

# OSHA-30 Lab Topics Course on Construction Safety and Hazard Identification

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The end goal of this research-based project is to evaluate whether an OSHA-30 integrated lab course would be beneficial to Cal Poly's Construction Management (CM) program and how it might also benefit the construction industry. The research conducted will be to interpret whether or not there is a need for this type of class to be included into the Construction Management Curriculum. Along with data research, two separate surveys were conducted, one survey taken by the Cal Poly Construction Management student population and the other survey taken by industry professionals. Additionally, a fellow Construction Management student, Mathew Bramlett, is working on the deliverables such as a course syllabus, lab topics, and assessments of the proposed lab class. After analyzing the data, discussing the need of a course that solely focuses on safety, and referring to my own past experiences, I have concluded implementing an OSHA-30 integrated lab topics course will be worthwhile for future Cal Poly Construction Management students and the construction industry. The purpose of this course will be to have students get their OSHA-30 certificate while taking the proposed class and conduct labs based on topics covered in the OSHA-30 program. The reason is that students will hopefully know more about safety before they start their professional careers, so they can identify and stop accidents from happening before they happen and keep workers and the public safe.

**Keywords:** OSHA, safety, hazard, identification, injury, death

## Introduction

The construction industry has always been one of the most dangerous lines of work that someone could go into. Even with all of the safety standards and precautions taken today, thousands of people in the United States still suffer serious and sometimes fatal injuries while working on a construction site or doing a construction related job. In 1971, the United States created the agency, Occupational Safety and Health Administration (OSHA), the agency was made because of public outcry against rising injuries and deaths in industries such as construction, agriculture, and maritime. In 1970, before OSHA was formed, it was estimated that there were 14,000 people killed on the job. Thankfully, since the creation of OSHA, the number has dropped to 4,693 fatalities in 2016. Of the 4,693 deaths, 21.1% were in the construction industry alone. From these statistics, it is clear that the construction industry is one of the most dangerous industries to be in as it makes up more than a fifth of all occupational deaths per year. The deaths have many factors and they may be difficult to figure out exactly what lead to the case – by – case incidents as they are connected to many factors. However, OSHA has broken down jobsite

deaths and determined that most fall under the “fatal four” leading causes of fatal injuries in the construction industry. The “fatal four” categories are falls, being struck by an object, electrocution, and caught-in/between. In 2016, the “fatal four” were the cause of 63.7% of the construction related deaths. If the industry can eliminate and prevent these leading causes of death, over 600 lives could be saved in the United States per year.

As mentioned previously, it is difficult to determine what exactly happened in every single fatal accident that happens on a construction jobsite. Of the “fatal four” categories, there are many different prevention strategies. Wet surfaces, falls, lack of protection, and unstable structures are the leading cause in fatal injuries. A few things to fight against these possible hazards are the use of proper equipment, thorough and diligent training, and proper planning to keep workers in a possibly dangerous situation safe. The fall protection plans that a construction company puts in place are mostly up to individual workers to follow when compared to the other three areas of the “fatal four.” For example, it can be as easy as tripping over your own feet or slipping on a wet roof. When looking at the other three categories of the fatal four, being struck by an object, electrocution, and caught-in/between, they are usually a result of something going wrong when multiple people working with or around each other. These types of accidents usually happen in the blink of an eye and often times the accident may have been preventable. Electrocution could be the result of touching an exposed wire that someone didn’t know was live. Being struck by an object could be the result of standing under a load on a crane in an area that should have been blocked off. Being caught in between two objects could be the result of not having the general knowledge of being between objects that are unstable. If the person or people in danger of these categories were aware of the hazards that they encounter on the jobsite, and could identify the safety concerns in front of them, it could prevent many injuries and deaths. The point being made is that many jobsite accidents could have been prevented if people were aware of the safety hazards in front of them so that they can take the proper precautions to perform their job safely. Furthermore, creating a safe work environment requires people to be aware of the risks that are in front of them so they can go home safely at the end of the day. In conclusion, having the knowledge of possible safety concerns is crucial to having a safe jobsite, and construction workers must continue to learn about safety prevention so that they can prevent jobsite injuries and fatalities before they happen.

