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## ABSTRACT

The relationship between manpower and productivity is an important factor in the area of increasing construction costs. Manpower supply is affected by worker mobility, influx of minority workers, work accidents, and training and apprenticeship programs.

A survey was conducted in the state of New Jersey to determine if a manpower shortage existed. The survey was conducted by submitting questionnaires to contractors, unions, owners, and architect-engineers.

The results of the survey indicated that a manpower shortage does exist, and that the shortage has influenced construction costs. Furthermore, as a result of the increasing costs, indications of a decline in new work became evident from responses by owners and architect-engineers.

MANPOWER AND PRODUCTIVITY IN THE  
CONSTRUCTION INDUSTRY

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A Thesis  
Presented to  
the Faculty of the Graduate School  
Newark College of Engineering

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In Partial Fulfillment  
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Master of Science in Civil Engineering

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by  
John A. Purciello  
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MANPOWER AND PRODUCTIVITY IN THE  
CONSTRUCTION INDUSTRY

BY

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FOR

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## PREFACE

The author wishes to acknowledge the valuable assistance of Dr. Roy Olsen and Dr. Charles Peck. I am indebted to John Di Biasi, Christopher D. Gianakis, Immans Kalnins, Joseph Layer, and F.J. Patock, who all cooperated in compiling our questionnaire. Without their assistance, this thesis would not have been possible. Their comments and criticisms have proven beneficial. However, the views and errors are my own.

## TABLE OF CONTENTS

	Page
LIST OF TABLES.....	vii
LIST OF FIGURES.....	ix

### Chapter

1. INTRODUCTION.....	1
Productivity Defined.....	1
2. THE INDUSTRY TODAY.....	3
WHAT HAS HAPPENED.....	3
3. CONSTRUCTION PRODUCTIVITY.....	8
ECONOMIC EFFECTS.....	8
UNION'S EFFECT ON PRODUCTIVITY.....	10
Restrictive Work Practices.....	10
Jurisdictional Disputes.....	11
Hiring Halls.....	12
WAGES.....	13
4. CONSTRUCTION AND MANPOWER.....	15
FACTORS AFFECTING MANPOWER SUPPLY.....	15
Wages.....	15
Training and Apprenticeship.....	18
Barriers to the Entry of Minority Workers.....	21
High Toll of Work Accidents.....	24
Worker Mobility.....	26

Chapter	Page
5. IS THERE A MANPOWER SHORTAGE?.....	29
NATIONAL PICTURE.....	29
LOCAL PICTURE.....	31
CURRENT EMPLOYMENT CHARACTERISTICS AS A RESULT OF THE SHORTAGE.....	33
Size of Labor Force.....	33
Permanent and Seasonal Employment.....	35
MANPOWER SHORTAGES AND CONSTRUCTION COSTS...	38
6. CONCLUSIONS.....	44
Size of Labor Force.....	44
Permanent and Seasonal Unemployment.....	44
Manpower Shortage and Construction Costs.....	45
Alleviating Manpower Shortages.....	45
Factors Affecting Labor Supply.....	46
7. RECOMMENDATIONS.....	47
Suggestions for Future Study.....	48
APPENDIX A.....	49
APPENDIX B.....	62
SELECTED BIBLIOGRAPHY.....	65



## LIST OF TABLES

Table	Page
I. Work Accidents in the Industries for 1966.....	25
II. Breakdown of Manpower Shortages by the Size of the Contractor.....	32
III. Breakdown of Manpower Shortages by the Type of the Contractor.....	32
IV. Hours Worked by Season.....	41
V. Size of Contractor and Percent of Work Performed on Overtime per Season.....	41
VI. Type of Contractor and Percent of Work Performed on Overtime per Season.....	42
Appendix Table	
A-1. Average Annual Earnings per Full Time Employee by Industry.....	49
A-2. Average Weekly Earnings in Construction and Manufacturing in 1957-1959 Dollars.....	50
A-3. Hourly Increases During Year Ending January 4, 1971, as Reported by the United States Department of Labor.....	51
A-4. Hourly Increases During Year Ending April 1, 1971, as Reported by the United States Department of Labor.....	51
A-5. Hourly Increases During Year Ending July 1, 1971, as Reported by the United States Department of Labor.....	52
A-6. Manpower Needs According to Size of Contractor and Order of Importance.....	53
A-7. Manpower Needs According to Type of Contractor and Order of Importance.....	53
A-8. Percent of Work Force that Are Apprentices by Contractors' Size, as Reported by Contractors.....	54

## Table

## Page

A-9.	Percent of Work Force that Are Apprentices by Type of Contractor, as Reported by Contractors.....	54
A-10.	Percent of Summer Work Force Employed per Season, by Size of Contractor.....	55
A-11.	Percent of Summer Work Force Employed per Season, by Type of Contractor.....	55
A-12.	Percent of Work Force that Is Temporary Summer Employment, by Size of Contractor....	56
A-13.	Percent of Work Force that Is Temporary Summer Employment, by Type of Work.....	56
A-14.	Size of Contractor and Number of Permanent Union Employees.....	57
A-15.	Type of Contractor and Number of Permanent Union Employees.....	57
A-16.	Order of Importance of Factors Affecting Construction Costs, Listed by Size of Contractor.....	58
A-17.	Order of Importance of Factors Affecting Construction Costs, Listed by Type of Contractor.....	58
A-18.	Increased Construction Costs, As a Result of Manpower Shortages, Listed by Size of Contractor.....	59
A-19.	Percent of Non-Agricultural Employment.....	59
A-20.	Order of Importance of Factors that Would Alleviate Labor Shortages, Listed by the Size of Contractor.....	60
A-21.	Type of Contractor and the Order of Importance of Factors that Would Alleviate Labor Shortages.....	61

## LIST OF FIGURES

Figure	Page
1. Pay and Productivity Increases.....	14
2. Wages by Major Industries.....	17
3. Manpower Shortages--Percent of Cities in which Contractors Reported More than Half of the Trades with Shortages.....	30
4. Percent of Work Force That is Temporary Summer Employment.....	36
5. Percent of Work Force That is Temporary Summer Employment, as Compared by Type of Work.....	37
6. Increased Construction Costs Due to the Manpower Shortage Versus Volume of the Contractor.....	40

## Chapter 1

### INTRODUCTION

Construction is the largest of all our industries. Its size is such that it is greater than automobile manufacturing and steel industries combined. Because of the magnitude of the industry, it becomes critical when construction costs start an inflationary spiral. The rising costs in construction have created the need for studies that delve into the problems of the industry.

Currently there are many problems confronting the industry: shortage of manpower, excessive absenteeism, high turnover, high wage rates, and loss of management control. All of the preceding problems are labor orientated, and present a need for study.

The labor orientated problems all reflect on the productivity of the industry. With rising construction costs and a decline in new and innovative techniques, the productivity of construction is rapidly decreasing. Productivity must be improved if construction hopes to meet the challenge of urban renewal; expansion of health, transportation, and educational facilities; and the creation of a healthy environment.

#### Productivity Defined

Productivity is the measure of output per man hour.

In this report, it will be further interpreted as cost per man hour.

The reason for the selection of productivity as the standard is that it is unbiased; that is, it neglects capital output and can be easily applied to all phases of construction work.

Productivity can be measured by:

$$\text{Productivity} = \frac{\text{Cost}}{\text{Unit Produced}}$$

## Chapter 2

### THE INDUSTRY TODAY

#### WHAT HAS HAPPENED?

Since World War II, the industry has experienced great difficulty in recruiting an adequate number of apprentices. An indication of the decline of apprentices is the increasing median age of the labor forces. The decline of new apprentices can be attributed to the changing mores of society, and the influence of the unions.

In this age of technology and education, society has placed more emphasis upon white collar work, and a college education. The emphasis placed upon non-manual work has become so great that youth have passed up the high paying work associated with learning a craft, to perform more prestigious work.

The manpower problems over the past decade were compounded by the war in Viet Nam, and the ease with which men could change fields of occupation. With the military placing a high demand on men, the construction labor supply found itself drained of potential craftsmen. The men who were not affected by the draft found a labor market that was very favorable. The ease with which these men could obtain jobs led to a declining interest in learning a craft, which was indicated by the declining number of sons of

craftsmen entering the unions.

Construction wages have been spiralling in the last decade. During this period, wages have risen nearly 50%, and the wage settlements over the next three years will equal the gains over the last decade (11: 139). These settlements have out ranged the average of 10%, for the rest of the economy. The continuation of these trends indicates that wage settlements in construction will double by 1975.

The large wage increases can be attributed to inflation, a shortage of manpower, and seasonality. These factors have placed the industry in a position where the large wage increases that are occurring are threatening the nation's economy.

Warnings to the industry were given in 1968, by the Assistant Secretary of Commerce for Economic Affairs, William H. Chartener.

"Wage demands being advanced by construction unions in widely scattered parts of the country constitute one of the most serious challenges to our efforts to slow down the advance of inflation in the American Economy." (61: 3)

Also, President Johnson's Cabinet Committee on Wage and Price Stability stated that:

"Wage-price developments in the important construction sector spread inflation throughout the economy by raising costs elsewhere, and by intensifying wage demands in other industries." (61: 3)

In spite of warnings by government and business officials, the construction industry continued their inflationary practices.

The government has had an effect on the rising construction costs. During President Johnson's administration, the government pursued a full employment economy. As a result, labor policies gave security to the workers, and have extinguished old fears of the worker being out of work for a long period of time.

With the change of administrations, the economy shows all indications of entering a recession. The construction industry has suffered from the present economic conditions, but the workers have still prospered. Various reasons have been presented for the continuing prosperity of the worker:

1. The fall of unemployment to 4% in all industries before the recession saw the migration of minimal skill workers to other industries. Therefore, a shortage of skilled workers exists.
2. The past five to ten years have been a boom in industrial construction, and have increased the demand for skilled craftsmen.
3. The bargaining situation is not regional, thereby affording the construction worker the opportunity of being able to work during strikes.

