The Causes of Electrical Labor Shortages within Central California

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Labor shortages within various trades in the construction industry have become a prominent issue throughout the world for decades. The negative effects due to lack of manpower affect construction personnel ranging from general contractors to manufacturers who are finding themselves struggling as many subcontractors are having to turn down work, which in turn affects general contractors timelines in projects - extending durations, and increasing costs. There has been general research done that has provided some insight, suggesting the root cause be attributed to the baby-boomer generation retiring, or a general lack of interest in the industry. This research paper on labor shortages within the electrical trade in Central California. By narrowing the parameters of research, generalizations will be avoided, and more focused root causes will be uncovered. The objective of this research paper is to identify specific causes which in turn could lead to answers that will benefit members of the construction industry, trade schools, and electrical workers

Key Words: Labor, Trades, Shortage, Electrical Workers, Construction

Introduction

Labor Shortage in the Construction Industry

There has been an increasing labor shortage within the construction industry for many years. The older generation retiring is not the only attribution to the decline in skilled workers entering the workforce; young people are showing less interest in the industry, and are not being introduced to trades from a young age (Mazzullo, 2002). The consequences of the labor shortage are trickling into the industry from general contractors to manufacturers, and causing a domino effect of issues. Most notably, subcontractors are having a difficult time meeting deadlines due to lack of laborers (Becca Oken-Tatum, 2019). Costs are increasing, and firms are asking their workers to do more work than they are physically able to do (Becca Oken-Tatum, 2019). The implications regarding labor shortages have taken a toll on the industry as many are navigating how to not only attract more skilled workers, but also manage the negative effects that are currently taking place.

Literature Review
There has been generalized research done on the subject of labor shortages. According to one study, “the need for new skilled construction workers nationwide is in excess of 100,000 per year. And AGC statistics show that the construction workers left have aged with the rest of the workforce.” (Mazzullo, 2002). The lack of young skilled workers entering the force is the most critical problem in the industry as of right now, as they are necessary to maintain the productivity within the industry. While the older generation is retiring, much research has concluded that young individuals aren’t aware of trade programs (Mazzullo, 2002). One study stated, “Finding more skilled workers is the most critical issue facing the industry, says Corey Peterson, executive vice president of AGC of Kansas. He says for the past few years schools have phased out industrial arts programs in their curriculum, turning wood shops into computer labs.” (Mazzullo, 2002). By phasing out wood shop and industrial art programs, young individuals could not be aware of the opportunities and job guarantee within the construction industry.

The lack of programs, and implementation of curriculum that pushes for four year university attendance has been attributed to less awareness of the industry, and a lower involvement in trade schools. Vice President of MSI Mechanical Systems, INC. Brain Hooper, mentioned in an interview, “We're seeing a lot of these people nearing retirement, and the younger kids - the ones who at one time would have gone into the trades - are now going on to four-year colleges and moving toward computers and other industries.” (Stone, 2007). Hooper attributes the trade shortage to the lack of programs which can be faulted to the state, as industrial electives are being phased out. Hooper has been working toward establishing partnerships among New Hampshire high schools, established trade workers and equipment vendors in an effort to introduce and prepare tomorrow's industry leaders as he believes this will result in awareness in younger generations. (Stone, 2007)

The effects on the industry have been apparent to anyone working in construction. A recent survey from USG Corp. and the U.S. Chamber of Commerce showed “the U.S. construction worker shortage caused 81 percent of firms to ask skilled workers to do more; while 70 percent struggle to meet deadlines; 63 percent report increased costs for new work; and 40 percent said it caused them to reject new projects.” (Becca Oken-Tatum, 2019). Many subcontractors are having to turn down work, which in turn affects general contractors timelines in projects- extending durations and rising costs up.

