Volume 4 Number 2 Fall 2016

The CTE Journal

An International Peer Reviewed Career and Technical Education Online Journal

Sponsored by Indiana ACTE

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Addressing the Challenges of Growing an Effective Advisory Committee

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Abstract

Career and technical education programs are required by federal legislation to employ advisory committees (Carl D. Perkins Career and Technical Education Act, 2006). Unfortunately, many educators do not yet have the relationships, confidence, or experience necessary to make the most of such opportunities. This article was written to identify and address several of the challenges that educators face when working to grow an effective program advisory committee. Developing strategies for committee recruitment, organization, and involvement will help educators better support local students and employers.

Introduction

Career and technical educators are respected for their content area expertise. While many offer strong pedagogy, knowledge, and technical skills, the support of a program advisory committee can add value to any program. Properly managed advisory committees can ensure that instructors remain engaged with local stakeholders and active industry professionals. Furthermore, the committee can help instructors stay abreast of notable industry trends. These benefits are likely why the Carl D. Perkins Career and Technical Education Act (2006) mandated that career and technical education programs employ local program advisory committees. While there are many benefits to operating a successful advisory committee, some educators find it difficult to network outside of their school environment. This article was written to address several of the challenges that educators face when working to grow an effective program advisory committee.

Forming Effective Advisory Committees

Developing a career and technical education advisory committee can be a challenging assignment. The work of creating connections to industry and organizational partners can be both time consuming and intimidating. However, the benefits of developing school-community partnerships are undeniable. Partners have been known to provide guidance on current industry practices, mentorship for students and staff, program donations, and more. By identifying and addressing the challenges of creating an effective advisory committee, educators can learn to make the most of such relationships. Teitel (1994) defines an advisory committee as a group of volunteers that meets regularly on a long-term basis to provide advice and/or support to an institution or one of its subunits (p.5). When forming an effective advisory committee, it is important to consider the intended scope of the program. Take time to identify the state standards, articulation agreements, and local employer demands that should be satisfied by program graduates.

While committees should include postsecondary, student, and community representatives, most members of the advisory committee should have expertise in a related career field. For example, if a Landscape Management program offers dual credits in agribusiness, horticulture, and landscape design, then members of the advisory committee should be recruited from each of these areas.

When deciding whom to recruit, one should consider a candidate's place of business as well as their position within the company. It may be insightful to hear from someone who is new to the industry, but if one of the program goals is to increase graduate placement with local employers, then it may be helpful to bring in an HR representative or a hiring manager. It is not essential that all committee members are corporate executives, but it is important that members are willing and able to help accomplish program goals.

Arrants (2011) believes that, "former students and employers provide the most valuable feedback when it comes to determining what your program delivers and what graduates need" (p.9). Many programs have found success by recruiting graduates who are working in related fields. Program graduates can serve as passionate and well-informed contributors. They may also offer impactful testimony regarding the effectiveness of the program.

Committee members may be recruited through current networks of guest speakers, student employers, etc. However, it is likely that educators will need to recruit some members from outside of their existing contacts. Outreach efforts may include cold calls, referrals, and/or introductions at industry specific events. Given our nation's current emphasis on the technical "skills gap" and college and career readiness, many technical training programs have experienced increased attention from employers. It may seem intimidating to meet with industry professionals face-to-face, but such a format is often more effective than a phone call or email invitation. Arrants (2011) suggests letting potential committee members know who you are and why you value their input (p.9). Educators who do not feel confident calling on community members are advised to partner in their outreach efforts with other instructors, existing community partners, and/or school administration.

Industry professionals are more likely to serve on advisory committees if they understand the benefits of participating. DiMattina (n.d.) suggests that benefits could come in the form of positive public relations, networking opportunities, and a higher quality workforce (p.2). Before approaching a potential committee member, it is important that educators develop a clear recruitment message that includes benefits to both students and committee members. If possible, recruiters should also be prepared to discuss time commitments, planned activities, and committee structure.

Schaeffer & Rouse (2014) noted that, "The major functions of advisory committees include those around assessment and counsel, assistance, promotion and advocacy" (p.3). Not only should advisory committee members be well informed of industry expectations, but they should also be passionate individuals who are interested in promoting the value

of the program. Meeting personally with potential committee members will help to determine whether or not the individuals have the confidence and communication skills necessary to effectively represent the program. It may also be beneficial to seek the counsel of someone with experience in advocacy and/or advertising, whether or not they join the committee full-time.

