This research-based project analyzes issues within the Granite Heavy Civil Minor that contribute to declining student retention. This document specifically focuses on the program’s course curriculum and graduation date extensions as major drivers of student withdrawals from the minor. Two separate surveys were conducted from students within the minor and students who had dropped out of the minor, to gauge the specific issues students have with the program. The results concluded that many students dislike certain courses in the curriculum, such as CE 222 and CE 321, and felt that these required courses were unessential and unhelpful in preparing them for the heavy civil construction industry. The results also concluded, as some courses were only offered once per academic year some students would have to extend their graduation dates, therefore leading to their drop out of the program. Many students were originally told that they would not need to extend their graduations prior to joining the program, however this was not the case. The minor course curriculum is rigorous and does not adhere to student schedules or students’ overall preparation for the heavy civil industry. These aspects were major drivers as to why students dropped out of the minor.

Key Words: Heavy Civil, Graduation Extension, Courses, Curriculum, Student Retention

Introduction

The heavy civil construction industry is at a deficit for managers and engineers in the industry. As heavy civil construction is the baseline for societal operations and sustainable development, it is quite vital for the future prosperity of a society. The proper education and demand of construction management and civil engineering students is essential for the future development of our cities and for the safeguarding of sustainable development. The demand for leaders in this industry is quite high, and the actions we take today impact the future. Our outlook on course development will shape the structuring of students’ development into leaders of this industry.

The Granite Heavy Civil Minor is a program developed for civil engineering, environmental engineering, and construction management students to better prepare them for the heavy civil construction industry and meet the demand needed for workers in the industry. The minor program aims to integrate design and construction execution properties in intermingling construction management and engineering students in the program. As the heavy civil sector focuses on large-scale
complex projects, the minor intends to prepare students for projects such as highways, bridges, dams, water treatment facilities, power plants, dams, subways, and other large-scale projects with the courses enlisted in the curriculum. However, there does exist the issue of curriculum content not achieving the intended goals of the minor. As many courses are focused on the construction industry, and some do have emphasis on heavy civil construction, the courses within the minor do not accurately entail the essentialities of industry preparation students are expecting. This particular issue leads to student retention problems within the minor, and in turn leads to industry duplexes of greater demand.

The primary issue with student retention within the minor is linked to the greater source of student expectations prior to or at the start of joining the minor, which is not necessarily linked to the truthful outcome of pursuing the program. Out of many expectations, students are first and foremost introduced to the minor with promises of professional industry preparation and guaranteed paid internships, as well as being able to achieve these things within their expected timeframe of graduation. Many students were promised that they would be able to take on the minor without having to extend their expected graduation dates. However, this was not the case, as certain courses are only offered once per year for only one quarter during specific quarters, this makes the curriculum not flexible for the students within the minor and results in some students needing to extend their expected graduation dates. Many course schedules are quite rigid and time extensive with certain labs like CM314 and others alike blocking out entire mornings or afternoons for four hours Monday through Thursday, which does not make this type of scheduling flexible for civil engineering students. With no adherence or consideration to the difficult schedules of engineering and construction management students, students are faced with the daunting confliction of staying in the minor and extending their expected graduation dates to as much as a full academic year or dropping the minor altogether and graduating at a more desired and originally expected date.

As student benefits within the minor aim to prepare students in heavy equipment operations and safety, heavy engineering and construction management, heavy construction infrastructure, temporary structures, and estimation and scheduling, the courses within the curriculum layout should emphasize these details, however, they do not. There exist many courses within the curriculum that are not substantial in fulfilling these points and do not adhere to the essentialities of the minor. In retrospect, as the minor increases the time of graduation and in doing so extends graduation expectation dates, many courses in the minor’s curriculum are wasting the time and efforts of students and professors. As time is money, and the industry is in high demand of engineers and managers in the field, the time is of the essence ideology applies to the realities of what is occurring in the industry. Students must efficiently and effectively gain the knowledge necessary to navigate the heavy civil construction industry. This document of research will attempt to best argue a curriculum proforma that will adhere to these needs and get as many students graduated and placed in the industry in the most desired and ideal timeframe.

The direct hypothesized synthesis being studied in this document proposes that issues of student retention within the minor are directly related to various required courses in the curriculum losing student interest, due to its mis-applicability to industry preparation, and/or having resultants of extensions in expected graduation dates. The research practices and methodology to be used focuses on student opinions, both from students within the minor and students who had recently dropped out of the minor. As these student opinions will tell if the hypothesized is true or false, the opinions of students will also tell which specific courses are unessential to their practical development of heavy civil industry preparation. The methodology taken will admit two surveys to these two groups of students with many opportunities for open-ended written responses to gain direct insights on which
specific courses within the minor are not beneficial, and what specific aspects of the minor are leading to student disinterest and retention issues.