**Research Objective**

The labor shortage has created issues within the construction industry over the past few years. Prolonged construction projects, higher costs, and not enough workers to keep up with the ever growing industry are just some byproducts of this shortage. While there’s been much research on this topic, it has often been vague and generalized resulting in conclusions that could potentially be a result from the baby-boomer generation retiring, little knowledge of trade schools, or lack of interest in the industry. Due to the generalized results found thus far, in order to find more precise answers, this paper hones in on a specific trade in a specific area. The trade specifically researched was the electricians in the Central California area. The main objective of this research is to find specific underlying reasons for trade shortages in the construction industry. This research will aid members of
the industry, trade school teachers, and electricians in finding a root cause which can in turn, could result in solutions.

For members of the industry such as construction companies and personnel who rely on electricians to often perform the electrical aspects of a construction project, this research will aid in providing knowledge as to why there is a lack of subcontractors in the field available. With knowledge comes possible solutions as well. With some of the findings from this research, solutions could be drawn which in turn could lead to elimination of the shortage. This would benefit contractors by allowing them to avoid delays caused by lack of labor, and increase ability to take on more jobs rather than turning them away due to inability to find work.

For trade school teachers and professors this information will aid in guidance to alter their current procedures of enrollment. A huge aspect of the trade shortage is the lack of young individuals enrolling in trade schools. When professors within these schools can be informed on the reasoning behind the lack of enrollment, they can establish procedures such as going to high schools and presenting information, or implementing a sit-in program where interested students could sit in on a class or two to gauge their interest. In turn, this will attract more young individuals into the program, and also spread awareness regarding the programs.

Lastly, electricians will benefit from this research as it will provide some answers to the prominent concerns in the industry. The results will optimally provide answers as to what is causing a trade shortage within the Central California region, specifically. Because of the specificity of this research, deeper answers might unfold in comparison to some of the more generalized research that has been done. With these specific results, electricians can utilize the results to their advantage in implementing their own protocols to acquire more individuals in the workforce.

**Methodology**

The research conducted was predominantly qualitative research. While there are past theories on this topic, new information was explored rather than testing past theories. This past research was collected through primary sources in forms of previously published journals. Secondary sources were another form of research that were collected in forms of articles and newspapers. After initial research, interviews were conducted. These interviews were semi-structured, and consisted of baseline questions which often alluded to a follow up question, or seeking more information based on the interviewee. Some of the interview questions that resulted in yes/no answers were sent out as a survey to gauge percentages. The interviews lasted anywhere from 10 minutes up to an hour, and were all conducted via zoom, phone call, and in the case for survey questions- Google Forms were utilized. The people interviewed were chosen based on their contribution to the electrical industry, and the assumption that thoughtful answers would be shared. Electrician trade school educators, current trade school students, current electricians, high school students, and members of the International Brotherhood of Electrical Workers were all interviewed.


**Interview Questions**

Questions for current electrician / IBEW member:

What made you first want to get into the electric industry?

Prior to entering the industry, what was your perspective on working in the construction industry? Working specifically as an electrician?

How and/or why did you choose this career path?

What is/are the reason(s) you continue to work within the industry as an electrician?

What do you consider to be some of the negative aspects working in the industry?

Are you aware of the labor shortage within the industry, specifically electricians? How did you become aware of this if so?

If you answered yes to the above question, Why do you believe there is a labor shortage within this field?

What do you think should be done about the labor shortage that could benefit the industry?

Questionnaire for trade student:

What made you want to get into the industry?

Did you have background knowledge prior to enrolling as a student?

Are you aware of a labor shortage within the industry?

Are you aware of the labor shortage within the industry, specifically electricians? How did you become aware of this if so?

Questionnaire for electrical trade teachers:

How did your career in the electrical trade begin?

What led to you becoming a teacher in the trade industry?

Do you believe there is a labor shortage within the industry, and if so, why do you think the labor shortage exists? Specifically electricians? How did you become aware of this if so?

If you answered yes to the above question, Why do you believe there is a labor shortage within this field?

What do you think should be done about the labor shortage that could benefit the industry?

Do you see enrollment rates in the electrical trade program improving or declining?