For those who work in geographic areas without much local industry, educators are encouraged to reach out to postsecondary partners, larger businesses in the state, and/or associations that support the targeted industry. It may also be possible to engage industry professionals using virtual tools such as Google Hangout, Skype, or GoToMeeting.

Advisory Committee Management

Once committee membership has been established, organizers must work to ensure that meetings address the needs of the program. Worth (2008) noted that "Advisory councils can make important contributions – both financial and otherwise – but they must be managed well to realize their full value to the institution" (p.49). A leadership structure, with roles such as chairperson and secretary, should be established. This structure will help to ensure that meeting dialogue is both efficient and well documented. The program instructor should not serve as the advisory committee chairperson. It is best if this role is held by a business or industry partner, so that the instructor can be free to contribute without the distraction of managerial responsibilities. Collaboration is vital to the success of an advisory committee, so the identified leader(s) must encourage cooperation among all participants. If conversation is routinely dominated by one or more members of the group, it may be useful to employ written questionnaires or post-it notes that are submitted anonymously and read aloud by the chairperson.

It is important to be sure that the entirety of formal meetings is purposeful. This can be accomplished by writing agendas that center on priority topics. Meeder and Pawlowski (2012) suggest that, "The number one priority is to focus on the quality of the program, its effectiveness in meeting the needs of students and employers, and creating a culture of action and excellence" (p.31). Time may be afforded to topics such as student goals, curriculum, equipment needs, upcoming activities, etc. Committee meetings should be scheduled regularly so as to allow for timely feedback throughout the year.

Advisory Committee Retention

Researchers Nagai & Nehls (2014) found that, "Focused expectations will help prevent feelings of disappointment or low satisfaction with board service" (p.13). It is also important to plan for advisory committee involvement in student related activities such as recognition ceremonies. Providing opportunities for members to get to know one another is worthwhile. Relationship building can occur at informal meetings or when attending student-focused events. Some educators struggle with advisory committees that have high turnover and/or low meeting participation. Member retention and engagement are strongest when individuals feel connected, and when they feel that their efforts are having a positive impact on others.

Addressing Ineffective Advisory Committees

CTE advisory committees are meant to provide guidance and support to educational programs. If a committee is no longer considered to be productive, then goals, activities and membership should be evaluated. It is important for the educator to define challenges facing the committee. If committee goals relate to program enrollments, and the enrollment numbers remain low, then it may be possible for the group to design more effective recruitment activities. If committee members regularly fail to show up for meetings, then a discussion with said committee members might resolve the issue. If the committee directs the program in a way that does not align with the program goals, then the committee may have a focus that is too broad or narrow. The educator has a responsibility to help address performance issues within the committee. Over time, it may be necessary to add, subtract, train, or replace committee members.

The Role of School Administration

CTE administrators play an important role in establishing and supporting program advisory committees. Administrators can show their support by participating in networking efforts, offering professional development related to advocacy and community engagement, and by allowing release time for committee activities. Administrators are strongly encouraged to participate in committee meetings, and to assist in accomplishing committee goals when appropriate. Instructors and committee members will be more likely to devote resources to program activities when they see that school administrators are also invested in helping to grow the program. Individual recognition, such as thank you notes, can also be used to show committee is not operating effectively, either in the opinion of administration or the views of committee leadership, administrators should support instructors in rectifying the situation.

Conclusion

Growing an effective advisory committee can be a challenge. It takes time, effort, and strong communication skills to recruit a qualified advisory team. Following recruitment, detailed planning, goal setting, collaboration and follow through are required to make committee efforts fruitful. Investing in a strong advisory committee can pay dividends in the form of professional advice, mentorship, and classroom supports. While effort is required, an effective advisory committee can make the difference between an outdated program and a world-class training experience that inspires college and career ready graduates.

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Veterinary Technologist and Technician Career Path Exploration

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Introduction

The purpose of this article is to give detailed and information to those who are potentially interested in pursuing a career as a veterinary technologist or technician. This article will assist in developing a deeper understanding of what a career as a veterinary technologist and technician would be like. Topics explored in this article include: responsibilities of a veterinary technologists and technician, how to become one, the pay and benefits and the job outlook.

Responsibilities of Veterinary Technologists and Technicians

The main responsibility of veterinary technologists and technicians is to care for animals through observing their behaviors and conditions. They also work to provide care or aide to recovering and injured animals. This care and aide includes bathing the animals, maintaining the animal's hair or clipping their nails. Veterinary technologists and technicians can also assist the veterinarian. This assistance involves conducting a variety of procedures and research (Department of Labor, 2015).

