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Is There a Demographic Labor Cliff that Will Affect Project Performance?

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Construction Industry Institute
Research Team 318, Is There a Demographic Labor Cliff that
Will Affect Project Performance**

**With assistance from
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Contents

<i>Chapter</i>	<i>Page</i>
Executive Summary	v
1. Introduction	1
2. Demographic Data Analysis	7
3. Impact of Craft Labor Availability on Project Performance	21
4. Conclusions and Recommendations	25

Executive Summary

After decades of facing periodic workforce challenges, many construction industry leaders seem to have become habituated to the idea of a looming skilled workforce cliff. With increasing concerns that imminent severe labor shortages could affect many projects—even as the industry continues its recovery from an economic downturn—the industry response is once again likely to be, “We’ll find the workers we need,” or “No shortage will exist if we pay enough.” While true to some extent, these statements are short-sighted and do not acknowledge the deeper problem.

CII chartered Research Team (RT) 318, *Is There a Demographic Labor Cliff that Will Affect Project Performance*, to determine whether the industry is in fact now facing a skilled labor cliff. The team found that such shortages are expected in the southwestern and southeastern United States among welders, pipefitters, and electricians. However, the more pressing issues are the long-term structural changes in the construction craft workforce, including the following:

- At a time when the wage gap between construction craft labor and all other industries has shrunk, construction craft workers are increasingly more motivated by higher wages than they are by job satisfaction.
- The average age of the construction craft workforce is increasing three times faster than the average age of workers in all other U.S. industries.
- Lack of educational attainment among the Hispanic workforce serves as a barrier to Hispanic workers moving into the higher-skilled trades that are more in demand, such as welding, pipefitting, and electrical.
- The decline in career and technical education among high schools across the country and the emphasis on four-year degrees as a path to career success have contributed to the shortage of experienced high-skilled workers.

This research summary presents empirical project-based evidence that workforce shortages are directly correlated with at least three key elements of project execution:

1. Safety – A labor shortage could cause OSHA TRIR rates on projects that range from 0.26 to 0.94, depending on the severity of the shortage.
2. Cost – A labor shortage could cause project cost escalations of more than 17 percent, depending on the severity of the shortage.
3. Schedule – A labor shortage could cause projects to experience schedule delays of more than 22 percent, depending on the severity of the shortage.

The research team used this analysis to develop Implementation Resource (IR) 318-2, *Craft Risk/Availability Forecasting Tool (CRAFT)*, a predictive model to determine craft labor availability for specific projects. The team also produced Research Report (RR) 318-11, *Is There a Demographic Labor Cliff that Will Affect Project Performance?*, to document the research process in technical detail.

The skilled labor market for the construction industry has a serious structural problem, and the longer industry leaders erroneously assume that the market will take care of itself, the more severe the problem will become. All industry stakeholders must contribute to the solution. As the ultimate buyers of construction services, owners must demand robust workforce development efforts to level the playing field for labor providers. Labor providers must invest in establishing a skilled workforce pipeline to ensure a sufficient numbers of workers when and where they are needed. By diligently planning for their workforce needs earlier in the project planning process, all stakeholders can muster greater capacity to influence their projects' labor components and more effectively manage labor risk.

Introduction

The North American construction industry has experienced multiple boom and bust economic cycles over the past half-century, forcing all construction stakeholders to adapt to constantly changing market conditions. Construction craft workers are no different. In 2014, the average age of a skilled construction craft worker was 41 years old. Assuming this average worker entered the workforce at the age of 18, he or she would have experienced three significant recessionary periods to date. While the severity and length of these recessionary periods may have differed, members of the previous generation likely experienced similar cycles during their time in the construction industry. So, the question arises as to why anyone would assume that the current labor market is different?

Since the 1980s, construction industry groups such as the Construction Business Roundtable and the Construction Users Roundtable have predicted shortages of skilled craft labor in North America. Since then, the construction industry has seen craft labor shortages emerge at the ends of several periods of economic growth. However, because of the economic contraction that followed the growth each time, the craft labor shortage was “solved” by the resulting labor surplus. Because this pattern has been repeated so many times, some in the industry view craft shortages as simply an inherent temporary problem that the industry has to endure at the tail end of economic growth periods. However, others argue that the craft labor shortages experienced over the past several decades are indicators of a more significant problem; they see it as a craft labor “cliff” that will permanently debilitate the construction industry.

Considering the recurring nature of craft shortages over the past several decades, RT 318 was charged with determining whether the frequency and extent of craft shortages are increasing or decreasing over time. To do this, the team formulated the following objectives:

1. Analyze the trends of craft labor availability in the United States and Canada.
2. Examine the ways craft availability affects individual project performance.
3. Determine how companies and projects can mitigate the effects of craft shortages or at least estimate their likely effects.

The research methodology used to achieve these objectives involved an extensive statistical analysis of data from publicly and privately available databases, as well as data collected from an RT 318 project-specific survey. The database data were collected from the following sources: the National Opinion Research Center General Social Survey; the U.S. Bureau of Labor Statistics' current U.S. population survey and current employment statistics; Alpha Resources; the National Center for Education Statistics; the National Center for Construction Education and Research; Statistics Canada; Build Force Canada; the Construction Users Roundtable Construction Labor Market Analyzer; and the CII Benchmarking & Metrics database. All told, the team collected more than two million individual data points from 12 different databases.