The contents of this dissertation include a literary review that finds previous works from various academic journals that emphasize which best practices are essential in the learning development of construction engineering students, and which aspects of the heavy civil industry directly should be taught in schools to officially prepare students for the industry. The literary review will then be followed with the methodology taken in this study, and it’s results of student opinions and course callouts. The concluding portion will relate both the literary research and methodology results to discover the best source of curriculum formulation to take with the heavy civil minor. As the conclusion speculates which specific courses in the minor should be taken out, it will also provide literary proven suggestions as to which aspects of courses should be used as replacements.

**Literature Review**

The design and teaching methods of construction engineering greatly affects the influencing power these sectors have on student career pursuits. The Granite Heavy Civil Minor moves to better prepare its students for the heavy civil construction industry, and in doing so, has high hopes of greatly increasing further interest in the industry. Student retention is not the easiest to accomplish for a sector of construction that is already unpopular, however there exists tactics and learning abilities that can accomplish the goal of student interest and teachings. As the Minor aims to better prepare students for the heavy civil industry, there exists certain practices and teaching methods that will improve student preparation and learning and will abide to student interest. According to a research design study at Universidad Industrial de Santander in Colombia for construction engineering students, certain courses that are designed with a mixture of theory and hands-on workshops better prepare students for the educational demands that are essential for the industry. In this experiment from the Universidad, students not only increased interest in the industry, but also yielded better academic performance all around and consistently yielded greater learning outcomes with this method. The purpose of this experiment was to test teaching methods in better preparing students to meet the social and economic demands the country of Columbia needed for its development (Guillermo, 2014). As proven true through this study, when student learning styles are integrated with cognitive functions, there exists a significant enhancement in student learning. This author as well noted that, “a learning event involves several mental processes such as emotion, perception, imagination, memory, and reason, as well as the capacity for communication and the development of habits” (Guillermo, 2014). In the analysis of the courses within the Granite Heavy Civil Minor, many of the courses within the program incorporate cognitive and theoretical methods of learning, however, there exists various courses that do not. These certain courses are hypothesized to not withstand the memories of students within the program. As the current program course curriculum involves many lab courses, many of these courses do not incorporate effective learning styles to better prepare students for the heavy civil industry, and seemingly are ineffective in penetrating the learning abilities and skill development desired for students within the minor.

According to the academic journal article, “A Logical Model for Curriculum Development” a single approach to teaching and learning should be used across all subject matters to improve the overall learning development of a student. For instance, in this journal study a model of curriculum development was created and tested in various workshops with professors and their students. The method in the model that was most preferred and effective was the process of asking how to teach a subject matter prior to determining what exactly will be taught. For teachings on construction engineering principles, it is best to prioritize hands-on learning incorporated with communicability in cognitive processing to better interpret and learn the material as students. Learning certain principles in this manner, allows for student memorization to follow them into their careers upon graduation.
The discovery of this journal article has led to the speculation of a new Granite Heavy Civil Minor course curriculum which entails more hands-on incorporation of actual events in the field, and reducing the courses required which inhibit busy work and de-maximization of college to career preparation. For the first steps of curriculum development, focusing on the “how” of teaching practices can only be accomplished with desire to learn subject matter. According to this article, teaching is secondary to learning, as it is not possible to “teach a man anything; you can only help him to learn” (Cowan, 1986). As mentioned, student interest in the heavy civil minor is essential and primary to the teaching practices instilled. As student interest bodes student retention, and student retention pretenses the labor supply of heavy civil industry demand, courses within the minor program must abide to the interest of students without compromising the integrities of industry essentialities of learning and success. As hands-on learning excites students and furnishes further interest into a subject matter, future courses in the minor program should prioritize and uphold lab courses that incorporate such material.

There exists various courses in the Granite Heavy Civil Minor that are seen, by students and others alike, as a waste of efforts. As student interest in this profession is tethered to the usefulness of certain knowledge and skill acquisitions, the courses in which students take must adhere to what is necessary for students to use in their future careers. Certain courses in the industry are seen as a waste of time because they do not consist of subject matter that is seen as purposeful to bring into a future career and comprehend in the study. For instance, the course CE222 is primarily seen as an unessential course, according to student results of the survey research. This course layout is primarily to understand historical experimentation in the transportation industry, however, this course does not provide the necessary cognitive integration to further supersede this knowledge into post-graduation life. Many students have confirmed their opinions on the course as being seen as useless. As the course contents consists of viewing various films on the historical development of U.S. highway systems and recognizing certain materials used for the development of roads, the contents itself is either repetitive or remedial in each civil engineering and construction management curriculums. For proper development of becoming a manager or engineer in the heavy civil industry, it is essential for students to learn the technical aspects of construction, not particularly the historical aspects.

Courses within the minor are prevalent to prepare students for the heavy civil industry, however, do not prepare students to handle and manage miscommunications and issues encountered in the direct line of work. Communicative development is an immensely important skill to develop across all industries of the world, especially so in the construction industry. Management and engineers alike serve various counter-partners and team integration to accomplish the necessary goals of future development. As communication plays a large role in the construction industry, heavy civil leaders must hone and harness this development to ensure safety and regulation is upheld in integral construction. Courses geared towards communication development and conflict resolution skillsets should be ingrained in the heavy civil minor program, as the program’s intention is to build leaders in the industry. Leadership requires not only the confidence in technical capabilities, but as well as the ability to stay calm, create solutions, and communicate the best methods of implementing these solutions to a crew or team of company constituents.