Both technologists and technicians assist the veterinarian with a variety of tasks. These tasks consist of restraining animals during examination or other procedures, as well as administering anesthesia and monitoring the animals' responses. They also assist the veterinarian when he or she is not looking after an animal. This assistance consists of conducting laboratory work on samples, such as blood, taking and developing x-rays, preparing animals and instruments for surgery, and collecting and recording an animals' health history. Not only can veterinary technologists and technicians assist a veterinarian, but they can also assist scientists. When working with scientists, technologists and technicians make sure that the animals are handled with care and are treated humanely. They also help the scientist conduct research for biomedical, disaster preparedness and food safety purposes (Department of Labor, 2015).

The tasks for veterinary technologists and technicians rely heavily on advancements in technology. Without technology, many of the practices used for the care of animals and for conducting research could be considered inhumane. Some tools and technology associated with a veterinary related career path can be medical software for various species of animal, emergency medical devices, equipment to catch animals without harming them and equipment to improve the care and wellbeing of animals (O*NET Veterinary Technologists and Technicians, 2015).

Veterinary Technologists

Veterinary technologists are responsible for more advanced research conducted with animals. They mainly work with veterinarians and/or scientists in a laboratory setting. They administer medication, prepare samples for examination, and record information about an animals' signs of pain, weight, diet and genealogy.

Veterinary Technicians

Veterinary technicians are responsible in assisting a veterinarian either through laboratory duties or through the examination of an animal. Technicians also get a chance to communicate with pet owners. They explain pet diagnoses and how to properly administer medication prescribed by the veterinarian (Department of Labor, 2015).

How to Become a Veterinary Technologist and Technician

Completing high school with some courses in biology and mathematics and postsecondary education is necessary for both occupations. Work based learning enhances career readiness while pursuing an education. Being a technologist or technician is dependent on how long one wishes to attend postsecondary school. Veterinary technicians must complete two years of education for an associate's degree in veterinary technology. Veterinary technologists must obtain a bachelor's degree in veterinary technology (Department of Labor, 2015). While in postsecondary school, technologists and technicians may have the opportunity for specialization in one or more of these areas: avian medicine, biomedical research, clinical pathology, clinic supervision, dentistry, emergency medicine, exotics, large animals, small animals and surgery (Veterinary Technician Job Description and Duties, 2016). Both technologists and technicians also must complete and pass a credential exam called the Veterinary Technician National Examination proctored by the American Association of Veterinary State Boards. Certification is not mandatory but can be beneficial to finding employment. Not only does someone need to possess the motivation to complete an education and pass an exam for this career path, but candidates must possess certain skills to be successful. These skills include: compassion for both humans and animals, communication, problemsolving, manual dexterity and focus on details (Department of Labor, 2015).

One organization, the American Association for Laboratory Animal Science (AALAS), offers certification for technologists and technicians who would like to work in research. Additional developmental opportunities can be through Laboratory Animal Technician and Laboratory Animal Technologist (Department of Labor, 2015). This organization also offers a certification titled Assistant Laboratory Animal Technician. The AALAS also offers educational and membership opportunities that allow one to be well informed about the technological and academic advancements in laboratory animal science (AALAS, 2014).

The work environment should be considered when pursuing a career as a veterinary technician or technologists because there are some dangers to be aware of in this career field. This career can be challenging. The physical demands can include standing for long

periods of time, cleaning animal cages and holding animals. The emotional demands can include witnessing the abuse of animals and assisting in the euthanasia of animals. Injury and/or illness incidents occur at a higher rate than the national average of all careers for veterinary technologist and technician. Injuries can occur when working with aggressive or frightened animals. The work schedule for technicians and technologists varies. Most laboratories and veterinary clinics operate 24 hours a day, making scheduling for work dependent on the availability of the staff. Working weekends and holidays is required (Department of Labor, 2015).

Pay and Benefits for Veterinary Technologists and Technicians

Salary and wage information has been available since May 2014 through the U.S Department of Labor (2015). The median annual salary for all employees in 2014 was \$35,540. Meanwhile the observed median annual salary for veterinary technologists and technicians in 2014 was \$31,070. The range of salary for employees in this particular occupation from the lowest ten percent to the highest ten percent was \$21,390 to \$45,710 (Department of Labor, 2015). According to a report provided by U.S.News.com (2016) the average annual salary in 2014 was \$32,350. It should be noted that a veterinary technologists and technicians that work in full-time research positions earn a higher salary (Department of Labor, 2015). There are some benefits attributed to this career path. Since veterinary technologists and technicians have to work weekends and/or holidays, there is a chance to receive overtime by covering another employee's shift. Other benefits include: social security, healthcare and a pension plan (Salary.com, 2016).

