h. Company provided training
- ☐ i. Other _____

8. Would you be interested in learning more skills in your **primary trade**?

☐ a. Yes

☐ b. No



If yes, what other skills specifically? _____

9. Do you prefer to?

☐ a. Learn about one or a few skills / Specialize

or

☐ b. Learn about many skills

10. Have you worked in trades other than your primary trade?

☐ a. Yes

☐ b. No



└─> If no, skip to question 11.

10a. If yes, mark your skill level in all of the trades that you have worked.

Trades	If you are not in a union,			If union member,	
	Un-skilled	Semi-Skilled	Skilled	Apprentice	Journeyman
Boilermaker					
Carpenter					
Electrician					
Equipment operator					
General laborer					
Glass/Glazing worker					
Instrumentation worker					
Insulation worker					
Iron worker (rebar)					
Iron worker (structural)					
Mason					
Mechanical worker					
Millwright					
Operating engineer					
Painter					
Pipefitter/Plumber					
Plaster/Cement mason					
Roofer					
Sheet metal worker					
Welder					
Other _____					

10b. If you have worked in trades **other** than your primary trade, please mark the method of training describing how you acquired the skills to work in these trades?

Trades	Methods of Training								
	Union Apprenticeship Program	Other Apprenticeship Program	High School or Voc. Program	Military	Community College Courses	Government Program	Informal on- the job training	Company Provided Training	Other
Boilermaker									
Carpenter									
Electrician									
Equipment operator									
General laborer									
Glass/Glazing worker									
Instrumentation worker									
Insulation worker									
Iron worker (rebar)									
Iron worker (structural)									
Mason									
Mechanical worker									
Millwright									
Operating engineer									
Painter									
Pipefitter/Plumber									
Plaster/Cement mason									
Roofer									
Sheet metal worker									
Welder									
Other _____									

11. Are you interested in learning skills in a trade **other** than your primary trade?

☐ a. Yes

☐ b. No

→ If no, skip to question 12.

11a. If yes, mark the skill level of the trades you would like to learn.

Trades	If you are not in a union,			If union member,	
	Un-skilled	Semi-Skilled	Skilled	Apprentice	Journeyman
Boilermaker					
Carpenter					
Electrician					
Equipment operator					
General laborer					
Glass/Glazing worker					
Instrumentation worker					
Insulation worker					
Iron worker (rebar)					
Iron worker (structural)					
Mason					
Mechanical worker					
Millwright					
Operating engineer					
Painter					
Pipefitter/Plumber					
Plaster/Cement mason					
Roofer					
Sheet metal worker					
Welder					
Other _____					

11b. If you are interested in learning trades **other** than your primary trade, why are you interested in learning more about these trades? **Please mark only one answer.**

- | | |
|---|--|
| <input type="checkbox"/> a. Higher hourly wages | <input type="checkbox"/> d. Easier work physically |
| <input type="checkbox"/> b. More challenging work | <input type="checkbox"/> e. Stay employed longer |
| <input type="checkbox"/> c. Interested in the trade | <input type="checkbox"/> f. Other _____ |

12. If you were offered the chance to train in another trade for free, would you be interested?

- | | |
|---------------------------------|--------------------------------|
| <input type="checkbox"/> a. Yes | <input type="checkbox"/> b. No |
|---------------------------------|--------------------------------|

13. What do you feel is the best way to learn construction trade skills? **Please mark only one answer.**

- | | |
|--|--|
| <input type="checkbox"/> a. Union apprenticeship program | <input type="checkbox"/> f. Government program |
| <input type="checkbox"/> b. Other apprenticeship program | <input type="checkbox"/> g. Informal on the job training/ojt |
| <input type="checkbox"/> c. High school/voc. program | <input type="checkbox"/> h. Company provided training |
| <input type="checkbox"/> d. Military | <input type="checkbox"/> i. Other _____ |
| <input type="checkbox"/> e. Community college courses | |

14. Who do you believe should pay for construction training?

- | | |
|--|--|
| <input type="checkbox"/> a. Company (Owner) of project | <input type="checkbox"/> c. Self |
| <input type="checkbox"/> b. Contractor you work for | <input type="checkbox"/> d. Both self and contractor |

15. Are you currently being trained in any other trades?

- | | |
|---------------------------------|--------------------------------|
| <input type="checkbox"/> a. Yes | <input type="checkbox"/> b. No |
|---------------------------------|--------------------------------|

16. Using the following scale of 1 to 5, with 1 as strongly disagree and 5 as strongly agree, please answer the following questions:

Circle the number that indicates your feelings about:

	Strongly Disagree	1	2	3	4	5	Strongly Agree
I enjoy my work.		1	2	3	4	5	
I would like a more challenging job.		1	2	3	4	5	
I enjoy working on my current project.		1	2	3	4	5	
I work too many hours each week.		1	2	3	4	5	
I enjoy working outdoors.		1	2	3	4	5	
I should receive better benefits for my work.		1	2	3	4	5	
I like my boss.		1	2	3	4	5	
I receive good pay for my work.		1	2	3	4	5	
I am given responsibility at work.		1	2	3	4	5	
I would like to work more.		1	2	3	4	5	
I receive good benefits for my work.		1	2	3	4	5	
I should receive more pay for my work.		1	2	3	4	5	
I enjoy my work schedule.		1	2	3	4	5	
I am given too much responsibility at work.		1	2	3	4	5	
My job challenges me.		1	2	3	4	5	
I get plenty of hours to work.		1	2	3	4	5	
I enjoy working with the other workers.		1	2	3	4	5	
I enjoy working for my current company.		1	2	3	4	5	

17. If you were to learn **additional** skills in your primary trade or another trade, how would you feel about:

Circle the number that indicates your feelings about:

	Strongly Disagree	1	2	3	4	5	Strongly Agree
I would enjoy my work more.		1	2	3	4	5	
I would work on the same project longer.		1	2	3	4	5	
I would be forced to work more hours.		1	2	3	4	5	
I would have more responsibility with my job.		1	2	3	4	5	
My job satisfaction would remain the same.		1	2	3	4	5	
My job would be more mentally challenging.		1	2	3	4	5	
I would receive better pay for my work.		1	2	3	4	5	
My work would become more physically demanding.		1	2	3	4	5	
My work would be more rewarding.		1	2	3	4	5	
I would receive better benefits for my work.		1	2	3	4	5	
I would receive the same pay.		1	2	3	4	5	
I would have a better work schedule.		1	2	3	4	5	
My boss would expect more work from me.		1	2	3	4	5	
I would get to work more hours.		1	2	3	4	5	
I would work for the same company longer.		1	2	3	4	5	

18. Do you believe that you would work more if you had additional skills in your trade or another trade?

☐ a. Yes

☐ b. No

19. Have you ever considered leaving the construction industry?

☐ a. Yes

☐ b. No

20. Have you left the construction industry and returned?

☐ a. Yes

☐ b. No

21. Do you believe that you will leave the construction industry within the next year?

☐ a. Yes

☐ b. No



21a. If yes, why? **Please mark only one answer.**

☐ a. Hard work physically

☐ b. Dislike the responsibility

☐ c. Dislike the weather/outdoors

☐ d. It is not challenging

☐ e. Dislike the boss

☐ f. Poor pay

☐ g. Lack of benefits

☐ h. Dislike the work schedule

☐ i. Not enough hours

☐ j. Dislike other workers

☐ k. Dislike moving around from project to project

☐ l. Health problems

☐ m. Dislike frequent layoffs

☐ n. Other _____

INFORMATION

Please fill in the blanks.

Age _____

What state are you working in currently? _____

How many years of education did you complete? _____ years

About how long have you been working in construction? _____ years
_____ months

About how long have you been with your current employer? _____ years
_____ months

About how many hours do you work in an average work week? _____ hours per week

Of the 52 weeks in a year, about how many weeks did you work in the last year? _____ weeks.

How much do you make an hour? \$_____ per hour

Do you have any helpers that assist you with your work?

☐ a. Yes

☐ b. No



If yes, how many? _____

Please place a check in the box next to your correct answer.

Which of the following do you work for?

- ☐ a. General contractor ☐ b. Subcontractor

Sex ☐ a. Male ☐ b. Female

Ethnicity ☐ a. White/Caucasian ☐ d. Asian-American
 ☐ b. African American/Black ☐ e. American Indian
 ☐ c. Hispanic ☐ f. Other, Please specify:

What is your level of education?

- ☐ a. 0-8 years of school
☐ b. Some high school
☐ c. High school diploma
☐ d. GED equivalent
☐ e. Some college
☐ f. Some apprenticeship program
☐ g. Completed apprenticeship program
☐ h. Associates degree (2 yr. program)
☐ i. Bachelors degree (4 yr. program)
☐ j. Masters degree
☐ k. PhD.

You have now completed the survey! There is space provided below, please feel free to leave any comments you may have. Again, we thank you for taking the time to fill out the survey. Your help is greatly appreciated.

Comments: _____
