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RESEARCH ARTICLE

WHAT HAS HAPPENED TO CONSTRUCTION LABOR IN THE UNITED STATES?

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ABSTRACT

Construction labor has changed in the United States. The ability for members of the construction industry to find qualified labor has gotten harder over the decades. This study will look at what changes have occurred in the population of the United States since the 1950's. Specifically how these changes in population and the increasing development of construction projects effects the ability to find construction labor. The study will compare population data with the amount of construction work being done. We are looking at the changes in our population that have affected the industry in terms of labor that is available. It does not answer the question completely about how to fix the issue of labor, but it begins the conversation in regards to what has happened to labor over the decades and what is likely to happen moving forward.

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INTRODUCTION

In order to understand what has been going on with construction labor it is important to look at what has been happening with construction labor over time. To do this we will be looking at the population of the United States back to 1950. Further the study will look at those people involved in the construction trades during that same period of time. Than once we have that data we will look at what is going on in the industry, in terms of growth within the industry.

The United States Census Bureau conducts and collects census data on the citizens of the United States. They do this data collection every ten years. This data is published and available on the internet. (United States Census Bureau, 2018a) Using the data provided by the United States Census will give the research the most accurate and impartial data on the population of the United States. In order to determine who was involved in the construction trades since the 1950's the research has depended on the United States Bureau of Labor Statistics. The Bureau of Labor Statistics keeps data on all types of industries and who is working in them. (United States Department of Labor, 2018) This is where the data on construction trade labor is kept which is vital for us to see in order to demonstrate what has been happening within the construction industry. This will let us know if there is a growth or decline in construction labor within the industry.

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The Census Bureau is used to bring many different types of data collected by multiple departments together. One of these key data points that is needed for this research is the amount of construction that is going on year to year in the United States. The Census Bureau keeps track of the amount of construction that is being done in the United States in terms of adjusted dollars. (United States Census Bureau, 2018b) This data is a way to look at the growth or decline of construction projects in the United States. We will use this data to compare to population and construction labor data to see how all three relate to each other.

This research is going to look at the long history of what has happened to labor within the construction industry. The best way to do this is to look at the history of the United States population and those involved in the construction industry than we can look at the growth in construction over time. The idea is to allow the researcher and the reader to see the big picture over the decades. The issue of labor is not new, it has been created over time, not just the last decade.

The three factors; total population, participating construction labor, and production have a relationship to each other. They have an effect on the construction industry moving forward. The study evaluates each of these items individually first and then will compare them.

Many different methods have been used to try and explain what has happened with construction labor. This study will use empirical data collected by others, to determine the history of

labor, in order to look at how they may have caused our current construction labor concerns. This research is not subjective, but rather driven by interpreting the numbers provided by the United States Census and the Bureau of Labor Statistics.

Literature Review: What courses should a student take in high school? What should a student do when they leave high school? Should they go to college, community college, vocational program or trade school? There has been a lot written on this subject. What has been written effects the outcome of this study. In looking at the issues of construction labor, the study must look at the alternatives that a student has before and after they graduate high school. A student's choice at this time in life is one with multiple variables that can affect the construction industry and labor. Whether graduating high school or choosing a career path at another stage in life one may want to look at the economics of the choice.

To begin with there should be a look at what the construction industry contributes to our economy in the United States. A large portion of the United State gross domestic product in the area of 4% to 12% is a result of the construction industry. (Hanna, A., Boodai, F. and El Asmar, M., 2013, p.139) The growth in the gross domestic product demonstrates a growth in the economy.

Part of the issue in construction is having people join the construction trades. There is a chance with the cost of college educations going up, but is that enough that this may attract more individuals to vocational and technical training. However, currently a college education still does seem to be a good investment as those with high school degrees only continue to fall behind economically. (Abel, J. R. and Deitz, R., 2014, p. 8) This belief is not shared by everyone. In looking at possible career paths, one article even suggests that parents would be better off putting a student's college fund in a retirement account. (Rose, S. 2013, p.30).

Looking only at college graduation rates is a mistake. The former Department of Education Secretary William Bennett and co-author David Wilezol argue that high school graduates should enroll in vocational and technical programs. They believe that this would reduce four year college's enrollments by as much as 50 percent. (Rose, S. 2013, p.25) Some of the arguments for college degrees are based on earnings over a life time, employment rates, health, and marriage rates. (Rose, S. 2013, p.25).