Job Outlook for Veterinary Technologists and Technicians

Veterinary technologists and technicians have a projected rate of 19% employment growth from 2014 to 2024. This is much faster than the average rate of all occupations within the U.S. economy. In 2014, the Department of Labor reported that there are a total of 95,600 veterinary technologists and technicians. It is projected that a 19% growth rate will increase the number of available positions to 113,600. This is a total of 17,900 new positions from 2014 to 2024. The overall outlook for finding employment is very good, especially in rural areas that are in need of veterinarians and technologists and technicians. It is important to keep in mind that with the large growth of demand for veterinary technologists and technicians, a number of postsecondary schools are supporting such programs and graduation rates are increasing, resulting in a competitive job market (Department of Labor, 2015).

Interview with Sarah Snider at the Care Animal Hospital in Muncie, Indiana

Sarah Snider is a veterinary technician with the Care Animal Hospital in Muncie, Indiana. (See Figure 1.). Sarah Snider was interviewed by Dr. Edward J. Lazaros, Angela Gervais, and Mary Pat Stemnock on April 5, 2016. To read more about the Care Animal Hospital, visit http://care-animal.com/about-us/. The following section details the questions that Sarah was asked about her career, along with read her responses: Figure 1. Sarah Snider displaying the computer used to view diagnostic test results including blood work.



What is your daily routine as a veterinary technician?

"The first thing we do when we arrive in the morning is come in and set up for the day. We begin by logging in to the computers, checking patients, and then moving into our treatment area. We do vital signs on the patients that stayed overnight and give them medications. Our main goal at the beginning of the day is to make sure everybody who stayed the night is doing well. Then, we set up for appointments and get the day prepared, which includes things like pulling up any vaccines or drugs that we may need. Every day is about getting into a routine.

In order to know what each day will be like, we have a computerized schedule. It's a breakdown of who's coming in for each hour of the day. We see patients from 8 until 6:30, which adds up to around 20-30 appointments per day. We have two doctors that often run out of time because we're so busy. Sometimes we have three patients here at a time. We also have a whiteboard that lists treatments for the day and night to keep us organized" (S. Snider, personal communication, April 5, 2016).

What is the best part of being a veterinary technician?

"Obviously, it's fun to see animals come in each day, but you also get a sense of achievement from helping them. It's rewarding when you have a sick patient come in, and two days later they're walking out to see their owners. The look on their owners face makes it worth it. They're their children.

When I was a child, I enjoyed watching television like Animal Planet and was upset by ASPCA commercials—I've always been an animal lover. The animals don't have a voice and you have to speak for them. There's an animal that's hurting and you have to figure out how to fix it. That's what I'm here for" (S. Snider, personal communication, April 5, 2016).

How do you diagnose an animal?

"Asking questions is important to give a proper diagnosis. We start by asking the owner what they think is wrong. First we check on eating and drinking, because there's a clear problem if the animal is not eating or drinking. Then we start to break it down—is it their arm? Do they put pressure on it? Where does it hurt? More answers can lead to a diagnostics. We take x-rays, do blood work, and find out concrete answers if need be" (S. Snider, personal communication, April 5, 2016).

What kinds of fun technology do veterinary technicians get to use?

"The digital x-ray machine allows us to get a better idea of what is wrong with a patient (See Figures 2 and 3). The machine breaks down the scanning area by column so only the affected area gets the radiation. You can increase or decrease the amount of radiation. Once the image is taken, it immediately appears on another computer" (S. Snider, personal communication, April 5, 2016).

Figure 2. Sarah Snider demonstrating how to select an area by column on the digital x-ray.





Figure 3. Sarah Snider showing images that can be displayed on the digital x-ray screen.

"The dental x-ray machine is used to look at a patient's mouth, including their gums and teeth (See Figures 4, 5, and 6). A black piece is inserted into the patient's mouth to take the image. Then, the image appears on the television screen. You can use the images to decipher what is wrong with each section of the mouth" (S. Snider, personal communication, April 5, 2016).