What is the general attitude of students enrolling the program -proactive in choosing their profession, or reacting to the need to start working?

Questionnaire for current high school students:
What are your plans after high school?

Did your high school offer these programs to the student? wood, auto, metal, and welding. Have you ever had programs at your school that include trades such as welding, electrical, mechanical, and/or wood work?

Do you know what trade schools are? If so, have you ever thought of going into a trade school?

Has anyone ever come and talked to you about these options?

**Analysis**

**Current Electricians**

*CalTrans*- Brandon Akers is a licensed electrician that has worked for EES, Helix Electric, Berg Electric, and is now working on the central coast of California as an electrician for Caltrans. Aker’s involvement in the electrical industry dates back to when he was in high school where he worked for a family friend’s construction company (Brandon Akers Interview). When asked why Brandon chose this career path he stated, “the technical aspects and detail of installations always caught my eye. I was going to Hancock College, and one of my professors wrote on the board one morning all of the average salaries for each degree level. I knew what electricians were being paid at that time, and decided to pursue a career in that field.” (Brandon Akers Interview). Akers also mentioned that working in the industry for a majority of his career has been a learning opportunity as every job brings different challenges (Brandon Akers Interview). However, Akers stated there are negative aspects such as the inability to become a journeyman electrician with on the job experience (Brandon Akers Interview). One must complete an apprenticeship program, and pass a state test that is based on reading code books and basic electronics. While this could be great for project managers, or electrical engineers- it simply does not prepare one for job site electrical work, and also requires you to attend school inhibiting your ability to work during those years. According to Aker’s, “most young kids do not have the will or means to do this while being paid as an apprentice. I also think that the solar industry has created so many more electrical jobs, there just simply are not enough electricians out there to fill all of the jobs” (Brandon Akers Interview). While there are electrical jobs open, there seems to not be enough electricians to fill them. Akers attributes this to the apprenticeship program, and believes that if there were more opportunities for online training apprenticeship programs, there would be a larger enrollment. “Some of these schools are only available in large cities. I attended the Western Electrical Contractors Association. I traveled on my own money, twice a year for two weeks at a time. This was very difficult on an apprentice salary. I would assume this deters a lot of younger people still” (Brandon Akers Interview).

*Electricraft, Inc.*- Electricraft, Inc. is a San Luis Obispo, CA local company that offers electrical installation, repair service, and general electrical construction for residential, commercial, solar, and public works construction. Ken Brown is an electrician working for Electricraft that was pulled into the electrical industry when working in the mining industry. While the mining industry gave Brown the ability to put himself through school, the electrical industry was attractive due to the engineering and mathematical formulas that were involved (Ken Brown Interview). While much of construction
trade work consists of manual labor- the electrical trade is somewhat different as it allows one to work at a desk utilizing mathematical equations, but also involves field work as well. Brown has worked from the bottom to now supervising and managing the electricians within the company. At Electricraft, Inc. Brown has witnessed an immense labor shortage with very few skilled electricians able to meet the demand (Ken Brown Interview). When asked what could possibly attribute this shortage from Brown’s perspective, it was said, “I believe all physical labor related jobs are less popular due to the availability of high paying and less physically demanding Tech Jobs.” (Ken Brown Interview). As for what can be done to curb this shortage, Brown doesn’t see a clear answer to that. An easy answer would be to offer higher pay, but that will not change the fact that working in the electrical industry requires a physical aspect (Ken Brown Interview). One must be intrigued, willing, and have a working mind and set of hands to connect all the dots required to wire a house or building.