High school graduates have many directions that they can choose from. Currently we need to look at college, community college, vocational and technical schools. The issue to be discussed here is not about the difference between a high school graduate and a college graduate having vastly different economic power. What we need to be discussing is the difference between a well-trained and skilled construction worker and a college graduate. Especially as we look at the current trends in construction labor.

In a search of the United States Department of Labor, states that 5,060,250 were involved in the construction trades in 2016. (United States Department of Labor, 2018) United States Census Bureau, Put in Place index shows the dollar value growth occurring in the United States construction industry. (United States Census Bureau, 2018a).

Moving forward we will need to look at how these two items labor and production relate to each other. The study tries to develop historical trends that may or may not continue. The study does not look at the effects of how often people within the population change careers. People change careers anywhere from 10 to 15 times in their life. (Doyle, 2018) Moving forward the study will look at data developed by the Department of Labor Statistics and United States Census to examine construction labor over time.

Problem Statement: It has been a decade since we had the great housing depression which caused a housing collapse with subprime loans and the construction industry has had to rebuild itself since. Even before the collapse construction labor has been a concern. The issue is qualified labor that can carry out tasks on a construction site. With the construction industry growing it is important to have a skilled and qualified labor force. The question has to be, why it appears that there is a labor shortage in the construction industry.

This study will look at the relationship between the growth of the construction industry and the growth of the trade population in the industry to see what effect they are having on each other. The study will look at how this relates to the population growth of the entire United States. In the study, we will look at possible reasons for the current relationship between the construction industry and construction labor.

The study will look at and show the past and current relationship between total population, trade population, and industry demand. Once this relationship is shown using historical data it will be analyzed to determine its significance.

Research Process

Population Being Studied

The research looks at several different factors in order to begin to make since of the changes that are occurring in the availability of construction labor in the construction industry. The demand for labor in the construction industry adjusts from year to year in the country. There is historical data that can be used to determine how the availability of labor has changed overtime. (United States Department of Labor, 2018) There is data available on how much construction work is being done from year to year through the United States government. We will look at this data over time in order to get a better understanding of its effects on the industry. This is to avoid looking at just one point in time. The variables that will be used are the United States total population, the United States Population that is involved in the construction trades, and the adjusted dollar value of construction projects in the United States. (United States Census Bureau, 2018a, United States Department of Labor, 2018).

The data needed to do this is available through the United States Census and The Bureau of Labor statistics. The research will be using these resources to construct a timeline for changes in labor for the industry. The data will cover several decades. By doing this no single event in time will control the outcome.

METHODS

The research will look at the direct change in the data from decade to decade as it compares the population of the United

States and those involved in construction trades. The percentage growth of the different decades will be calculated and analyzed. All of the data will be compared to the adjusted dollar value of construction projects in the United States and the growth that has occurred decade to decade. The data will be described later in tables. The population data from the United States Census will be described in a table. There will be data and a percentage will be calculated to show the growth or loss for each decade. The data from the Bureau of Labor Statistics on the number of people in the construction industry will be described in a table.

There will be a calculation to show the percentage of growth or loss for each decade.

The data related to the adjusted dollar value of construction projects will be handled similarly, however, it is in a different unit of measure, the original data is in adjusted dollars. It will be described in a table as well. Calculations will be done on it to show the growth or loss decade to decade as a percent so it may be compared with the other two.

Data Analysis

The following are the tables outlining both the original data and all adjustments made to it through mathematical calculations (See Table 1). United States Population came from the United State Census (United States Census Bureau, 2018a**)** Engaged in the Trades came from the Bureau of Labor Statistics. (United States Department of Labor, 2018) The percentage in the trades came from dividing those engaged in the trades by the United States Population. 10 year population growth and trade growth came from subtracting the previous 10 year growth from the next 10 years of growth and then dividing by the previous 10 years. ((Next 10 years-Previous 10 years)/Previous 10 years) The data is in Table1. Two items to point out with this next table (Table 2) is that the last two years, 2010 to 2016 is not a full decade. Notice that for these years the loss in 2010 also matches the gain in 2016.