Figure 4. Sarah Snider adjusting the dental x-ray machine.

Figure 5. Sarah Snider showing images taken by the dental x-ray machine.





Figure 6. Sarah Snider examining and addressing the medical issues in an image taken by the dental x-ray machine.

"This is the computer we use for our calendar and patient charts (See Figure 7). The calendar is color coded and marked for each type of appointment. Our charts are also stored here. The charts contain all of the information about a patient and should be accessible to all employees" (S. Snider, personal communication, April 5, 2016).



Figure 7. Sarah Snider displaying the appointment calendar.

"The laser therapy machine is used to treat animals dealing with pain and arthritis (See Figures 8 and 9). It can be rolled over a muscle or other area such as an ear for relief. The laser therapy machine is essentially a massage for our patients. It does wonders!" (S. Snider, personal communication, April 5, 2016).

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Figure 8. Sarah Snider demonstrating how to use the laser therapy machine.

Figure 9. The laser therapy machine screen and applicator.



"We have a few types of x-rays. We have digital x-rays and dental x-rays. X-rays are useful because you can see what you can't when you're just looking at the animal. For example, the dental x-rays allow us to see below the gum line to see if a tooth needs to get pulled. With x-rays, we can catch things earlier.

Another type of technology we have is a laser therapy machine. It is used to reduce pain faster. If an arthritic dog comes in and it's limping, we can take the laser therapy machine and go over the affected area with heat. The next thing you know, they're

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walking. We also do a lot of things for ears with the laser therapy. The cats and dogs enjoy it. It's therapeutic and its helps faster. It's also not medication, which some owners cannot give. It's much less invasive than surgery as well.

We also chart our patients on the computer. Each animal that walks in for an appointment gets a chart. The process we use to fill out the chart is called SOAP: subject, objective, assessment, and plan.

The subject category includes the history you get for each animal. This tells you more about them and their medical records. After reviewing the subject, you move on to the objective category. This includes looking and seeing what's going on with the patient. The objective category includes taking note of the patient's mouth, teeth, body weight, and other observable aspects. The assessment comes from observation including notes, vital signs, and diagnostics, or other data. Once all of this has been completed, you create a plan of treatment for the patient" (S. Snider, personal communication, April 5, 2016).

What will be the most challenging thing a recent graduate will encounter when trying to break into this industry?

"The hardest thing to do is to build a relationship with the clients. You have to talk to people about what's going on with your pet, which can be difficult. You have to figure out how to talk to them and build that relationship and that trust.

Being able to communicate is something that school doesn't prepare you for. Experience, like talking on the phone and what questions to ask, comes with practice. They teach you in class that clients can ask questions that might not make sense. When this happens, you have to be able to answer that question quickly and confidently to show that you know what you're talking about.

The relationships are also the most rewarding thing, though. I get to see older people and talk to them and have a conversation, which is really nice. Talking about their animals and how cute they are is fun.

Experience is what teaches you. I've been in the field for a year, and I'm still getting used to answering questions. It's hard to learn to know what to do in certain situations. You don't get to face an emergency in school. We take walk-ins, so you'll have situations where dogs get hit by cars and you have to know what to do to make the animal comfortable right away. You have to be able to talk to the client, comfort them, and give them a game plan" (S. Snider, personal communication, April 5, 2016).

Conclusion

Veterinary technologists and technicians help man's best friend and other pets recover from medical issues and conduct research to solve medical issues for animals. Becoming a veterinary technologist or technician could be the right choice for those who have a passion for animals and are willing to invest in postsecondary education. It is also important to find opportunities to participate in internships or apprenticeships to gain experience in the field. The job growth rate in this field is high, meaning the job market will be competitive. Having something unique on one's resume, such as some type of specialization, can make one a good candidate for a position. It is important to consider all aspects of this career path before committing to it.

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Cement Mason Career Exploration via a Hands-On Concrete Activity

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Abstract

The construction industry is one of the most diversified fields due to the large number of products, systems, methods and processes that are involved to complete different types of projects. Therefore, a very wide range of expertise and skills are required for any successful business or project in this industry. People, specially students, who have interest in joining this important industry need to understand the qualifications for these different expertise areas so that they can decide which one is of more interest to them. The purpose of this paper is to introduce background of the qualifications and skills required for a cement mason, as one of the critical site jobs and to explore the relevant career potential. The paper also presents lab demonstration of concrete casting activities as one of the main tasks performed by the cement mason in addition to an interview with one of the professionals in this areas or expertise.