Under President Nixon, many attempts were made to curb inflationary increases. In mid-January, 1971, he summoned various leaders of Building Trade Unions to the White House to discuss the industry's problems. Out of this meeting came a directive from the President, requesting that these leaders establish a voluntary plan for holding down inflation. They had thirty days to respond.

By February, 1971, it became apparent that there



would be no response to the President's request for establishing a voluntary plan of action. At this time, he suspended the Davis Bacon Act. The government's action came while the construction industry was experiencing an 11% unemployment rate. It was felt by the various contractors' associations that the suspension of the Davis Bacon Act would only add confusion to the current labor situation, and not provide any significant gains for management. However, by suspending the Davis Bacon Act, the President was hoping to give labor leaders an excuse for cooperating with the administration. Again, his efforts were fruitless.

The Construction Industry Stabilization Committee was then formulated to stabilize the rapidly increasing wage gains. Their primary function is to review wage demands and make recommendations. Until the wage-price freeze, the C.I.S.C. did not fulfill its potential.

On August 15, 1971, President Nixon instituted a wage-price freeze that would be effective until November 12, 1971. The wage-price freeze marked a complete reversal of his previous plans of voluntary cooperation.

It is hoped that the wage-price freeze will curb inflation, reduce unemployment, and restore confidence in the economy as the United States moves toward a peacetime economy. The effects of the freeze on the construction industry are the following:

1. Unions and management cannot negotiate pay

increases to be effective after the freeze period, but retroactive to cover the freeze period.

2. Deferred wage increases previously negotiated to take effect during the freeze are not permitted.
3. Increases in material prices, insurance rates, and similar fees cannot be put into effect during the freeze.
4. Professional service fees (Architect-Engineers) cannot be increased during the freeze.
5. Wage increases under apprenticeship contracts approved by the Labor Department may be permitted up to and including the top step of the agreement. (1: 9)

Finally, the inequities in the bargaining positions that developed over the past few years have enabled unions to push for greater gains. The reasons for the imbalance can be attributed to the following:

1. Failure of owners to support contractors during impending strikes.
2. Fragmentation of construction management.
3. Pro Union labor laws.
4. Contractors with national agreements working during local strikes.

## Chapter 3

### CONSTRUCTION PRODUCTIVITY

#### ECONOMIC EFFECTS

Since 1966, the Department of Commerce Indexes indicated that construction costs are rising. The rate at which they are climbing is almost double that of the economy as a whole; while the average increase in labor productivity has risen  $2\frac{1}{2}\%$  annually. The average increase in the whole economy's productivity has been 3.6% per year, indicating that construction has been slow at adopting new techniques. (13: 2)

Basically, there are three factors which affect the rising construction costs:

1. The share of labor in the industry's output is declining.
  2. Rising labor costs offset the effect of prefabrication of materials on construction costs.
  3. Variations in the demand of construction have little, or no effect on the prices of construction materials and equipment.
- (13: 101)

The decline in labor output can be attributed to many factors. One important factor is the attitudes of the workers. The average worker has a casual relationship with his employer because his job is short-termed and temporary; the worker cannot develop a fixed relationship with the

contractor. The workers' allegiance will be to the union because they receive their wages and other conditions from labor agreements negotiated by the unions, and receive their work assignments and security from the unions.

As a result, there is low motivation from the worker to perform for the contractor. In some instances, the men will drag out a job in order to provide a little short-termed security.

Rising labor costs and restrictive work practices have offset the effects of prefabrication and methods improvement. The unions have managed to fight any major changes in the industry. Prefabricated material has either been banned from construction projects, or the unions have organized the places of manufacture.

Furthermore, the unions have gained the acceptance of using standby workers to start a pump, or turn on a light or switch. The use of these men has negated any advantage made from labor saving devices.

Finally, we should investigate the disruptive effects of strikes on productivity. Strike losses in the construction industry have quadrupled since 1966. The first nine months in 1970 saw more than 455 walkouts, involving 875,000 workers and 30 billion dollars of construction (58: 49).

Sitting out strikes presents problems to the contractors because capital charges and overhead go on even though the company is not operating. By capitulating and

signing a generous contract, the competitiveness of a contractor is not hurt; all of the contractors are faced with the same contract. Therefore, the contractor has solved his short-range problem of survival, and has passed the increases on to the consumer.

### UNION'S EFFECT ON PRODUCTIVITY

"At times, indeed, organized labor seems to be chasing the delusion that a society can consume more than it produces, and that everybody can consume more than they need, and that everybody can prosper by beggaring his neighbor." (12: 65)

The role of the union in construction productivity is a complex one. Because of the scope of the topic, three areas will be investigated:

1. Restrictive Work Practices
2. Jurisdictional Disputes
3. Hiring Halls

#### Restrictive Work Practices

Restrictive work practices are fairly self-explanatory. The presence of these practices pad the payrolls and push productivity down.

Examples of common restrictive work practices found in construction are:

1. Only foremen can give orders to the men. The superintendent, who might be better qualified and more knowledgeable than the foreman, must not give orders to the men.
2. Limits on the number of men to a foreman, and the number of crews to a general foreman. This causes additional hiring, a

larger payroll and erosion of management control.

3. The operating engineer's restriction upon the number of different machines a man can operate in one day. If an operator stops use of machine A, the operator can be moved to a different machine, and then back to his original machine. The operation of a third machine in the same day is illegal. The result is an increase in the number of men, and a decrease in the flexibility of the contractor.
4. The use of standby workers. Operators are used to start up equipment such as pumps and vibrators, and to stop them. The rest of the time they are not needed and must be paid for doing nothing. Electricians are also guilty of this practice.

The power of the unions at the collective bargaining table has also resulted in other restrictions for management. The union can regulate the supply of labor by restricting entrance to their craft, imposing a high initiation fee, using a permit system, and imposing unfair apprenticeship regulations. They have managed to limit the acceptance and use of labor saving devices, the amount of output per worker, and have restricted the use of prefabrication. Each of the previous restrictions has created larger payrolls, increased costs, and reduced productivity.

#### Jurisdictional Disputes

A jurisdictional dispute arises when more than one union claims jurisdiction over a given item of work. Jurisdictional disputes have been declared an unfair labor practice by the National Labor Relations Act, unless the employer fails to conform to a National Labor Relations

Board Order. But, as happens in so many instances, the contractor is more concerned with maintaining production than fighting with the unions over jurisdictional disputes.

The current view presented by most contractors is one of apathy. This attitude can lead to internal strife, restrictive work practices, and an increase in costs. The contractors and trade associations should push for new work classifications to end these disputes. The new classifications should reflect the difficulty of the work and the skill required to perform the work.

### Hiring Halls

The union hiring halls gained their validity in the early 1960's, when many contractors were struck, and the unions' primary demand was for the recognition of hiring halls. When the legality of the hiring halls was questioned, the Supreme Court upheld their validity and insured the protection of the government for the hall.

In essence, the contractor must notify the hall of his need for men, and the hiring hall must be given a chance to refer qualified applicants to the contractor. As a result, the union can control the type and calibre of men sent to each contractor.

The hiring hall is in direct conflict with the responsibility of management because it takes the responsibility of the efficient use of manpower away from the contractor. Their control over the labor supply has given

the union added strength in its dealings with the contractors.

### WAGES

In theory, high wages should result in high productivity because increased wages retard the migration of workers and encourage the immigration of new workers.

High wages should provide the following:

1. Improved Attitudes and Performance
2. Retainage of a Work Force
3. A Reduced Turnover
4. A Reduction in Tardiness and Absenteeism
5. A Contribution to Greater Efficiency

In reality, high wages have not resulted in high productivity because the unions have retarded the immigration of new workers, and have limited the competition that would develop from an industry with a large labor supply. Furthermore, the average union worker is now content with working a few days a week, and being able to earn a comfortable income. As a result, absenteeism and turnover remains high.

The average increase in labor productivity has been at 2.5% from 1947 to 1955, while for the same period, the annual rise for the whole economy was 3.6% per year (13: 2). This average held true until 1970, when the productivity rate was approximately one third of its normal rate. During this same period, wage increases averaged approximately



13% (75: 11).

The rate of increase of productivity and wage rates can be seen in figure 1. On this graph, pay per man hour is plotted yearly, with 1963 being considered 100%.

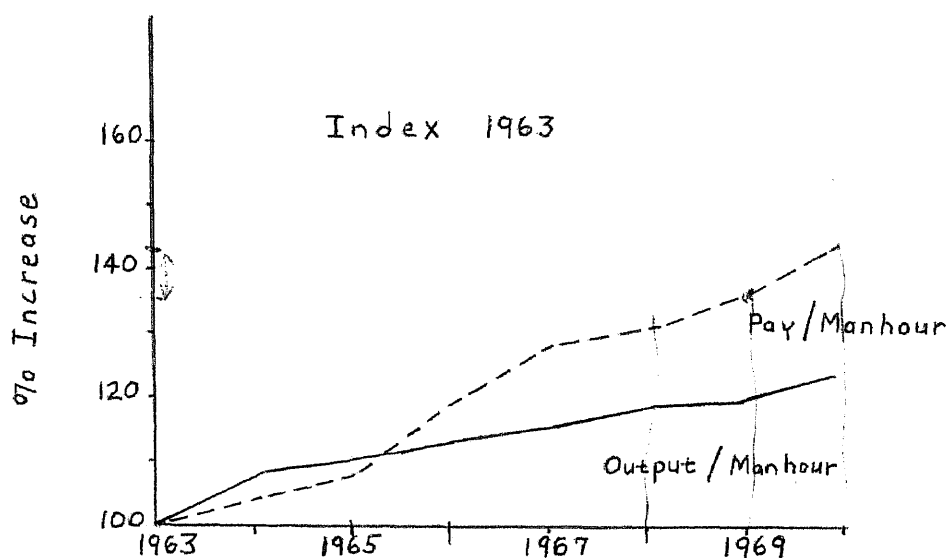


Figure One: Pay and Productivity Increases (12: 64)

Index 1

## Chapter 4

### CONSTRUCTION MANPOWER

#### FACTORS AFFECTING MANPOWER SUPPLY

This article will deal with the following topics and their relation to manpower supply: Wages, Training and Apprenticeship, Barriers to Minority Groups, Obstacles to Worker Mobility, and Work Accidents.