Tyler Stefanich is an employee for Electricraft, and works under Ken Brown. Stefanich originally was a mechanic intrigued by the electrical component of working on cars, and eventually joined a union to work as an apprentice (Tyler Stefanich Interview). Not only did the critical thinking and mathematical aspect of electrical work compel Stefanich to enter the industry, he also had a positive outlook on the construction industry as a whole as it “provided a possibility for a great career and future.” (Tyler Stefanich Interview). A huge aspect of the industry, according to Tyler, is working in elements that aren’t ideal for many people. “We are almost always working outside in the elements. So in the winter you can be freezing in the mornings and have multiple jackets on. In the summer you can be working in a ditch at 100 degrees out and sweating through your shirt. A lot of people can’t handle this type of work.” (Tyler Stefanich Interview). Although Stefanich mentions this drawback, he highlights the opportunities that arise with this line of work such as doing something new everyday, and undergoing free union training rather than potentially enduring debt for a college education. Stefanich believes a major reason why individuals are not entering the electrical trade is due to the push for young adults to pursue four year degrees rather than get involved in an apprenticeship program (Tyler Stefanich Interview). Stefanich stated “I try to speak to people who are unsure of what they want to do with their life. To let them know there are many paths to having a successful life. Going to college and getting in debt isn’t always the best path. Since student loans are now the second highest form of household debt and estimated at 1.6 trillion dollars there are much better options out there. The union training that we get is free, they are just looking for time from you.” (Tyler Stefanich Interview.) Just like there is a push to prioritize higher education, doing the same thing with the skilled trade industry would give the opportunity for those that may not know other options. To add, Stefanich brought up the new infrastructure deal that will be providing openings for many skilled trades, “With the infrastructure deal that was just passed, there are going to be so many jobs for decades in order to repair the failing infrastructure in the US. But specifically, I feel we need to re-emphasize the need for those workers. Without the skilled trades we wouldn't have the world we have today.”(Tyler Stefanich Interview). Emphasizing the need for these workers as much as the need to go to college could provide opportunities for young adults who might not be entirely ready for the college route.

Central Electric- Central Electric is based in Atascadero, CA, but performs work throughout the Central California region. Owner, Miles Ley, founded the company, and performs work from residential to commercial to more niche construction such as fuel sites. Miles’s son, Nathan Ley, works as a full-time licensed electrician for Central Electric. The electrical industry is all Nathan has ever known, and was involved at a young age given his Dad’s influence. Recounting his initial
involvement, Nathan stated, “family is the reason I got involved in the industry: it was all I ever knew, and was what put food on the table growing up. I got pretty good at it learning from my Dad starting at a young age. I think it’s a fun job that keeps me on my toes everyday.” (Nathan Ley Interview). Nathan did not believe there were many drawbacks to entering the industry, and believes everyone should attempt working in a trade before enrolling in college. “Everyone is pushed to go to a four year college and pay thousands of dollars pursuing something they might not even like. Getting a job as an electrician requires little time and cost, and can provide a financial lifestyle that is similar to some people who pay thousands of dollars to get a degree.” (Nathan Ley Interview). Ley recalled noticing a labor shortage within the past few years, “there’s a huge labor shortage right now. We can’t find any help anywhere which is why we are working overtime almost everyday.” (Nathan Ley Interview). To combat this labor shortage, Ley emphasized the importance of implementing trades in primary school from a young age. “I was exposed to being an electrician from birth, by the time I was in high school I knew that’s what I wanted to do because I was already helping my Dad out. If more people were exposed earlier they might be more interested.” (Nathan Ley Interview).

International Brotherhood of Electrical Workers- The International Brotherhood of Electrical Workers is a union that represents workers and retirees throughout the world to ensure electrical workers make fair, livable wages (Who We Are). Business manager, Mark Simonian for IBEW 639, the San Luis Obispo location, entered the industry due to his draw towards being on the site from beginning to end, “the electrician is there from start to finish, while other trade members are just getting their portion done, it’s more or less job security.” (Mark Simonian Interview). Simonian appreciated the core values of the International Brotherhood of Electrical Workers which includes aspects such as retirement, health care, and livable wages which are critical to every person (Mark Simonian Interview). As for a labor shortage, Simonian has not experienced any problems. “My job is to refer electricians to contractors, if you were to call me for an electrician, I would have one for you tomorrow. We have roughly 60 applicants at any time.” (Mark Simonian Interview). Simonian did mention there could be labor shortages for specialty electricians such as ones needed for more niche jobs that require special electrical work like fueling, or other specialty construction. However, Simonian has not experienced any problems filling manpower requests throughout his involvement within IBEW (Mark Simonian Interview).