Adjusted dollars Put in Place came from the United States Census web-site under the Economic Indicators section for construction spending. (United States Census Bureau, 2018b) The percent change every 5 years came from subtracting the previous 5 year growth from the next 5 years of growth and then dividing by the previous 5 years. ((Next 5 years-Previous 5 years)/Previous 5 years) This is all demonstrated in Table 2. Table 3 demonstrates population growth within the United States and Trade growth in the United States.

United States Population came from the United State Census (United States Census Bureau, 2018a**)** Engaged in the Trades came from the Bureau of Labor Statistics (United States Department of Labor, 2018) 10 year population growth percentage, trade growth percentage, and construction growth percent came from subtracting the previous 10 year growth from the next 10 years of growth and then dividing by the previous 10 years. ((Next 10 years-Previous 10 years)/Previous 10 years) This is all demonstrated in Table 3.

RESULTS

The point of the study is to look at relationship between labor and the construction industry. In the project we have looked at the fact that the population of the United States has continued to grow. Construction labor as a percentage of population has remained relatively consistent in relationship to the population.

The finding show that the dollar value of construction projects had grown over the decades even when the dollar value is adjusted. Using the population data, the number of those working in the industry, and the dollar value of projects the study has compared these items in order to evaluate the relationship between these factors.

The data shows a clear growth in the dollar value of projects. The other area of increase has been in the United States Population. There has been minor increase in the number of people involved in the construction trades. The findings and results of this project come from the comparison of the previously mentioned data and looking at the relationship between the data. (Table 3).

The results get difficult to view in some ways because of the large dip in the construction industry in 2007 and 2008. This is shown in the data (Table 2) where both people involved in the industry has stayed relatively consistent, except a dip at 2010. It shows a similar dip for the growth of construction.

When you look at Table 3 you can see that the percent increase in the dollar value of construction is moving faster than the percent increase in labor. However part of the issue may be in reading the charts based on the large lose in construction in 2007 and 2008. In order to get a better look at this we are going to change our interval from 10 years to 20 years to minimize the effect of 2007-2008. As seen in Table 4.

Table 4 was derived from Table 1 and 2. Population growth percent, trade growth percent and construction growth % came from subtracting the previous 20 year growth from the next 20 years of growth and then dividing by the previous 20 years. ((Next 20 years-Previous 20 years)/Previous 20 years). In this Table (Table 4) we see a negative growth in those participating in trades and still a positive growth in construction. It also shows that the growth of construction is out pacing the growth of those entering the trades. If we look at the data and try to project the table to 2020 by using the average growth from year to year, the result is Table 5.

While it is difficult to project the growth of population, trade, and construction growth for 2020, due to the events that occurred between 2006 and 2010 that can distort the data several things are obvious. For the first time population growth is out pacing those going into the trades. This is while there continues to be growth in new construction projects. Construction growth out paces both population growth and growth in the trades. The effects of the recession that hit the construction industry between 2006 and 2010 may be having the greatest effect on the calculations. The data does show continued growth in construction projects.

DISCUSSION

Implications

If the current trends continue we will continue to have a trade labor shortage. This not only will affect the industry negatively, but could also affect the greater economy as this could affect other businesses and industries abilities to expand

Table 1. United States Population and Compared to the Population in the Construction Trades

Year	U.S Population	Engaged in the Trades Population	Percent of Population in Trades	10 Year Population Growth	10 Year Trade Growth
1950	151,325,798	2,250,333	1.49%		
1960	179,323,175	2,650,583	1.48%	18.50%	17.79%
1970	203,302,031	3,156,250	1.55%	13.37%	19.08%
1980	226,542,199	3,622,750	1.60%	11.43%	14.78%
1990	248,709,873	4,114,083	1.65%	9.79%	13.56%
2000	281,421,906	5,295,583	1.88%	13.15%	28.72%
2010	308,745,538	4,172,917	1.35%	9.71%	-21.20%
2016	323,127,513	5,060,250	1.57%	4.66%	21.26%

Table 2. Adjusted Dollars and the Percent Change

Year	Adjusted Dollars Put in Place Construction Production	Percent Change Every 5 Years
1965	81,886,000,000	
1970	105,890,000,000	29.31%
1975	152,635,000,000	44.14%
1980	273,936,000,000	79.47%
1985	403,416,000,000	47.27%
1990	476,778,000,000	18.19%
1995	557,818,000,000	17.00%
2000	828,768,000,000	48.57%
2005	1,132,149,000,000	36.61%
2010	809,256,000,000	-28.52%
2015	1,113,648,000,000	37.61%
2016	1,185,683,000,000	