#### Wages

There are a number of factors affecting pay in the construction industry:

1. Amount and type of construction activity
2. Local supply of labor
3. Cost of living in the area
4. Level of skills of the worker - High level of skills will correlate to high wages
5. Decline in work satisfaction (has driven up wage)

Each of these factors will affect the wage demands for any particular geographical area. The greater any of these factors become, the greater the wage demands for the area will be.

Currently, the construction industry has an unemployment rate of 30% (62: 50). Despite this fact, wages and fringe benefits in 1970 rose 17%, and are averaging

approximately 25% this year (62: 50). There are a number of reasons why this has occurred:

1. Effective Union Organization--Control is exercised on the entrance of new workers through apprenticeship regulations and high initiation fees.
2. Average level of skills in the construction industry remains high.
3. Construction occupations are generally more hazardous than other industries, and accident rates are relatively high, as reflected by frequency and severity rates of work injuries (13: 105).
4. Seasonal variations

All of the above factors will affect wages to some degree. There is, however, one aspect that has raised some opposition. This area is seasonality. On a national basis, the Labor Department Bureau of Labor Statistics states that the average construction work year is 1400 hours (27: 70), which breaks down to approximately 35 weeks of work a year. The 1400 hours does not reflect the true picture of weeks worked because it does not show the number of hours worked on an overtime basis.

By using the average weekly earnings of \$132.60 for construction (Based on a 1957-59=100 Index) (13: 133), we obtain a relative idea of earnings between manufacturing and construction.

Based upon 1957-1959 Dollars:

In 1967, Construction Average Weekly Earnings are  
\$132.60.  
Manufacturing Average Weekly Earnings are  
\$98.80.

The yearly earnings of an average construction worker, based upon 1400 hours of work a year, would be approximately \$8523 (Appendix B). This would correspond to \$6879 (13: 20) for manufacturing. By including the lost time due to seasonality, it can be seen that the average construction worker still earns more than his counterpart in manufacturing.

Using the information supplied from Table I, Appendix A, we can see the relative wages for each major industry. (See Figure Two)

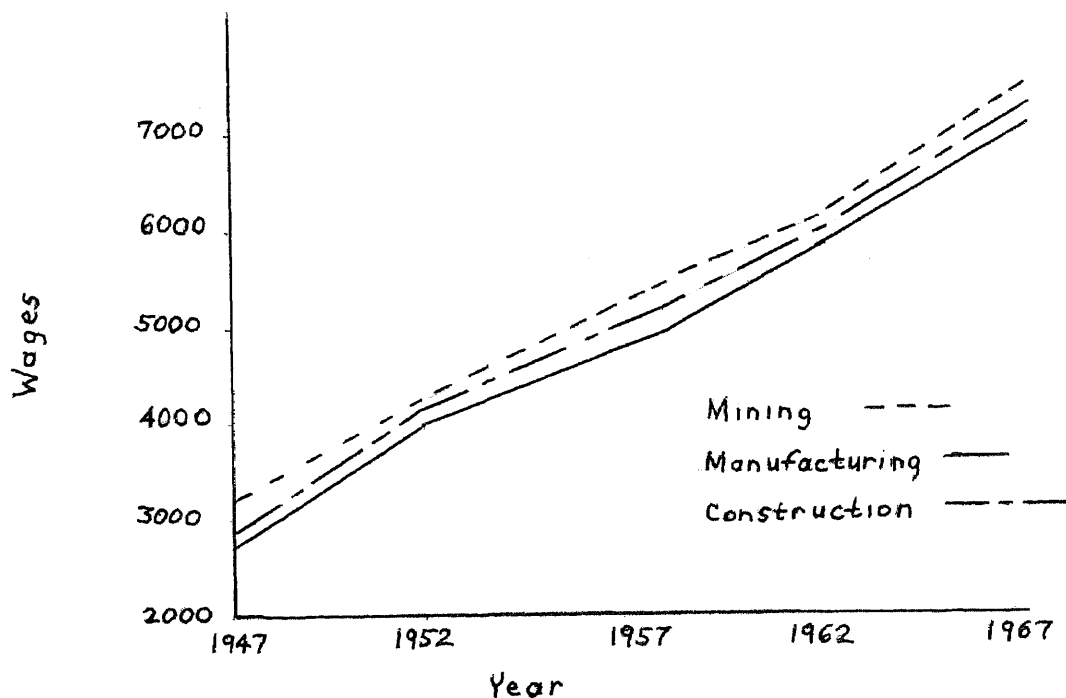


Figure Two: Wages by Major Industries

The wage rates for the first seven months of 1971 have reflected our increasing inflationary economy. The average scale of wages and fringe benefits rose from \$7.23/hour in January, 1971 (51: 51), to \$7.99/hour in July, 1971 (10: 64). This has marked a 10.5% increase in a period of six months.

### Training and Apprenticeship

Craftsmen should be able to handle more difficult work, as well as routine work, and should be able to implement the use of new methods and equipment. To do this, the knowledge and training of construction workers should be sufficient.

Formal training will offer the best course for craftsmen to learn their trade, as well as the best method for guaranteeing the worker job security and increased productivity. Since the foremen are selected from within the crafts, the adequacy of training may eventually affect the quality of supervisory personnel.

In estimating training needs, it is necessary to take into account:

1. Transfers of workers with construction skills, into and out of other occupations
2. Re-entry of craftsmen from retirement under conditions of labor shortages
3. The increased number of skilled craftsmen who might be available from reduced seasonality, and from better utilization of the work force (79: 4).

Currently, the training needs of the industry are

not estimated but are established by a fixed ratio of apprentices to journeymen. An example of the inadequacy of this procedure is shown by the fact that 10% of the labor pool is lost every year because of deaths, retirements, or transfers to other industries. At the same time, apprenticeship programs are graduating about 0.55% per year; therefore, the loss of manpower is made up by the industry through using workers who do not have any training. Currently, less than one half of the construction workers learned their trade from formal apprenticeship programs (79: 4).

The expansion of training programs is hindered by union rules which specify the ratio of journeymen to apprentices. The current ratio of apprentices to journeymen is approximately one apprentice to every six to twenty journeymen. With current programs lasting four to five years, the number of men replacing the men who die, are elevated to supervisory positions, and other forms of attrition, is inadequate. The success of apprenticeship programs will determine the availability of labor. By this standard, the apprenticeship programs are not sufficient, nor successful.

The training of apprentices also suffers opposition from management because many factors will determine the amount of cooperation from contractors. In general, contractors are against training men because the men will most likely leave and go to work for a competitor. To further their position on training men, most contractors do not feel

responsible for the industry's long range manpower needs. According to some sources, the main factors associated with the training of apprentices seems to be the contractors' economic situation, and the token responsibility given to an apprentice.

Another source lists the reluctance of contractors to employ trainees as:

1. After the expense of training a man, he will probably leave and work with another company.
2. A decrease in productivity.
3. An increase of accidents.
4. The cost incurred during training.
5. Impairment of the superintendent's efficiency record (61: 25).

The answers to the training problems must come from both sides. The prospect for better training programs is becoming better. The government has entered the picture and has established guidelines for recruiting union apprentices. Their guidelines include:

1. Aptitude tests must be pertinent to the work involved.
2. Oral interviews would be allowed only if questions pertained to the job, and were objective.
3. Summaries of all interviews must be kept.
4. Rejected applicants must be notified and reasons for rejection given.

The government's push for equal opportunity and an increase in apprentices can be traced to 29 Code of Federal

Regulations Part 30. This directive was issued to establish criteria for the effective recruiting of apprentices.

Other solutions to the problem of apprenticeship could be:

1. Shortened training periods
2. Training of personnel as specialists (42: 23)
3. Having each contractor train one apprentice

The last solution could prove to be the best. If each contractor took the responsibility of training one apprentice (as a result of bargaining with unions), there would be an increase in the number of craftsmen as well as a fair distribution of the responsibility. This would also necessitate the establishing of funds to pay for the training of apprentices, an expansion of the Department of Labor to include establishing programs, and expanding the existing programs (79: 4).

#### Barriers to the Entry of Minority Workers

Construction unions are being challenged for their discriminatory practices. It should be noted that these unions are not discriminatory to Blacks only; they discriminate against everyone. Their practice of issuing work permits rather than membership cards gives the union great flexibility in the selection of a temporary work force.

Racial discrimination in the construction industry has been practiced by both unions and management. Contractors have been fearful of hiring Negroes because they are



fearful of introducing them into public contact positions, and because they do not want non-whites to have low-level supervisory jobs (23: 68).

The unions are currently under attack by the N.A.A.C.P. for the following practices:

1. Refusal of admittance of Negroes to building trades unions; most highly paid skilled construction jobs are held by whites.
2. Exclusion of Negroes from apprenticeship programs
3. Use of hiring halls and referral systems
4. Attempts to evade Federal Law by accepting a token number of Negroes (50: 256)

The opposition from the unions has been successful in blocking major attempts by Negroes to gain jobs. To date, only a token number of non-white workers have been added to apprenticeship programs. In 1966, non-white workers made up 7.4% of all employed craftsmen (79: 5); while in 1968, out of 130,000 men training for construction work, only 9,000 (6.9%) were from minority groups (55: 68).