Before attempting to identify a labor cliff, the research team determined that it would first need to define the term; and it defined it as a craft labor state in which project performance is significantly affected by one or more workforce issues (e.g., labor quantity or quality). The team derived this definition from its analysis of project performance of 29 of the projects it surveyed and 68 projects from the CII Benchmarking & Metrics database. (All these projects were located in North America.)

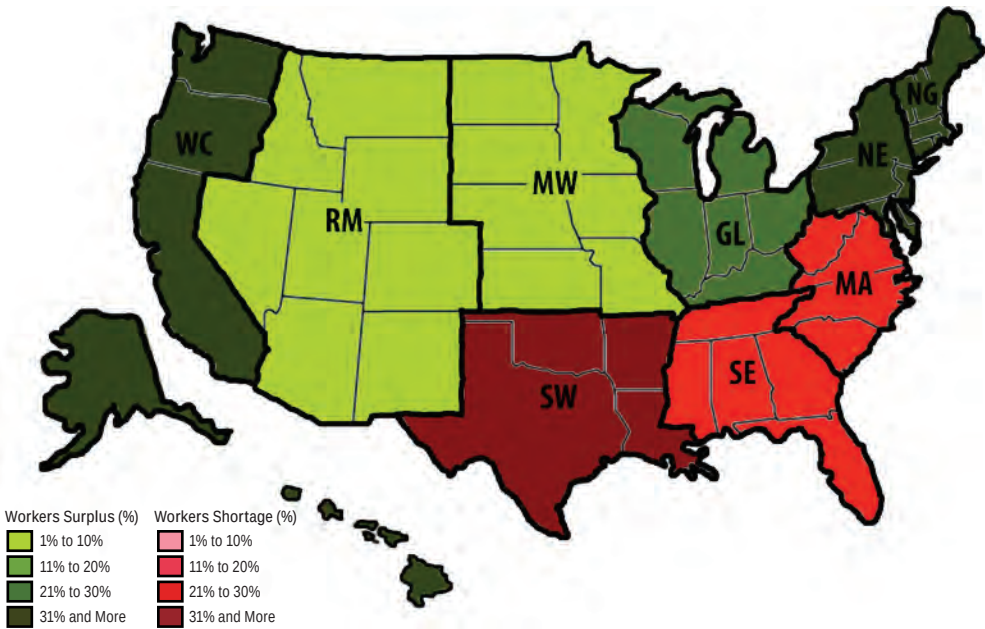
Table 1 shows the changes in project performance (for safety, cost, and schedule) for projects that experienced three different categories of staffing difficulty. The table shows that craft labor shortages can have a significant impact on project performance and provides one example of how awareness of a craft labor cliff would be important foreknowledge for construction organizations.

Table 1. Performance of Projects Affected by Craft Labor Shortage

Craft Labor Staffing Difficulty	OSHA Number of Recordable Incident Cases per 200,000 work hours	Average Cost Change (%)	Average Schedule Change (%)
Moderate/ Severe	0.94	17.3%	22.5%
Slight	0.43	3.2%	12.8%
No Difficulty	0.26	-6.2%	6.4%

Data Source: RT 318 Project Survey and CII Benchmarking & Metrics Database

In addition to finding these general performance impacts of labor shortages across the entire North American continent, RT 318 also determined that a craft labor cliff exists for some regions of the U.S. for specific trades. Figure 1 projects the availability of pipefitters by region in the first quarter of 2018, based on owner- and contractor-supplied data to the Construction Users Roundtable Construction Labor Market Analyzer and Industrial Project Reports. This color-coded map reveals that some regions of the U.S., especially the Southwest and Southeast, are expected to experience severe pipefitter shortages, while other areas will experience surplus labor conditions for this trade. RR 318-11 provides projections for welders and electricians that display similar regional patterns.



Source: Construction Labor Market Analyzer and Industrial Project Reports

Figure 1. Future Pipefitter Deficit/Surplus for First Quarter 2018

While Table 1 and Figure 1 respectively show general performance impacts and the likelihood of regional craft labor shortages over the next several years, these scenarios depend greatly on market conditions (e.g., rising and falling energy prices) and other factors. So, although the near-term cliff may be avoided due to falling construction demand, more alarming long-term trends are also evident. For instance, the finding that some regions have significant shortages while others have significant surpluses indicates that some craft workers may not be as mobile as they were in previous periods. Indeed, emerging research shows significant increases in construction craft worker spousal employment over the past four decades, a shift that may significantly limit construction worker mobility currently and in the future.

The RT 318 analysis also indicates that the industry has underlying structural factors that are precipitating a craft labor cliff different from the ones generated at the ends of economic cycles. These short-term and long-term trends are examined in Chapter 2. Chapter 3 presents a statistical analysis showing how these trends could have negative impacts on project performance.