### *What is OSHA Outreach Training?*

OSHA Outreach training is a pair of voluntary courses that “provides workers with basic and more advanced training about common safety and health hazards on the job.” At the end of the training of OSHA-10 and 30-hour courses, students receive an OSHA-10 or 30-hour course completion card that documents that a person has properly received their safety training. For the construction industry, it is necessary for workers to receive training so that they are aware of, and have a general knowledge of job-specific safety concerns. Such safety concerns are general safety and health provisions, personal protective equipment, fall protection, and other topics as defined by OSHA standards. For workers who need to receive training, OSHA created the Outreach Training Program which was “developed to promote workplace safety and health by providing access to training by OSHA-Authorized trainers.” (USFOSHA) Outreach training and specific on-site safety training by the employer will help ensure employers and workers meet the required training provisions under OSHA standards. To ensure that training is properly available

and properly given, OSHA authorizes a limited number of trainers to provide online or in person courses. The topics covered in the training, “has the same timing requirements as a classroom course, but students have the flexibility to take their course at their own schedule.” Training is even available on mobile compatible courses, allowing people to do the training on their mobile phones. The online training even has videos and interactions that help students work through the OSHA training, which helps engrave the topics covered in the course into the student’s heads. The result of the OSHA Outreach training courses is the issuance of an official Department of Labor OSHA card, also known as an OSHA-10 or OSHA-30 card. It is encouraged that workers keep their certification cards on them while on jobsites for documentation purposes, many states even require workers to have their cards with them at all times.

### *Who Is OSHA Certified?*

OSHA recommends that all construction workers should receive their OSHA-10-hour training certifications and recommends that construction employees with supervisor or safety-related responsibilities receive their OSHA-30-hour training certification. In some states, jurisdictions or employers may require that their construction workers need to receive Outreach training or Department of Labor cards. However, Outreach training is not specifically required by OSHA, as all OSHA training courses are voluntary. The OSHA training does not necessarily cover all training requirements found in OSHA standards. According to USF OSHA, “employers are responsible for providing additional training on specific job hazards. Some workers may find that a combination of Construction, General Industry and on-site training is necessary.” Each job is different from one another, and it is the employer’s responsibility to ensure that all potential job safety hazards are explained and in their training. OSHA training has been proven to be effective as private industry construction workers who are not required to participate in OSHA safety training had a fatality rate that was three times larger than other industries. OSHA-10 and 30-hour training is a great way to keep a standard for safety training. The training is voluntary; however, it is necessary to help ensure that construction workers on jobsites are aware of safety hazards that are common in construction. Many companies also require that their office staff who do not physically do the labor themselves receive their OSHA-10-hour certificate, and less commonly OSHA-30-hour certificate, so that they are aware of hazards that are commonly present on jobsites.

## **Methodology**

The purpose of this senior project is to analyze whether implementing an OSHA-30-hour integrated lab course would be beneficial for Cal Poly’s Construction Management program and the construction industry. Along with the research previously discussed, two different surveys were conducted to find the voids in schooling and in the industry. One survey was created for students to see their interest in possibly taking an OSHA-30 integrated lab course, if they thought that the Cal Poly Construction Management program thoroughly taught them safety training, and to see if they felt prepared on the knowledge of safety and hazard identification when they start their internships and full-time jobs. The other survey was created for industry professionals to give their opinions about if they thought construction management students, not just from Cal Poly, but from all schools were prepared and knowledgeable about safety concerns and hazard identification, if they would like their future employees to be more knowledgeable about safety

concerns, and if they would be more willing to hire a prospective employee if they were OSHA-30 certified. Lastly, my partner Mathew Bramlett, is developing a class syllabus along with other requirements that go hand in hand with my research. Together we will be able to provide and structure and reason for this exciting new course.