Introduction

Cement masons are involved with installing curbs, roads, sidewalks, and floors. Specifically, they pour material and then begin the process of finishing and smoothing the surfaces. The hands-on concrete activity described in this article is a great way to learn how to use some of the tools that some cement mason workers may use. Participating in this activity may help to determine if a career in this occupational specialty areas is something that you would enjoy doing as a career.

Responsibilities of Cement Mason Workers

Cement masons prepare a construction job site by installing forms, which will ultimately contain the concrete in one place. See Figure 1A.

Figure 1A



Once the forms are installed, metal wire mesh or rebar is used to strengthen the concrete after it is poured and after it cures. To prepare for pouring the concrete, cement masons must often direct truck drivers to the exact location of the pour site. See Figure 2A.

Figure 2A



After the concrete has been poured, the cement worker must use a trowel, float, and/or screed to smooth the concrete and guarantee that it is spread level. **See Figure 3A.**

Figure 3A



Expansion joints must also be installed during this process to prevent cracking as the concrete expands and contracts during different weather conditions. See Figure 4A.

Figure 4A



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Prior to finishing the job, the concrete curing process must be monitored so that a proper finish can be guaranteed. Finally, the cement mason must apply waterproofing or sealants on the concrete to protect it (U.S. Department of Labor, 2015).

Becoming a Cement Mason

A high school diploma is typically required for entry level employment as a cement mason; however, there are no specific requirements. For those who are thinking of entering this career field, courses in blueprint reading, math, and construction drawing are recommended. Hard working, organized and leadership on site activities are usually aspects that make a person ready for this career. This is in addition to capability of communicating with engineers, architects or inspectors for reviewing site works. On-the-job training is common, which consists of working with experienced workers who teach how to use the materials, machines, tools, and equipment used by a cement mason. As a trainee working under an experienced worker, entry level tasks might include jointing and edging concrete after it has been poured. See Figure 5A.

Figure 5A



The tasks often increase in complexity as time progresses during the training process. It is common for cement masons to enter into a formal apprenticeship program, which is three years in length. In such a program, apprentices are required to complete 144 hours of technical instruction and two thousand hours of paid on-the-job-training. The benefit of completing an apprenticeship program is earning a journey worker designation. This designation will qualify the worker to be employed by construction companies in projects, which is a very dynamic market process where contractors bid for projects and Page / 21

they normally get a percentage of what they bid for and once they are awarded any contract, the company will have to work fast on lining the qualified professional resources to complete the project tasks. Organizations such as contractor associations and unions offer apprenticeship programs (U.S. Department of Labor, 2014).

Pay and Benefits for a Cement Mason

The U.S. Department of Labor (2015) identifies details regarding the compensation for cement masons as of May 2012. The median annual pay, as of 2012, is listed as \$35,760.00 annually. Salary.com (2015) identifies the median annual salary for a concrete and terrazzo finisher as \$39,815.00 or an hourly wage of \$19.00 per hour. Additional benefits are identified by this source such as bonuses, Social Security, 401k/403B, disability insurance, healthcare, pension, and time off. Considering all of these benefits, the compensation total comes to \$59,241.00 annually.

Job Outlook for a Cement Mason

The U.S. Department of Labor (2015) specifies job outlook information, which is current as of the year 2012 for cement masons. This source specifies the number of jobs in 2012 as 144,300. When reviewing the employment outlook from 2012-2022, this field has a growth rate of 29%, which is much faster when compared to all occupations. The employment change from 2012-2022 is estimated to be 41,700. According to U.S. News & World Report Money (2015) "Job opportunities are directly linked with economic growth and building activity. After several lean years, the pace of both residential and commercial building work is picking up" (Para. 3).

Interview with Chris Cutshaw who is a superintendent at Bowen Engineering (General Contractor) and works extensively with cement

In the following section, you can read the questions that Chris Cutshaw was asked about his career, and you can read his responses:

- What do you like best about your job?
 "I would have to say what I like best about my job is that my job is always changing. And what I mean by that is there are always new challenges. Every project is different in some way or shape or form and it keeps things interesting" (C. Cutshaw, personal communication, November 29, 2015).
- 2. What is your advice for high school student looking to get into this industry? "My advice for high school student looking to get into this industry is to figure out which path they would like to take in regards to this industry. There are many roles that need to be filled from the design aspect, the engineering side, the actual putting work in place side of it, or as in my case I get to do a little bit of all of them" (C. Cutshaw, personal communication, November 29, 2015).