The primary reasons why Negroes are rejected by the unions are listed as follows:

1. Fear of membership opposition
2. Intra-union power considerations
3. A desire for continued monopoly control over a trade
4. A desire to maintain an unobstructed autonomy of local unions directed by prejudiced officials
5. A feeling that these jobs are white people's jobs (23: 68)

These factors have produced a severe gap between the construction industry and the urban communities.

Construction work in urban areas has been met with much opposition. As a result, the members of the communities have picketed job sites, and even resorted to terrorist tactics in the hope of increasing their representation in unions and construction.

The recruiting of minority workers has been hampered by certain environmental factors such as:

1. Education
2. Inbred fear of seasonality
3. Lack of a relative within the construction union

The lack of education of non-whites is a problem because virtually all apprenticeship programs require the applicants to be high school graduates. From the following statistics, it can be seen that fewer non-whites go to high school.

The median years of education in 1965

Non-whites	10.2
Whites	12.2
	(23, 68)

The second point, inbred fear of seasonality, is predicated upon the fact that most Negroes are raised under the threat of unemployment. As a result, they will usually seek jobs that are more stable and reject the jobs that are seasonal.

Finally, most unions have systems that are based upon nepotism. This affects minority workers because they do not have a father or an uncle with whom they can identify, or who can guide them through apprenticeship. As a result, they do not seek the type of jobs that will eventually lead to apprenticeship programs.

The Federal and State Governments have been trying to reduce the racial barriers through legislation, education, and training. They have been able to exert influence upon the hiring of non-whites through their awarding of contracts, and promises of compliance to the 1964 Civil Rights Act. However, their policies have not been overly successful because the government has failed to provide direction for integration of unions.

#### High Toll of Work Accidents

The problem of spiralling wages can be attributed, in part, to the high toll of work accidents. The exceptional hazards that workers must face are part of the reasons for higher wages and lost productivity.

The Bureau of Labor Statistics stated that the frequency rate for construction accidents in 1965 was twice that of the primary metals industry. The injury severity rate was 25 times as great (79: 7). In the period 1957 to 1965, the construction industry lost over 21 million man-days a year because of injuries; losses which are approximately ten times greater than strike losses (74: 12). With

the preceding and following statistics, you can see why insurance premiums and wage rates are high. The number of accidents is reflected in exceptionally high expenditures for workmen's compensation.

Table I: Work Accidents in the Major Industries for 1966

Industry Group	Deaths		Disabling Total	Injuries Per 100,000 Workers
	Total	Per 100,000 Workers		
All Industries	14,500	20	2,200,000	3,030
Trade	1,300	8	420,000	2,660
Manufacturing	1,900	10	470,000	2,500
Service, Government	3,200	13	580,000	2,310
Transportation and Public Utilities	1,700	40	200,000	4,710
Agriculture	2,900	69	250,000	5,950
Construction	2,800	74	240,000	6,320
Mining, Quarrying	700	108	40,000	6,150

(14: 282)

One reason for the neglect of safety could be the short duration of jobs. The contractor will usually take risks in order to avoid a large outlay of money. A prime example would be not bracing a cut or trench because the duration of the excavation is usually very short, while the cost for bracing would be quite high. The costs incurred for safety would be well worthwhile for the contractor who would eventually be able to accrue a savings from decreased expenditures for workmen's compensation.

Another aspect that is seldom investigated by a contractor is the lost production due to a work accident.

A typical injury cycle might be:

1. An accident occurs.
2. Workers leave their assignment to assist their injured companion.
3. Workers wait around the injured man until first aid arrives.
4. Discussion of the accident proceeds after the worker is removed from the job site.
5. Workers again return to work.
6. Loss of morale results in slower production because men have become overly cautious.

The time elapsed for the first five steps of the cycle will vary from approximately 30 minutes to 60 minutes, depending upon the degree of seriousness of the accident. (Observations made by the author) In some instances, when loss of life occurs, the workers will usually leave the job for the remainder of the day.

A major breakthrough in safety has occurred with the Occupational Safety and Health Act, made effective on April 28, 1971. The safety standards published under this act supercede those under other acts, such as Walsh-Healey and Construction Safety Act. This act now places power into enforcing safety laws through the ability to place penalties up to \$20,000 on violations.

### Worker Mobility

An increase in the mobility of the labor force will

result in greater utilization of manpower resources. The nature of construction work places a high premium upon the mobility of the labor force. Worker mobility will insure that there are enough men available in every location, thereby increasing the level of employment.

Unemployment in construction rose from 493,000 men in December, to 685,000 men in January; and the seasonality rate of unemployment is at 11.2%, according to the Labor Department (51: 51). The rate of 11.2% is much higher than the average unemployment rate in the United States. The reasons for this high rate of unemployment in an industry that is short of trained craftsmen are probably seasonality and a lack of worker mobility.

The worker himself determines how mobile he will be. His degree of mobility will depend upon:

1. Home Ownership
2. Family Ties
3. Age
4. Accuracy of Job Information
5. Ability to Transfer Welfare and Pension Funds
6. Travel Costs

Family ties and home ownership usually limit a man's ability to be flexible and willing to change assignments and locations. The more ties and responsibilities that are exhibited, the less frequent will changes occur.

Age is one of the greatest factors in mobility because the younger worker is not afraid of change. He

usually exhibits a tendency to be more flexible and adaptable than older workers and is associated with not having the responsibilities of families and home ownership.

Mobile manpower and inaccurate job information often leads to misguided job changes. The repercussions of inaccurate job information are many:

1. A lag in finding a new job
2. Undesireable social effects
3. Under utilization of manpower resources
4. Disruption of family relationships

The biggest deterrent to movement of labor is the transfer card system. This forces a union member who moves from one area to another to obtain a permit from the local unions to work there. The union member is now faced with the same discriminatory hiring practices as a non-union member (79: 8).

## Chapter 5

### IS THERE A MANPOWER SHORTAGE?

#### THE NATIONAL PICTURE

The question of whether or not there is sufficient manpower supply has been a big issue in recent years. Contractors have repeatedly insisted that there are not enough men to do the work. On the other side, the unions are adamant in their stand that there is a sufficient number of workers available.

The shortage of manpower will create an imbalance in the labor supply and demand. As a result, the attitude of the men will change, and there will be a tendency for excessive turnover and absenteeism.

Various surveys have been conducted to determine if a manpower shortage does exist in the construction industry. Of the seventy cities surveyed by Engineering News Record, three reported shortages in sixteen or more trades (38: 115). Last year, seventeen cities were reporting shortages. The hardest hit of all the cities was New York, with shortages reported in sixteen trades (51: 51).

The carpenters head the list of shortages in sixteen cities, followed by the electrical workers, cement finishers, and steam fitters. A comparison of surveys conducted between June, 1970, and June, 1971, indicates that a



substantial improvement occurred over the year. However, the rise in manpower can be associated with the unfavorable economic factors, and not with changes within the industry.

The shortages have still persisted, despite the sluggishness in the economy, crippling of construction by a number of bargaining strikes, and a report by the Labor Department that there has been a 36,000 man drop in the construction employment (39: 76).

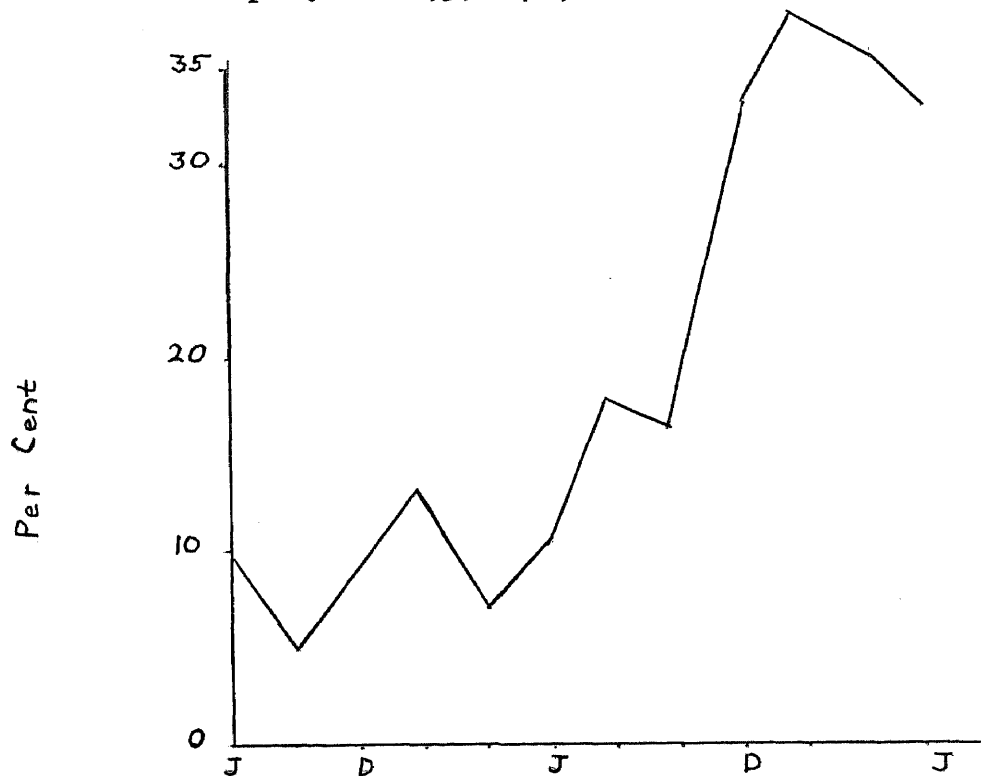


Figure Three: Manpower Shortages--Per Cent of Cities in Which Contractors Reported More Than Half of the Trades with Shortages (19: 80).