### *Survey*

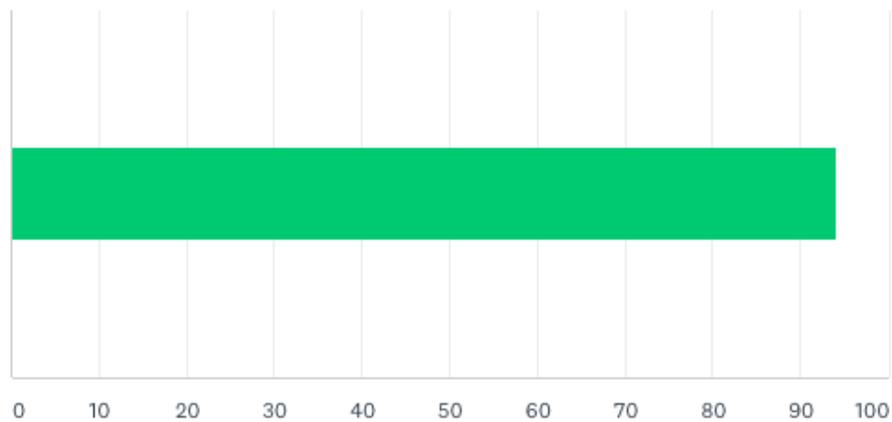
The most dependable resource that could have been used for this project was to reach out directly to people who are currently in the construction industry and studying to eventually enter the construction industry. In regard to the student survey, we specifically wanted students who have finished their first year of the Construction Management program here at Cal Poly to participate in the survey. We wanted students in their second year and higher to take the survey because they have already taken many Construction Management courses, and have hopefully had an internship with a construction company. However, we decided that it may be beneficial to know what students at the end of their first year think about their knowledge of safety. In order to compare parts of both surveys, students were asked if they felt that the Cal Poly Construction Management department sufficiently covered safety topics in the curriculum. Next, the students were asked if they had either their OSHA-10 or OSHA-30 certification. The following question asked if they did have an internship in the past, did the company require them to get either one of the certificates. At the end of the survey, students were asked if they thought that OSHA online courses do an adequate job in teaching hazard identification and mitigation. To finish up the student survey, the students were asked if they would be interested in taking a laboratory course in conjunction with an OSHA-30 online course, and what safety topics they would be interested in learning more about.

For the industry professional survey, some background questions were asked to get a gauge on their responses. They were first asked what sector of construction they were in, what position they held at their company, and if they were a Cal Poly Construction Management alumni. The next question was if their company required their employees to be OSHA-30 trained. The next few questions were asking if their company employed Cal Poly alumni, and if they felt that employees are sufficiently trained in job safety after graduation. The following two questions were more general, asking if construction management students from all universities' knowledge would significantly increase if they took the proposed course, and if they thought the OSHA-30 integrated lab course would be more beneficial than taking only the OSHA-30 online course. To finish up, the industry professionals were asked if they would be more inclined to hire OSHA-30 certified college graduates, and if the proposed OSHA-30 lab were offered at Cal Poly what topics would be most beneficial for their employees to know.

### **Results**

There were 21 responses to the industry professional survey and 26 to the student survey. Let's first take a look at the industry survey and later compare it to the student survey. To gain a sense of who took the industry survey, of the 21 responses, 15 of the respondents worked for commercial companies, 4 were commercial and residential, 1 multi-use and residential, and 4 were heavy civil. Of the 21 respondents, 12 of them were Cal Poly San Luis Obispo alumni, and

9 were not. The respondent's positions were 9 were Project Managers, 2 were estimators, 3 were project engineers, 3 were an owner/CEO/VP, 1 superintendent, 2 safety managers, and 1 person from administrative staff. When asked if their companies require their employees to be OSHA-30 trained, 6 said yes and 15 said no. Every single one of the companies currently employs former Cal Poly Construction Management students. Following that, the respondents were asked to agree or disagree on a scale from 0 to 100, (0= strongly disagree, 100= strongly agree) that construction management students, not just from Cal Poly, were adequately trained after graduation. On the scale from 0 to 100, the average response was a 60. The next question was to see if the respondents agreed that construction management student's knowledge of jobsite safety hazards would significantly increase if they took the OSHA-30 integrated lab course, the question was also on a scale of 0 to 100 (0= strongly disagree, 100= strongly agree), the average answer was a 94 which was crucial to this project, please see figure 1 below.