- 3. What type of activities you do on a typical working day? "For what I do every day, as far as concrete forming is concerned, is we have a set of plans that we are required to follow on dimensions and sizing of walls, footers, concrete decks, so on and so forth. Now as far as the forming side of that goes, there are many choices to choose from as far as which form system, wall tie system, or even decking and shoring system and each has their advantages and disadvantages. In a lot of cases it is up to the foreman to decide which form system is better for each application" (C. Cutshaw, personal communication, November 29, 2015).
- 4. What type of fun technology do you get to use on your daily work? "Some of the fun technologies that I get to use in my daily work consist of a few newer programs that have made my position a lot more fun and easier as well. First off is PlanGrid which is a program for our ipads on site that have all 1500 pages of our current blueprints at the swipe of your finger. The next would have to be Navisworks Freedom which is a is a 3D Design review program that we use to get a better look at what we are building in 3 dimensions. And lastly would be our robotic total station which is a layout tool we use to layout very complex jobs such as the site we are currently working on here at the Southport waste water expansion project. This system basically works off of predetermined control points to triangulate its position and set points such as footer lines, wall lines, and building lines" (C. Cutshaw, personal communication, November 29, 2015).
- 5. What are the main challenges you have in your daily work? "My main challenges in my daily work are communicating my preplanned work with my crew and making sure that the group as a whole is all on the same page which makes us function better as a team. Communication and Information are the driving factors for what makes a good concrete forming team. Not far behind these two are material, from ordering the material for a certain task and making sure it is onsite prior to starting the work to managing it efficiently and not wasting it" (C. Cutshaw, personal communication, November 29, 2015).
- 6. What would you like to see as an improvement in the area of concrete casting? "What I would like to see as an improvement in the area of concrete casting is cold weather concrete. We face it every year and with the amount of technology and engineering that is out there I feel that there has got to be a better solution for handling cold weather concrete. And what I mean by that is currently when temperatures start dipping down to just above freezing and lower we are required to start heating our substrate temperatures to be able to pour on. Now once the concrete has been placed and the forms have been wrecked we have to continue to insulate the concrete with blankets and sometimes even introduce heat to keep the concrete from freezing, which would be detrimental to achieve the strength of the concrete. There are some add mixtures currently on the market such as "Freezeguard", which allows you to pour in colder temps as long as the concrete Page | 23

is poured onto a substrate that is above freezing and the temperature while pouring the concrete is 25 degrees and rising. With this admixture there is no need to insulate or heat the concrete to keep it from freezing because the chemicals in this mixture do so internally. The only problem with this product is it's not intended for structural use. So it's perfect for sidewalks, approaches, or driveways but it is not intended for use in vertical structural concrete which is the majority of our work" (C. Cutshaw, personal communication, November 29, 2015).

 How did you get involved in the world of concrete?
 "I've been in the concrete construction industry for quite some time. I actually started with Bowen Engineering right out of high school. My father also has been in the industry for many years. And I knew at a very young age that I would also someday follow in his footsteps. Construction is a passion of mine and always has been" (C. Cutshaw, personal communication, November 29, 2015).

Activity Involving the Process of Mixing, Placing, Testing, and Curing of Concrete

Materials and Equipment Required

The materials and tools that are used in the activity include the following:

- 1- Type I Normal Portland Cement
- 2- Aggregate #11 stone or #12 gravel for the 5 bag mix.
- 3- Pea gravel.
- 4- Masons sand.
- 5- Electric concrete mixer such as the Kobalt 4.0CF 0.5HP.
- 6- For screed, use 2X4 to strike off the excess concrete so that the concrete is level with the top of the form.
- 7- Float made of wood or magnesium.
- 8- Steel trowel
- 9- Broom

Activity Procedure

A) Safety

Before work starts sufficient personal protection equipment (PPE) should be used in order to avoid body injuries. Common PPE for the cement mason include glasses, hard hats, hard boots and gloves.

B) Preparation

1- Determine the mix that is appropriate for the project. For typical flatwork such as a concrete slab or sidewalk a 6 bag mix with a compressive strength of 400 psi to 500 psi would by typical. Concrete consists of portland cement, gravel, sand, and water.

For one cubic yard, mix the following materials: 6 bags of Portland cement at 94lb/bag or 564 lb 1600 lb gravel 1400 lb sand 31 gal of water at 8.33lb/gal or 258 lb

2- Calculate the weight of each component for the volume required. For one cubic foot divide the weight of each component by 27 as there are 27 cubic feet in one cubic yard.