## LOCAL PICTURE

The manpower problems in the state of New Jersey reflect those of the nation. From responses to a questionnaire, it has been determined that a shortage of manpower does exist. Contractors responding to the questionnaire have indicated that the shortages were in:

1. All Trades	26%
2. Carpenters	11.5%
3. Plumbers	8.6%
4. Electricians	6.1%
5. Others	47.7%

The above trades are listed in their order of importance as was indicated by the questionnaire.

It is interesting to note that the unions responded by a vote of 32 to 1 that there was no shortage in the past year. An optimistic note is that the unions questioned unanimously agreed that they could meet the manpower requirements of the future.

By studying the responses to the following question, a few observations can be made:

Question: Were your manpower needs met during the past year?

Answer: Yes 73  
No 204

Table II: Breakdown of Manpower Shortages by the Size of the Contractor

Size	Yes	No	Crafts in Order of Importance
\$0 to \$500,000	10	24	Electricians, Carpenters, Laborers
500,000 to 1,000,000	8	23	All trades, tie-H.V.A.C. & Carpenters
1,000,000 to 3,000,000	35	86	All trades, Plumbers and Carpenters
3,000,000 to 8,000,000	14	45	All trades, tie-H.V.A.C. & Electricians
8,000,000 to 12,000,000	2	5	Not enough information
Over 12,000,000	4	21	All trades, Carpenters

Table III: Breakdown of Manpower Shortages by Type of Contractor

Contractor	Crafts--In Order of Importance
Residential	All trades, Plumbers, Carpenters
Commercial	Carpenters, All trades, H.V.A.C.
Industrial	All trades, Carpenters, Plumbers
Institutional	All trades, Carpenters, Plumbers
Heavy	All trades, tie-Plumbers, Carpenters
Earthwork	All trades, Iron Workers
Utility	Not enough information
Other	Not enough information

As can be seen, the presence of a manpower shortage did not affect one type or size of contractor specifically. Instead, it affected all contractors in all sections of the

state. It is interesting to note that the degree with which the manpower shortage affected a contractor depended upon his degree of unionization. The more unionized the contractor, the more he experienced a shortage.

Another aspect of the manpower shortage is seen in the responses of the unions. When questioned about their ability to meet the manpower requirements, 97% of the unions surveyed responded that they were able to meet the requirements of the industry (See Appendix B for survey results).

#### CURRENT EMPLOYMENT CHARACTERISTICS

##### AS A RESULT OF THE SHORTAGE

A question that has evolved as a result of the manpower shortage deals with the current characteristics of employment, and how the contractors have adapted to the shortage.

##### Size of Labor Force

Among the questions asked of unions and contractors were questions geared at ascertaining the size of the labor supply. From the responses, we were able to determine the following:

Average Full Members per Union	1,178.94	88%
Average Apprentice Members per Union	17.3	1.3%
Average Permit Members per Union	142.88	10.7%

(See Appendix B)

The above numbers are not typical of the whole industry because the questionnaire did not have a response from all of the unions. It seems that a question pertaining to the actual union functions is not favorably responded to.

Some discrepancy has been noted in the average number of apprentices. A similar question to the above was asked of the contractors. Their response indicated that 6.57% of the work force consisted of apprentices. (Refer to Table A-8 of Appendix A).

The per cent of work force of apprentices that was reported by contractors' size are the following:

Size of Contractor	Per Cent of Work Force
\$0 to \$500,000	26%
500,000 to 1,000,000	9.67%
1,000,000 to 3,000,000	4.47%
3,000,000 to 8,000,000	6.81%
8,000,000 to 12,000,000	6%
Over 12,000,000	3.42%

The observations that can be made from these statistics are as follows:

1. Apprentices become more prevalent with the small contractor (Under \$1,000,000). This is probably due to the short duration of work, and the greater uncertainty associated with the smaller contractor. The unions will usually leave this type of work to newer members than to the older, more established workers.
2. The sudden decrease and gradual incline in the percent of apprentices in the \$1,000,000 to \$8,000,000 category is indicative of the

contractor's ability, work in the one area, and duration of jobs. The above type contractor will usually absorb more of the book members and permit members than the smaller contractors. Again, the union would rather place their full members to the jobs that have longer durations and better working conditions. Also, this size of contractor will keep a more permanent work force.

3. The decline in apprentices for the larger contractors will indicate the long term employment possibilities, the better working conditions, and the increased use of permit workers. As a result, the unions will assign permanent book members to these better jobs.

By examining the responses of contractors with respect to the type of work performed, it is interesting to note that the percent of apprentices increases as the work becomes heavier in nature, and more unionized (See Table A-9 in Appendix A).

#### Permanent and Seasonal Employment

This past winter (1970-1971), the Labor Department reported the construction seasonal rate of unemployment at 11.2%. The high unemployment rate still came, even though the industry continued to report a shortage of manpower (38: 115).

According to the results of our survey, the construction unemployment rate for New Jersey should be about 31% (Survey question 16 for contractors). Contractors reported an average work force of 63.51% of their summer force for this past winter. Of the remaining 36.49%, we can account for 6.05% (Survey question for contractors) as the average percent of seasonal temporary help used during the summer.

The unemployment figure of 31% has not been verified

by the Labor Department. A number of reasons for such a high unemployment rate could be the following:

1. Failure of workers to report to unemployment offices, for a variety of reasons; such as, traveling for long vacations and the ability to work temporarily in other industries.
2. General lack of work in the state.

It is interesting to note that the rate of winter employment goes up as the degree of unionization increases. A plausible explanation for this is that as the larger, more unionized contractors close down for the winter, the men that are laid off will tend to seek employment with non-union contractors.

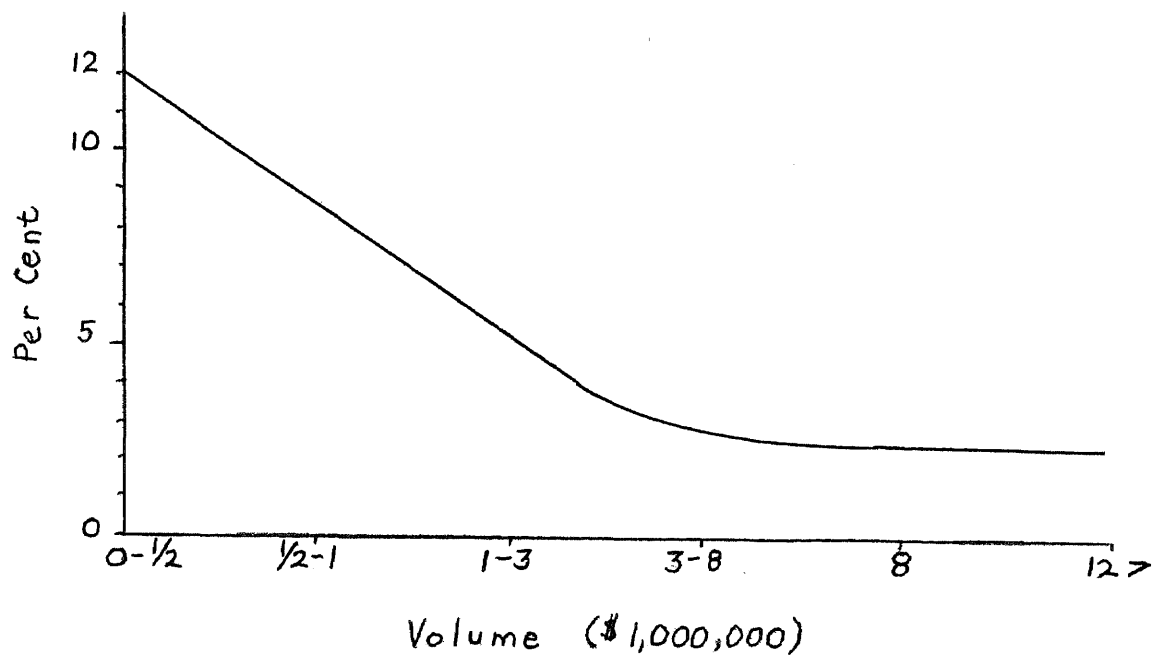


Figure Four: Percent of Work Force that is Temporary Summer Employment (See Table A-12 in Appendix A).

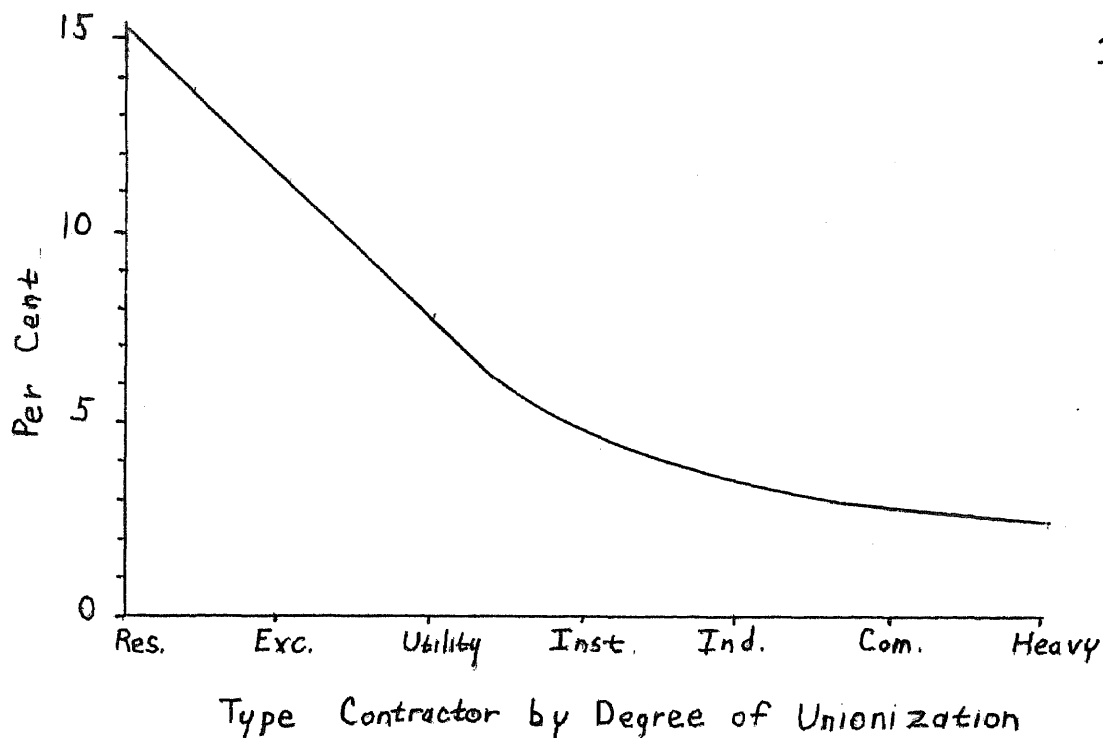


Figure Five: Percent of Work Force that is Temporary Summer Employment, as Compared by Type of Work (See Table A-13 in Appendix A).