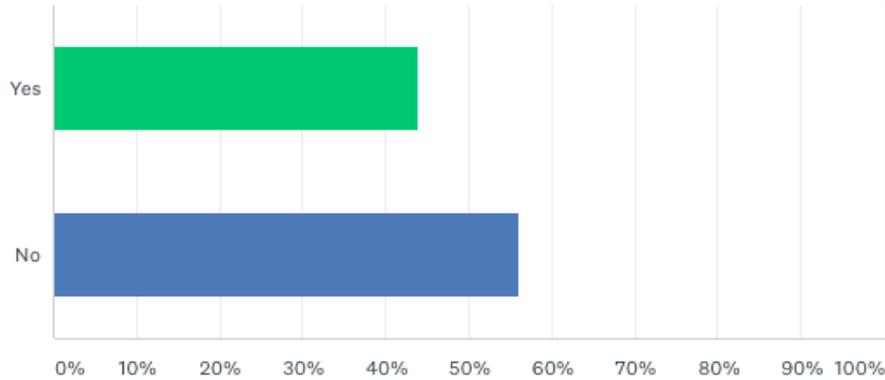


ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
Responses	94	1,884	20

Figure 1 - 20 Industry Survey Responses to see if professionals agree or disagree on a scale from 0 to 100, (0= strongly disagree and 100= strongly agree) that student's knowledge of jobsite safety hazards would significantly increase if they took the proposed course (Survey Monkey Survey Analysis)

When asked if they agree that taking an OSHA-30 integrated lab course would be more beneficial compared to only an OSHA-30 online course on a scale from 0 to 100, (0 being strongly disagree and 100 being strongly agree) the average answer was an 84. The following question asked if a company agreed that they would be more inclined to hire an OSHA-30 certified college graduate after graduation on a scale from 0 to 100 (0= strongly disagree and 100= strongly agree), the average response was a 73.

Moving on to the student survey there were 28 responses, and of those 9 were 4<sup>th</sup>/5<sup>th</sup> years, 12 were 3<sup>rd</sup> years, 3 were 2<sup>nd</sup> years, and 4 were 1<sup>st</sup> years. The first question asked whether they felt that the Cal Poly Construction Management department sufficiently covers safety topics in their curriculum on a yes or no basis. 44% of the respondents said yes and 56% said no, please see figure 2 below.



ANSWER CHOICES	RESPONSES
Yes	44.00% 11
No	56.00% 14

Figure 2 - 25 student survey responses to if students felt that the Cal Poly Construction Management program sufficiently covers safety topics in their curriculum (Survey Monkey Survey Analysis)