Table 3. Population and Growth

Year	United States Population	Population Engaged in the Trades	Population Growth Percent	Trade Growth Percent	Construction Growth Percent
1970	203,302,031	3,156,250	13.37%	19.08%	29.31%
1980	226,542,199	3,622,750	11.43%	14.78%	158.70%
1990	248,709,873	4,114,083	9.79%	13.56%	74.05%
2000	281,421,906	5,295,583	13.15%	28.72%	73.83%
2010	308,745,538	4,172,917	9.71%	-21.20%	-2.35%
2016	323,127,513	5,060,250	4.66%	21.26%	46.52%

Table 4. Percent Growth

	Population growth % (since 1960)	Trade growth % (since 1960)	Construction growth % (since 1965)
1980	26%	37%	235%
2000	24%	46%	203%
2016	15%	-4%	43%

Table 5. Projected Percentage Growth

	Population Growth % Projected 2020	Trade growth % Projected 2020	Construction growth % Projected 2020
1980	26%	37%	235%
2000	24%	46%	203%
2020	10.88% (projection)	7.03% (projection)	63.37% (projection)

and grow. Infrastructure continues to be discussed as a national need. If something like that were to move forward the shortage of labor would be made even more severe. There is going to be a need to find new sources of labor. There are two possible routes. One would be the creation of more short term training programs. This could be done by creating specific training programs for different trades that give the basic skills needed. This could also be done through unions, certification programs, and degree programs at community colleges. The other possibility would be to import the labor. Use our immigration laws to import the skills that we need from other countries. In many ways this could in time be what has to happen if we do not increase the training of our own citizens. We may need immigrant labor to keep our construction sites active.

The choice here is simple, we either stop growing and moving forward or we have to find a solution to the problem. What we can't do is nothing. We are at a point now where we need to begin to solve the problem of trade labor. In looking at the data it illustrates the point that growth in the industry is out pacing the growth in construction labor. It will take decades to turn this around, just like it took decades to get in the situation. This demonstrates the need to come up with a program that grows trade labor.

Future Research and Recommendations

The issue has been caused by decades of neglect. The shortage did not happen overnight. Looking at specific trades to see which parts of the construction industry will need help in the future is one place to start. Research aimed at determining the reason why the trades are not attracting new people.

The data above and the inability to keep up with the trade labor need, also demonstrates the need for strong vocational programs in our high schools and community colleges. It further demonstrates the need to be able to explain and market to the local communities the importance of those involved in the trades. A program that describes the skills and incomes of those involved in the trades is another key aspect in recruiting new members to the trades. There is a societal issue in what it thinks of those in the trades. We need to get past this by illustrating the importance of career diversity. Skilled labor is both a well-paid and honorable profession.

CONCLUSION

In examining the data above one can see the development of an issue in regards to trade labor that is available for existing and future construction projects. The growth in trade labor seemed to be the highest in 2000. Since that time it has not been increasing at as great of a rate. (Table 1 and 3). In looking at the overall growth of the industry trade labor has been an issue for decades. If you look at the data specifically starting in the year 2000 you can see that after that date gains in trade labor gets out paced by the growth in the industry. In further examination show that since 2000 trade labor is also being out paced by population growth. Since the recession that began to hit the industry in 2006 through 2010 and beyond, seemed to further damaged trade labor, even though construction activity continued at a slower rate of growth than had occurred previously. The key long term is for more training. We need to look at high school vocational education programs, community college training programs, and trade unions. Opportunities for apprenticeship programs and internships in the construction fields are also important to grow the trade base. In summary we need to grow the trade base once again.

Declarations

Availability of Data and Material: The Reference section details all of the locations where the original data was collected. This is where the data used to create all of the tables for the research was located. Specifically most of the data can be found on the United States Department of Labor web-site (https://www.bls.gov/iag/tgs/iag23.htm), and the United States Census Bureau web-site. (http://www.census.gov/ construction/c30/c30index.html**)**

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Authors, Contributions: There is only one author on this research project. The author is solely responsible for the selection of the topic as well as the research that was completed. The author also created all of the tables that are referenced in the article.

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