From figures four and five, it can be seen that the amount of summer employment will vary according to the type and size of the contractor. The conclusions that can be made from these graphs are as follows:

1. As the degree of unionization decreases, the amount of temporary unemployment increases.
2. The smaller the contractor, the greater his flexibility for hiring non-union workers.
3. The smaller contractor is affected by seasonality more so than the larger contractor.

The last area to be investigated is that of the number of men employed on a full time basis. The unions report that approximately 20% of their forces are employed on a permanent basis (Survey question number 6 for unions).



This figure appears to be quite high, but because of a lack of data, we cannot refute this figure.

The contractors, on the other hand, show an average of 41.1 workers per contractor. The number of workers increases as the contractor gets larger, and more unionized.

#### MANPOWER SHORTAGES AND CONSTRUCTION COSTS

Construction costs will be dependent upon the relative productivity and efficiency of the industry. When labor demand is high and the supply is low, there is a tendency for low efficiency and productivity. The converse of this also holds true.

The contractors in the state of New Jersey were asked if the efficiency of the industry could be increased. The response was 124 yes and one no vote. The lone dissenting vote was cast by a contractor in the less than \$500,000 volume category, in the commercial construction sector.

After establishing that efficiency can be increased, the unions were asked if, in their opinion, the contractors were making effective use of the available manpower. The responses were 74% yes and 26% no. This could possibly indicate that the contractors are partially at fault for rising construction costs and the decrease in efficiency and productivity.

From the survey, contractors indicated, in order of importance, the various reasons for the increased costs.

The following are the results from all sectors of the industry, listed in the order of their importance (Refer to Tables A-16 and A-17 in Appendix A).

1. Manpower Shortage--The effect of the shortage on costs increased as the contractors became larger. The shortage was also observed to increase in importance as the degree of unionization increased.
2. Lack of Unity Among Contractors--This was indicated overwhelmingly by all contractors, irregardless of size and type of work.
3. Hourly Workers Uncertainty of a Stable Income--The effect of stable income varies inversely with the size of the contractor. The bigger the contractor, the less important is the effect. An interesting note is that the higher the contractor's degree of unionization, the more important is the worker's income.
4. Lack of Competent Supervision--A very common complaint with the less than \$500,000 volume contractor, and the Earth Excavator. This is indicative of the father and son businesses that have no benefit of experienced or trained managers.
5. Lack of Research--This figures high with the industries that are material oriented; such as institutional construction.

The exact influence of the shortage of manpower on construction costs probably lies in the 0 to 5% increase area. From the contractors questioned, it is fairly difficult to obtain any meaningful data on costs versus the type of industry. Some sort of handle can be placed upon the increased costs and volume of work performed (Refer to Figure Six).

Overall, the responses were as follows:

Increase in Costs	Percent Response
0 - 5%	28.8%
5 - 10%	23.4%
10 - 15%	19.2%
15 - 20%	12.8%
20 - 25%	5.1%
25 - 30%	10.7%

An interesting aspect of the manpower shortage is the claim that contractors offer inducements (such as overtime), to attract manpower. When questioned about such practices, the overwhelming response was 32% yes and 68% no. The major proportion of yes answers were from the Heavy Contractors.

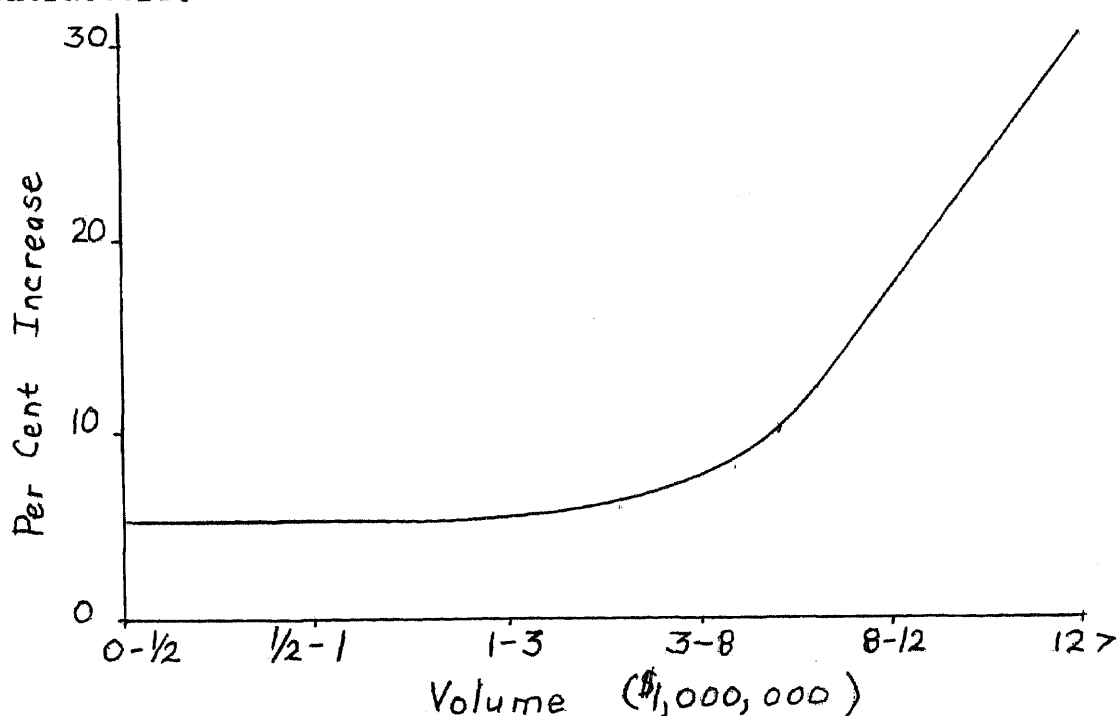


Figure Six: Increased Construction Costs Due to the Manpower Shortage Versus Volume of the Contractor (See A-18 in Appendix A).

Table IV: Hours Worked By Seasons

Season	Less Than 20	20 to 40	Over 40
Spring	6.3%	87.4%	6.3%
Summer	0	91%	9%
Fall	6.3%	90.6%	3.1%

The previous responses tend to indicate the claim that inducements are offered to be invalid. However, information furnished as to the amount of overtime as a percent of work performed will contradict this earlier statement. The only explanation is that the contractors are basically against offering inducements; therefore, they did not wish to emphasize the fact that inducements were being offered.

Table V: Size of Contractor and Percent of Work Performed on Overtime per Season

Contractor Size	Summer	Fall	Winter	Spring
\$0-\$500,000	11.6%	6.4%	1.0%	10.4%
500,000-1,000,000	2.83%	5.2%	2.0%	2.0%
1,000,000-3,000,000	11.44%	5.13%	8.25%	4.0%
3,000,000-8,000,000	11.58%	9%	8.75%	9.67%
8,000,000-12,000,000*	0	0	0	0
Over 12,000,000	15%	5%	6.25%	5%

\*Not enough information available

Table VI: Type of Contractor and Percent of Work  
Performed on Overtime per Season

Type of Contractor	Summer	Fall	Winter	Spring
Commercial	15%	9%	3.5%	9%
Industrial	7.14%	6.08%	6.6%	6.33%
Institutional	4.27%	4.5%	5.6%	5%
Excavation	30%	10%	0%	17.5%
Utility	32.5%	10%	0%	0%

By studying the information obtained, the following observations can be made:

1. The smaller contractor performed less work in the winter than his larger counterpart.
2. The small contractor offered more overtime to his workers than the larger contractors. This indicates a need to offer overtime as an inducement to attract labor.
3. Seasonality does not affect the larger contractors as much as the smaller contractors.
4. More overtime is offered to the building trades in all seasons than to the other crafts.
5. The heavy contractors are affected by weather.

The owners of construction, the architects, and the engineers were polled for their opinion of the effects of construction costs. As a direct result of recent wage settlements, changes in the amount of work were reported.

Amount of Work	Percent Reporting
More	3.61%
Less	53.98%
No Change	42.61%

One question arises from the previous statistics. That is, did the decrease in construction result directly because of increased costs, or because of the economy. To answer this, the owners were asked if recent construction costs influenced them in any way when capital improvements were involved. The majority, 63.7%, of those questioned, answered that they were affected, and would make due with existing facilities.

## Chapter 6

### CONCLUSIONS

"I know, I've heard it before. We're supposed to rebuild all our cities before the end of the century. That's good. That's wonderful. But how are we going to do it if we don't have the manpower?" (8: 22)

There is currently a shortage of manpower in the construction industry. The primary crafts affected by the shortage are the following:

1. Carpenters
2. Plumbers
3. Electricians

These crafts represent the areas of critical shortage. The above crafts and other unions were questioned about their ability to meet the manpower requirements of the industry. Their responses were 97% yes, and 3% no.