The following question asked if students had their OSHA-10 certificate, OSHA-30 certificate, both, or neither. Of the respondents, 68% had their OSHA-10 certificate, 0% had only their OSHA-30 certificate, 4% had both their OSHA-10 and OSHA-30 certificate, and 28% had neither. Of the students who had either of their OSHA-10 or OSHA-30 certificate, 15/19, or 78.95%, took the training course online, and 4/19, or 21.05% had taken the course in person. The next question asked if the respondents have had a construction internship in the past, 25 students answered the question with 22 students saying yes, and 3 students saying no. It is safe to assume that the 3 students who didn't respond did not have an internship in the past. There was a follow up question that came next, asking if the company that they worked for had them obtain an OSHA certificate. The 6/22 respondents, or 27.27%, of the students said yes, and 16/22, or 72.73%, of the respondents said no. Of the students who had to obtain an OSHA certificate all had to obtain their OSHA-10 certification while only 1 had to obtain both their OSHA-10 and OSHA-30 certification. The students were then asked to rate on a scale of 1 to 5, (1= very beneficial, 2= somewhat beneficial, 3= neutral, 4= not very beneficial, 5= useless) how beneficial and adequate the OSHA online courses are in teaching hazard identification and mitigation. For the most part, students found the OSHA online courses adequate, with 19.05% saying it was very beneficial, 47.62% saying it was somewhat beneficial, 23.81% saying they were neutral about it, 9.52% saying they thought the course was not very beneficial, and 0% said the course was useless. The following question asked students if they agree or disagree that they would be interested in taking a lab course in conjunction with an OSHA-30 online course based on a scale of 1 to 5, (1= strongly agree, 2= agree, 3=neutral, 4=disagree, 5=strongly disagree) see figure 3 below.

ANSWER CHOICES	RESPONSES
1	36.00% 9
2	36.00% 9
3	28.00% 7
4	0.00% 0
5	0.00% 0
<b>TOTAL</b>	<b>25</b>

Figure 3 - 25 student responses to their interest in taking a lab course in conjunction with an OSHA-30 online course (Survey Monkey Survey Analysis).

### *Free Response From Surveys*

The industry professionals were asked what topics they would like to see their employees know more about.

1. PPE/SDS
2. Trench safety/confined space
3. Hazardous materials
4. General jobsite knowledge
5. Safety/hazard identification
6. Scaffold safety
7. Miscellaneous OSHA rules and regulations
8. Trip hazards
9. Fall prevention
10. Trip hazards

The students were asked what safety topics they would be interested in learning more about.

1. Accident prevention and investigation
2. Hazardous materials
3. Best practices in the most common temporary structures on site
4. Preventing fall and caught in between hazards
5. Noise and dust control
6. Electrical safety
7. General jobsite safety
8. Trenching and shoring
9. On site safety such as different PPE for different types of jobs
10. Fall prevention

### **Conclusion**

Through all of the research on the issues regarding safety identification and mitigation, and general knowledge of safety for students and industry professionals, it is clear that there is a missing gap between what construction management programs teach their students and what companies want their employees to know. With the world continuing to build bigger, better, and more complex structures and buildings, it is important to keep the workers, employees, and the public safe. Less than half of the students who participated in the survey said they felt that the Cal Poly Construction Management program sufficiently cover safety topics in their curriculum, and industry professionals who participated in the survey said that construction management students from all programs are just a little above adequately trained in job site safety after graduation. As America continues to build and the construction industry continues to expand to greater heights, there is going to be a need for more employees to monitor safety and identify

safety hazards. The construction industry can't afford to have employees not be sufficiently trained in safety topics that are necessary to keep a jobsite free from injuries and death. With the proposed OSHA-30 integrated lab course, industry professionals said they strongly agreed that it would significantly increase student's knowledge of site safety practices and hazard identification. Industry professionals also said that it would be more beneficial for students to take an OSHA-30 instructional lab course compared to the standard OSHA online course. For the most part, students said that they would be interested in taking an OSHA-30 integrated lab course in conjunction with the OSHA-30 online course. The free response in the industry professional and student survey showed that industry professionals have a wide variety of safety topics that they would like their employees to know more about, and students also have a wide variety of safety topics that they would like to know more about. From the results of both surveys and free responses, it seems that there is an interest from both students and industry professionals to have students know more about safety topics so that jobsites can hopefully become safer in the future.

Furthermore, industry professionals said that they would be more inclined to hire students who were OSHA-30 trained and certified. The Cal Poly Construction Management program already has a fantastic job success rate, however, if Cal Poly Construction Management students were also OSHA-30 certified and trained, they would have an even better advantage to getting the jobs they want after graduation. Having construction management students take the proposed OSHA-30 integrated lab course would give them an extra advantage over other schools in scholastic competitions as well as job opportunities.

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