Electrical Teachers

Cuesta College- Cuesta College is a state approved training provider of a General Electric certification. Once enrolled, students can work as an electrician trainee, and can continue to work if 150 classroom hours each year are completed until qualified for the certification exam. Passing this exam grants students their state electrician certification (Electronics and Electrical Study, 2020). Eric Finlayson works as a teacher for the electronics and electrical trade department which provides the necessary classes and hours for students to become prepared for state examination. Finlayson got involved in his teaching career after working in the residential solar roof business which led him to the opportunity to teach at Cuesta College. Finlayson recalled there has always been a skill shortage since he started his career, “I have always experienced a labor shortage within the industry. I have dealt with sub contractor’s employees who could not read a tape measure after seeing them on the
jobsite for several weeks. It seemed I was always training laborers to better their skills.” (Eric Finlayson Interview). The labor shortage from Finlayson’s personal accounts attributes mostly to a lack of skilled workers in the industry, a result of inability to find qualified electricians. From Finlayson’s perspective, the reasoning for this could be due to the blue-collar and the current cultural stigma within the industry, “our cultural sphere promotes schooling and money instead of building a good life and knowing oneself. Add to these aspects a cultural stigma associated with blue collar work.” (Eric Finlayson Interview). These reasons require cultural and social repair over a period of time, and is no way a short term answer. However, Finlayson mentioned that students enrolled in the electrical program at Cuesta are “generally more proactive than students in other trades” (Eric Finlayson Interview). This indicates that the students enrolled might be more productive and less reactive to the need to start working. While there are many job openings, the enrollment rates for the electrical program at Cuesta College have remained rather stagnant throughout the years with no significant change of enrollments (Eric Finlayson Interview).

Fresno Area Electrical Training Center- Long time teacher, Robert Getz of the Fresno Area Electrical Training Center was led into the industry due to his father’s influence. After working in the industry for 38 years, Getz went into teaching to share his experience, and work with the incoming generation. When it comes to students, Getz stated he has not seen a shortage of enrollment, “We have 200 people on the waitlist to enter Fresno Area Electrical Training Center.” (Robert Getz Interview). On top of that, Getz believes the students enrolled are “the brightest and best skilled set in the industry. They take a state certified test, then an interview if they do well.”(Robert Getz Interview). Currently, Fresno Area Electrical Training Center has the largest first year group from 25-50 students. Considering the general attitude of students entering the program Getz commented that, “A lot of military veterans are looking for a new career, and ages 18-45 getting into the trade, it’s all over the spectrum.” (Robert Getz Interview).

Electrical Trade Students

IBEW 639- Max Threlkel is a first-year student of the apprenticeship program through the International Brotherhood of Electrical Workers at the San Luis Obispo location. The apprenticeship program is a five-year program that combines classroom and on the site training. Once the program is completed, students will graduate as a state certified Journeyman Inside Wireman. (Who We Are). Threlkel had very little knowledge prior to entering the trade, but both his dad and uncle worked as electricians which gave him enough knowledge to pursue the electrical career path (Max Threlkel Interview). Threlkel recounts how he decided it was the route he wanted to take, “My dad first suggested it because I didn't know what I wanted to do in college, and from then on I talked to people in the trade and came to a conclusion.” (Max Threlkel Interview). Threlkel mentioned he is aware of the trade shortage, which was another underlying reason he got involved in the apprenticeship program. As for the general work conditions, this is something that drew Threlkel in, “I enjoy it a lot, I think it's way better than sitting at a desk staring at a screen.” (Max Threlkel Interview)

Fresno Area Electrical Training Center- Second and fourth-year students were interviewed at Fresno Area Electrical Training Center. After speaking to sixteen students, thirteen of the students got
involved in the trade due to parental or familial influence, while the others had heard of the opportunities through friends, or third parties. In a survey, 68.8% stated they had background knowledge prior to entering the industry, and 68.8% were aware of a skill shortage within the trade. However, 78% of the students who did not believe there was a trade shortage with the industry mentioned they do believe that there was a shortage at one time, but believe enrollment rates are improving.