For one cubic foot, use the following quantities: 21 lb Portland cement 60 lb gravel 54 lb sand 1.15 gallons of water which equals 10 lb

C) Mixing

- 1- Start the mixer empty
- 2- Add half of all components with water added first. See Figure 1B and 2B

Figure 1 B



Figure 2B



3- Mix for 5 minutes. See Figure 3B

Figure 3B



4- Add the remaining components. See Figure 4B

Figure 4B



5- Mix for 10 minutes or until desired consistency is obtained. This is verified with a slump test.

D) Slump Test

The slump test verifies that the mix has the proper amount of water. Conduct this test before any concrete is placed. This test is conducted by a licensed engineer per ASTM C143.

1- Fill the slump test cone 1/3 full. See Figure 5B

Figure 5B



- 2- Use a metal rod to consolidate the concrete 20 times.
- 3- Fill the slump test cone 2/3 full
- 4- Use a metal rod to consolidate the concrete 20 times.
- 5- Fill the slump test cone and repeat the consolidation.
- 6- Strike of the top so the concrete is level with the top of the cone.
- 7- Lift the cone and measure how much the concrete has slumped. A 3" to 4" slump would be typical. See Figure 6B

Figure 6B



If the slump exceeds the required value, there is too much water and the concrete must be discarded. If the slump is too low, water can be added. In other words, if the measured vertical distance between the horizontal bar and the top of the concrete cone is large, this means that the concrete is unable to be intact or hold itself as required due to higher water content, which means the mix was not done properly and the concrete should be discarded.

E) Placement

- 1- Before placing concrete all steel reinforcement must be in place and forms treated with form oil so that the concrete does not adhere to the form.
- 2- Place concrete directly from the chute of the truck, by wheelbarrow, using a pump truck, or a crane and bucket. **See Figure 7B**

Figure 7B



3- Fill the forms and consolidate the concrete by using a vibrator, rod, or tapping on the sides of the form. This ensures that the concrete completely fills the forms and there are no voids. See Figure 8B

Figure 8B



- 4- Strike off excess concrete so that the concrete is level with the top of the form.
- 5- Use a float to bring the cement paste to the top for a smooth finish. See Figure 9B

Figure 9B



- 6- For interior work use a steel trowel for a smooth finish.
- 7- For exterior work finish the surface with a broom to provide texture and a nonslip surface.

F) Curing

The reaction between Portland cement and water is called the hydration reaction. As this process takes place it is very important to prevent evaporation from the surface of the concrete. Proper curing is achieved by spraying the surface with a curing compound, covering the surface with plastic sheeting, or covering the surface with burlap and keeping it wet for at least seven days. Failure to achieve proper curing will result in a weakened concrete that will have to be replaced. Therefore, it's critical to plan for the curing activity and leave the concrete for sufficient time before exposure to loads so that it can perform as required. Otherwise, the concrete may fail to carry the loads its designed for. **See Figure 10B**

Figure 10B



G) Cylinder Test

The cylinder test verifies that the concrete mix meets the required compressive strength. This test is conducted by a licensed engineer per ASTM C31.

- 1- Fill the cylinder ¹/₂ full and rod the concrete 25 times to consolidate the mix.
- 2- Fill the cylinder and rod 25 times. See Figure 11B



Figure 11B

3- Strike off the top so the concrete is level with the cylinder. See Figure 12B

Figure 12B



- 4- Cover the cylinder to prevent evaporation.
- 5- The following day the engineer will transport the cylinders to the lab for proper curing.
- 6- The compressive strength of the concrete will be tested at 7 days and 28 days by applying pressure until the cylinder fails.
- 7- At 7 days the concrete should be within 60% to 67% of design strength.
- 8- At 28 days the concrete should be within 80% of design strength.
- 9- If the concrete does not meet these requirements, it may have to be demolished and poured again.
- 10- Standards similar to ASTM C39 (2015) are issued by the American Society for Testing and materials (ASTM) and followed by quality control teams to ensure quality of the concrete produced.

Conclusion

Students who have an interest in being part of the construction industry and also like working with their hands and basic tools and equipment, may want consider a career as a cement mason. Given the impressive growth rate of 29% from 2012-2022 and a median annual salary ranging from \$35,760.00 to \$59,241.00 (depending on the source), this career may be the right choice for some to consider.

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