#### Size of the Labor Force

The unions indicated an average size of 1,339 members per union. Their breakdown was the following:

Full Members	1,179
Apprentices	17
Permit Members	143

#### Permanent and Seasonal Unemployment

The contractors hire an average of 41.1 union members

on a year round basis, and supplement their work force with summer help. The amount of summer help employed will vary with the degree of unionization, and the size of the contractor.

#### Manpower Shortage and Construction Costs

The manpower shortage provides for approximately 0-5% increase in costs. The contractor usually is forced to offer inducements to workers; usually in the form of over-time. These inducements result in cost increases.

#### Alleviating Manpower Shortages

Alleviating manpower shortages will require more training and the establishment of programs that will allow for promotion from within. When openings arise in the crafts, the men selected for these openings should come from the labor union. The laborers are familiar with construction and can be easily trained to enter another craft. All openings created by the promotion of laborers should be filled by men just entering construction.

To summarize, the contractors in the state of New Jersey are of the opinion that the following are the important factors in alleviating labor shortages:

1. Elimination of Restrictive Work Practices
2. Increase of Union Membership
3. Elimination of Seasonality

The above are listed in their order of importance.



The contractors' responses indicate that there is enough manpower within the industry, but the workers must be freed from non-productive work practices.

Factors Affecting Labor Supply

The manpower supply is affected by worker mobility, influx of minority workers, work accidents, and training and apprenticeship. Each of these areas warrants considerable investigation into its effect upon productivity.

## Chapter 7

### RECOMMENDATIONS

Construction is rapidly becoming outdated in its response to many of the problems confronting the industry. The following recommendations will help to improve the industry:

1. Have all levels of government and private industry project their program of construction so that unions and contractors can plan to meet their requirements.
2. Establish reasonable jurisdictional lines based upon task skills and job difficulty.
3. Reduce the economic strength of the unions at the bargaining table by submitting new contracts to arbitration.
4. Create a neutral third party to control recruiting and training of manpower. Both the contractors and unions have proven to be incapable.
5. Maintain the concept of the hiring hall, but limit its power of recruiting, training, and other management functions.
6. Retain and upgrade laborers for skilled craft work.
7. Increase the awareness of the workers to safety, through programs sponsored by the unions and contractors.

Any improvements that are made to contemporary union-management relations should be carefully examined to prevent domination of the industry. The industry can achieve all of its future goals, if there is parity between the two forces.

An industry that is dominated by one, cannot hope to survive.

Suggestions for Future Study

There are many topics that should be investigated for future study. The following were selected during writing the thesis:

1. Mores and attitudes of the workers, and their effects on productivity.
2. Lack of unity among contractors, and its effects on the industry.
3. The type of contractor, and the effect of the manpower shortage.
4. Projection of future manpower requirements by segment of the industry.
5. Feasibility of training laborers to fill openings in crafts.

## APPENDIX A

Table A-1: Average Annual Earnings per Full Time  
Employee by Industry, 1947-1967  
(Cassinatis, 13: 20)

Industry	1947	1952	1957	1962	1967
Agriculture	\$1,276	\$1,423	\$1,518	\$1,728	\$2,437
Mining	3,113	4,062	5,197	6,017	7,545
Construction	2,829	3,978	4,881	5,846	7,450
Manufacturing	2,793	3,832	4,786	5,730	6,879
Transportation	3,169	4,269	5,432	6,638	8,127
Communication	2,763	3,599	4,553	5,895	7,047
Utilities	2,957	4,088	5,212	6,493	7,964
Trade	2,632	3,298	4,109	4,894	5,890
Finance	2,740	3,539	4,432	5,410	6,720
Services	1,996	2,489	3,110	3,783	4,730
Government	2,575	3,279	4,045	4,993	6,124
All Industries	2,589	3,402	4,230	5,065	6,209

Table A-2: Average Weekly Earnings in Construction  
and Manufacturing, in 1957-1959 Dollars  
(Cassimatis, 13: 20)

Year	Construction		Manufacturing	
	Weekly Earnings	Index (1957-59=100%)	Weekly Earnings	Index (1957-59=100%)
1950	\$83.20	\$80.00	\$69.60	\$82.80
1951	85.10	81.70	69.90	83.10
1952	89.60	86.70	72.70	86.50
1953	92.70	89.00	75.60	90.00
1954	95.00	91.20	75.30	89.50
1955	97.40	93.60	81.10	96.50
1956	101.80	97.80	83.10	98.90
1957	102.40	98.40	83.30	99.10
1958	103.20	99.10	82.10	97.50
1959	106.80	102.50	87.00	103.40
1960	109.50	105.10	87.00	103.40
1961	113.30	108.90	88.60	105.30
1962	116.00	111.30	91.60	109.00
1963	119.20	114.50	93.40	111.00
1964	122.00	117.10	95.30	113.30
1965	126.00	121.10	97.80	116.20
1966	128.90	123.90	99.30	118.10
1967	132.60	127.40	98.80	117.50

Table A-3: Hourly Increases During Year Ending  
January 4, 1971, as Reported by the  
United States Labor Department  
(51: 51)

Trade	Wages Only		Wages and Fringes		Current Rate Level Wages	Average Scale Wages & Fringes
	Cents	Per Cent	Cents	Per Cent		
All Trades	66.3	11.9%	81.7	13.0%	\$6.39	\$7.23
Bricklayers	86.1	14.0%	100.1	14.5%	7.00	7.83
Bldg. Laborers	54.5	12.6%	70.7	14.6%	4.91	5.60
Carpenters	65.8	11.1%	83.1	12.5%	6.64	7.62
Electricians	79.3	12.5%	83.9	11.9%	7.20	7.97
Painters	54.4	10.1%	69.0	11.7%	6.11	6.80
Plasterers	64.4	11.0%	79.0	12.1%	6.56	7.30
Plumbers	81.8	12.9%	103.6	14.0%	7.20	8.52

Table A-4: Hourly Increases During Year Ending  
April 1, 1971, as Reported by the  
United States Labor Department  
(77: 115)

Trade	Wages Only		Wages and Fringes		Current Rate Level Wages	Average Scale Wages & Fringes
	Cents	Per Cent	Cents	Per Cent		
All Trades	69.3	12.3%	85.7	13.5%	\$6.59	\$7.48
Bricklayers	90.3	14.5%	105.1	15.0%	7.25	8.21
Bldg. Laborers	60.8	14.0%	77.5	15.9%	4.98	5.69
Carpenters	65.4	11.0%	83.5	12.4%	6.90	7.92
Electricians	82.3	12.8%	90.9	12.8%	7.42	8.24
Painters	61.4	11.2%	76.0	12.8%	6.34	7.07
Plasterers	69.6	11.8%	84.7	13.1%	6.58	7.36
Plumbers	83.3	13.1%	106.1	14.2%	7.41	8.76

Table A-5: Hourly Increases During Year Ending  
 July 1, 1971, as Reported by the  
 United States Department of Labor  
 (10: 64)

Trade	Wages Only		Wages and Fringes		Current Rate Level Wages	Average Scale Wages & Frings
	Cents	Per Cent	Cents	Per Cent		
All Trades	69.4	11.4%	83.6	12.2%	\$7.04	\$7.99
Bricklayers	89.4	13.2%	99.8	13.2%	7.79	8.71
Bldg. Laborers	57.7	12.1%	75.0	14.0%	5.36	6.15
Carpenters	65.6	10.2%	76.4	10.4%	7.36	8.43
Electricians	87.5	12.8%	99.7	13.2%	7.87	8.77
Painters	54.6	9.4%	68.1	10.7%	6.66	7.44
Plasterers	65.9	10.4%	83.9	11.9%	7.01	7.89
Plumbers	96.3	14.1%	123.6	15.4%	8.00	9.50



Table A-6: Manpower Needs According to Size of Contractor and Order of Importance

Size of Contractor	Masons	Plumbers	Elect.	Carpenters	Laborers	H.V.A.C.	Iron Workers	Lathers	All Trades
\$0 to \$500,000			1	2	3*				3* *tie
500,000 to 1,000,000		3	2*			2*			1
1,000,000 to 3,000,000		2		3	4	5			1
3,000,000 to 8,000,000			2*	3		2*			1
8,000,000 to 12,000,000	Not Enough Information Given								
Over 12,000,000	3*	3*		2					1

Table A-7: Manpower Needs According to Type of Contractor and Order of Importance

Type of Contractor	Masons	Plumbers	Elect.	Carp.	Labor	H.V.A.C.	Iron Work.	Lathers	All Trades
Residential		2		3*				3*	1 *tie
Commercial	4*		4*	1		3			2
Industrial		3	4	2	5*	5*			1
Institutional	4	3		2					1
Heavy		2*		2*					1 Not enough information
Earthwork							2		1
Utility		2*	2*		2*				1 Not enough information
Other		1*		1*					Not enough information

Table A-8: Percent of Work Force That are Apprentices  
by Contractors' Size, as Reported by  
Contractors

Size (Volume)	Average Percent
\$0 - \$500,000	26.00%
500,000 - 1,000,000	9.67%
1,000,000 - 3,000,000	4.47%
3,000,000 - 8,000,000	6.81%
8,000,000 - 12,000,000	6.00%
Over 12,000,000	3.42%

Table A-9: Percent of Work Force That are Apprentices  
by Type of Contractor, as Reported by  
Contractors

Type of Contractor	Average Percent
Residential	2.33%
Commercial	6.20%
Industrial	6.97%
Institutional	5.71%
Heavy	3.00%
Transportation	None Reported
Excavation & Earthwork	40.00%
Utility	8.33%
Other	5.00%

Table A-10: Percent of Summer Work Force Employed in the Winter, Fall, and Spring, by Size of Contractor.