### High School Students

**San Luis Obispo High School** - A survey with questions regarding trades was sent out to senior students at San Luis Obispo High School. San Luis Obispo High School recently added engineering design & drawing electives along with construction electives. On top of these newly added industrial technology electives, they provide metal, auto, and wood classes some of which internships are available to the students. However, the student responses showed that only 3 out of 112 students are planning to attend a trade school after high school. Although 3 out 112 students were planning to attend trade school after high school, 56.3% of students had participated in at least one of the industrial technology electives. However, only 25.9% of students ever considered going into an apprenticeship program or trade school, and 9.8% of students did not know what an apprenticeship/trade school was. A majority of the 109 students who do not plan on going to trade school, plan on attending two year or four-year colleges. Lastly, 64.3% of students responded that they had never been informed of trade school and apprenticeship options through San Luis Obispo High School.

**Arroyo Grande High School** - A survey with questions regarding trades was sent out to senior students at Arroyo Grande High School. Arroyo Grande High has electives such as welding, wood, auto and recently added a construction elective. Of the 28 students that responded to the survey, none were planning on attending trade school. 85.7% of students reported not ever participating in any of the industrial technology electives offered at Arroyo Grande High School. Only 17.9% responded they had considered going into a trade school or apprenticeship program, while 14.3% did not know what trade/apprenticeship programs were. 71.4% of students stated they had never been informed of apprenticeship options at Arroyo Grande High School.

### Conclusion and Future Research

In the Central California region, a majority of current electricians that were interviewed have experienced a prominent labor shortage with the exception of The International Brotherhood of Electrical Workers. IBEW attributes a possible electrical labor shortage to areas of construction that are more specialty. While teachers in the electrical industry have ranged from not experiencing any changes in enrollment status to experiencing the largest enrollment with 25-50 students. Students in the electrical trade program are mostly aware of the labor shortage with some outliers. Almost all students who answered were drawn into the industry due to familial pull, and had background knowledge of the industry. No students reported enrolling due to exposure from high school, and/or influence from high school staff. As for high school students, trades in the form of elective classes have recently been added to course catalogues in the Central California region. A majority of high school students have taken elective classes offered such as construction, welding, wood, and engineering design that are now being offered to students which shows that students are interested.
While students are participating in these elective courses, they are not considering entering the workforce, nor are they aware about apprenticeship/trade school options. These courses are rather new, and are voluntary elective programs that are not required for a student to graduate. Although trade teachers and even members of the International Brotherhood of Electrical Workers reported high enrollment of students; in retrospect, 25-50 students enrolling in the program is considerably low in comparison to enrollment of community and four-year colleges. The root problem seems to stem from primary schools, and the push for students to attend four-year colleges starting as early as elementary school, and persisting into high school where college counselors, spokespersons, and mandatory classes are provided for students leaving students unaware of opportunities and benefits within the trades.

The labor shortage is not going anywhere anytime soon. It seems as though the root problem is occurring at a high school level. Students are in majority taking the offered elective courses aimed at trades, but still not showing interest in going into trade schools. This could be due to bad stigma, or lack of knowledge. What is present is an interest in the classes, but what could be further studied is what is missing between the interest in these elective courses, and actually entering the workforce.

References/ Appendices


Mark Simonian Interview. (2021, November 10). personal.

Max Threlkel Interview. (2021, November 9). Personal.


Nathan Ley Interview. (2021, November 9). personal.