Size of Contractor	Fall	Winter	Spring
\$0 - \$500,000	87.14%	51.43%	88.50%
500,000 - 1,000,000	90.83%	54.58%	79.17%
1,000,000 - 3,000,000	88.78%	61.62%	82.93%
3,000,000 - 8,000,000	90.75%	66.50%	87.30%
8,000,000 - 12,000,000	100.00%	60.00%	100.00%
Over 12,000,000	98.00%	85.00%	98.00%

Table A-11: Percent of Summer Work Force Employed in the Fall, Winter, and Spring, by Type of Contractor.

Type of Contractor	Fall	Winter	Spring
Residential	96.67%	66.37%	86.67%
Commercial	87.65%	63.24%	81.11%
Industrial	90.27%	64.00%	85.13%
Institutional	91.48%	63.15%	88.74%
Heavy	90.00%	70.00%	80.00%
Excavation & Earthwork	95.00%	40.00%	80.00%
Utility	90.00%	60.00%	90.00%
Other	95.00%	67.50%	95.00%
Overall Average	90.49%	63.51%	85.76%

**Table A-12: Percent of Work Force that is Temporary  
Summer Employment, Reported by Contractors,  
and Listed According to Size**

Size of Contractor	Percent Reported
\$0 - \$500,000	12.00%
500,000 - 1,000,000	9.29%
1,000,000 - 3,000,000	3.48%
3,000,000 - 8,000,000	3.88%
8,000,000 - 12,000,000	1.00%
Over 12,000,000	2.60%

**Table A-13: Percent of Work Force that is Temporary  
Summer Employment, Reported by Contractors,  
and Listed According to Type of Work.**

Type	Percent Reported
Residential	15.00%
Commercial	3.14%
Industrial	4.90%
Institutional	3.39%
Heavy	2.00%
Excavation & Earthwork	11.50%
Utility	7.50%
Other	1.00%
Overall Average	6.05%

**Table A-14: Size of Contractor and Number of Permanent Union Employees**

Size of Contractor	Number of Employees
\$0 - \$500,000	6.17
500,000 - 1,000,000	9.13
1,000,000 - 3,000,000	26.34
3,000,000 - 8,000,000	41.81
8,000,000 - 12,000,000	22.50
Over 12,000,000	125.60

**Table A-15: Type of Contractor and Number of Permanent Union Employees**

Type of Contractor	Number of Employees
Residential	41.67
Commercial	28.20
Industrial	37.56
Institutional	55.17
Heavy	68.00
Excavation & Earthwork	0
Utility	25.50

Table A-16: Order of Importance of Factors Affecting Construction Costs, Listed by Size of Contractor.

Size of Contractor	Factors by Order of Importance
\$0 - \$500,000	Lack of Competent Supervision, Manpower Shortage, and Hourly Workers Uncertainty of a Stable Income.
500,000 - 1,000,000	Manpower Shortage, Lack of Unity, and Unstable Income.
1,000,000 - 3,000,000	Manpower Shortage, Lack of Unity, and Unstable Income.
3,000,000 - 8,000,000	Manpower Shortage, Lack of Unity, and Outmoded Building Codes.
8,000,000 - 12,000,000	Manpower Shortage, Lack of Unity, and Lack of Research.

Table A-17: Order of Importance of Factors Affecting Construction Costs, Listed by Type of Contractor.

Type of Contractor	Factors by Order of Importance
Commercial	Manpower Shortage, Lack of Unity, and Lack of Competent Supervision.
Industrial	Manpower Shortage, Lack of Unity, and Unstable Income.
Institutional	Lack of Unity, Manpower Shortage, and Lack of Research.
Excavation	Lack of Competent Supervisors, Lack of Unity, and Outmoded Building Codes.
Utility	Lack of Unity, Unstable Income, and Outmoded Building Codes.

Table A-18: Increased Construction Costs, As a Result of Manpower Shortages, Listed by the Size of the Contractor.

Contractor Size	Percent Increase
\$0 - \$500,000	0 - 5%
500,000 - 1,000,000	0 - 5%
1,000,000 - 3,000,000	0 - 5%
3,000,000 - 8,000,000	5 - 10%
8,000,000 - 12,000,000	5 - 10%
Over 12,000,000	25 - 30%

Table A-19: Percent of Non-Agricultural Employment (Cohen, 15: 53).

Industry Division	1920	1930	1940	1950	1960
Mining	4.5%	3.4%	2.9%	2.0%	1.3%
Construction	3.1%	4.7%	4.0%	5.1%	5.3%
Manufacturing	38.9%	32.3%	33.6%	33.5%	30.9%
Service Producing	53.5%	59.6%	59.5%	59.4%	62.6%

Table A-20: Order of Importance of Factors that Would Alleviate Labor Shortages, Listed by the Size of the Contractor.

Size of Contractor	Factors by Order of Importance
\$0 to \$500,000	<ol style="list-style-type: none"> <li>1. Eliminate Restrictive Work Practices</li> <li>2. Increase Union Membership</li> <li>3. Eliminate Seasonality</li> </ol>
500,000 to 1,000,000	<ol style="list-style-type: none"> <li>1. Increase Union Membership</li> <li>2. Eliminate Restrictive Work Practices</li> <li>3. Eliminate Seasonality</li> </ol>
1,000,000 to 3,000,000	<ol style="list-style-type: none"> <li>1. Eliminate Restrictive Work Practices</li> <li>2. Increase Union Membership</li> <li>3. Eliminate Seasonality</li> </ol>
3,000,000 to 8,000,000	<ol style="list-style-type: none"> <li>1. Increase Union Membership</li> <li>2. Eliminate Restrictive Work Practices</li> <li>3. Eliminate Seasonality</li> </ol>
8,000,000 to 12,000,000	<ol style="list-style-type: none"> <li>1. Increase Union Membership</li> <li>2. Eliminate Restrictive Work Practices</li> <li>3. Other</li> </ol>
Over 12,000,000	<ol style="list-style-type: none"> <li>1. Eliminate Restrictive Work Practices</li> <li>2. Increase Union Membership</li> <li>3. Other</li> </ol>



Table A-21: Type of Contractor and the Order of Importance of Factors that Would Alleviate Labor Shortages.

Type of Contractor	Factors by Order of Importance
Residential	<ol style="list-style-type: none"> <li>1. Eliminate Restrictive Work Practices</li> <li>2. Increase Union Membership</li> <li>3. Other</li> </ol>
Commercial	<ol style="list-style-type: none"> <li>1. Increase Union Membership</li> <li>2. Eliminate Restrictive Work Practices</li> <li>3. Eliminate Seasonality</li> </ol>
Industrial	<ol style="list-style-type: none"> <li>1. Increase Union Membership</li> <li>2. Eliminate Restrictive Work Practices</li> <li>3. Eliminate Seasonality</li> </ol>
Institutional	<ol style="list-style-type: none"> <li>1. Eliminate Restrictive Work Practices</li> <li>2. Increase Union Membership</li> <li>3. Eliminate Seasonality</li> </ol>
Utility	<ol style="list-style-type: none"> <li>1. Increase Union Membership</li> <li>2. Eliminate Seasonality</li> <li>3. Eliminate Restrictive Work Practices</li> </ol>
Heavy	Poor Returns
Transportation	No Returns
Excavation & Earthwork	Poor Returns

## APPENDIX B

## DATA FROM QUESTIONNAIRES

## 1. Yearly Earnings of Construction Workers

Average Number of Hours Worked	= 1400
Average Weekly Earnings (1967)	= \$132.60
Dollar Value	= \$ .63
.'. Average Weekly Earnings in Relation to Current Dollar Value (1967) = \$210.50	
210.50 x 35 weeks	= \$7367.50
Remaining 17 weeks on unemployment \$68 x 17	= <u>\$1156.00</u>
Total Income	\$8523.00

2. Question: During the past year, was your local able to fill the manpower requests of the construction industry?

Union Answer:	Yes	32	No	1
		97%		3%

Comment: Lone dissenter was a Mason Local in Central Jersey.

3. Question: What was the average membership in your union local last year?

Union Answer:

Average Full Members per Union	1,178.94	88%
Average Apprentice Members per Union	17.3	1.3%
Average Permit Members per Union	142.88	10.7%

4. Question: What percent of your membership is employed by a contractor on an annual basis?

Union Answer: 19.86%

5. Question: Can the efficiency of the construction industry be increased?

Contractors' Answer: Yes 124 No 1

Comment: The one dissenting vote was registered by a commercial contractor with a less than \$500,000 volume.

6. Question: Do you believe that contractors make effective use of available manpower?

Union Answer: Yes 23 No 8  
74% 26%

7. Question: Do you find it necessary to offer any inducements over and above wages, to attract manpower? (During the previous year.)

Contractors' Answer: Yes 38 No 81  
32% 68%

Comment: Yes was the major response of the heavy construction contractors.

8. Question: Do you detect any change in the amount of work as a result of recent wage settlements in the construction industry?

Architect-Engineers' Answer: More 3.61%  
Less 53.98%  
No Change 42.61%

9. Question: Have recent cost increases in the construction industry altered your future plans with respect to new construction and/or capital improvements by your organization?

Owners' Answer: Yes 35 No 20  
63.7% 36.3%

Comment: The majority of companies have decided to make due with existing facilities. All companies doing over \$1,000,000 in business have been affected the hardest.

10. Question: Do you feel your local will be able to satisfy construction manpower requests in the future?

Union Answer:     Yes    33     No    0  
                              100%

11. Question: Will the construction industry be able to meet the needs of the country with the present labor-management system?

Contractors' Answers:

Yes   24     19.2%

No    49     39.2%

Maybe   32     25.4%

Don't Know   20     16.2%

Comment: Building contractors were more responsive to the question, and answered predominantly No.

12. Question: Is the idea of "District 50" feasible?

Contractors' Answer:   Yes    46     No    68  
                              40.4%     59.6%

Comment: Yes vote was the largest in \$3,000,000 to \$8,000,000 volume range.

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