The courses in the minor are intended to teach students about civil construction, however there has been an overwhelming consensus amongst students within the program that this overall goal has not been achieved. Certain courses have not incorporated any such cognitive and hands-on learning methods even though some are lab courses. The integration of civil engineering and construction management students has benefited the communication practices of students in interdisciplinary work, however certain courses can emphasize this matter more. The matter at hand is some courses are evidently seen
as unmemorable and unessential to the learnings and development of students pursuing the heavy civil construction industry.

**Methodology**

The methodology for data collection used within this project involves two surveys sent to both students currently in the Granite Heavy Civil Minor and students who had dropped out of the minor. The proposed hypothesis speculates that many students in the minor feel that certain courses they have taken do not have much of an impact on their development of the vital skills and knowledge that would prep them for the heavy civil industry. Students who dropped the minor answered specific questions on where they stand, their personal interests in their field, original interests in the minor, and specifics on why they dropped the minor exactly. Students who are still currently in the minor answered a separate set of questions on which specific courses they felt were additive or diminutive to their development as a leader in the heavy civil industry. As there are various courses within the minor seen as a waste of efforts in industry development, the correlation of students dropping the minor due to these course-related issues are quite prominent and overbearing in the like. The intentions of this methodology are to bring new knowledge of the status and opinions of students who associate, or have associated, with the minor in acceptance into the program.

The survey questionnaire created was sent to four cohorts of students within the minor and students who dropped out. The first survey was sent to a total of 85 students who are currently in the minor, and the second survey was sent to the 14 students who had dropped out. Two separate surveys were used due to the varying informal criteria that was sought between the two groups that were surveyed. Both groups were questioned on the courses in the minor in which they took and their opinions of each course, with added text boxes for open-ended written explanations of opinions. However, the group that had dropped the minor were also questioned on direct details and were able to add open-ended written explanations as to why they had specifically dropped the minor, and their original intentions with the heavy civil industry. Both groups were asked detailed questions on the issues within the minor, but due to their status within the minor, the question format was differentiated for more detailed responses and direct answers. The survey sent to students in the minor consisted of about 14 questions, while the survey sent to students who had dropped out consisted of about 18 questions, with each survey taking a timespan of about 10 minutes to complete.

To encourage student participation in each survey, the surveys were created with anonymous responses and every question within the survey was not required to be answered. As time is very limited for construction engineering students, students are not necessarily interested in utilizing their time to complete a ten-minute survey so using incentives such as the possibility of shortening the time spent on the survey were implemented. Other tactics, such as frequent survey reminders and emphasis on the opportunity for students to voice their opinion on the program, were used. Student response overall was fairly low, nonetheless, the responses from students who did respond were sufficient and each student provided lengthy details of their opinions on the heavy civil minor.

As the Granite Heavy Civil Minor has experienced recent issues with student retention, the methodology attempts to find direct reasoning as to why students lose interest in the minor. As the heavy civil industry currently is experiencing major deficits of manager and engineer positions, as well as craftsmen positions in the industry, the heavy civil minor program at Cal Poly and other universities alike intend to create student interest in the industry and provide more workers for this labor force.

**Analysis of the Results**
The rate of responses from both student groups were small in comparison to the whole, however, the responses were quite detailed and proved the hypothesized theory of the study to be true. Out of the 85 students in the minor who were surveyed, 22 responded and each provided detailed explanations of what they found wrong with the minor and the courses within. Out of the 14 students who had dropped the minor and were surveyed, 5 responded with detailed responses. The average percentage of student responses from both groups was about a 30% response rate. The characteristics of students who had dropped out of the minor and completed the survey were majority construction management majors and were typically third or fourth years. The students in the minor who had completed the survey were majority civil engineering majors, with 13 respondents from the civil engineering major and 9 from the construction management major. There was an even mix of student respondents who are still currently in the minor being from the second-, third-, and fourth-year categories.

The results of the survey questionnaire proved the proposed hypothesis to be true. As was hypothesized, students within the minor have dropped out due to course elements leading to feelings of uncertainty in industry preparation and/or leading to extensions in graduation dates. The results of the survey documented direct written responses from students in and out of the minor which recorded that certain courses are not conducive to the essential practical learning development for students entering the heavy civil construction industry.

Below are the questions asked to the 8 students who had dropped out of the minor and the 22 students who are still in the minor and have directly answered the proponents of the hypothesized. More specifically, the questions and results in analysis will be separated with the first section addressing the students who had dropped out of the minor, and the second section addressing the students who are still in the minor. The section addressing students who had dropped out of the minor starts with their reasonings relating to extensions in graduation dates and follows up with reasonings relating to specific course opinions. The section addressing the responses from students who are still in the minor follows a similar format as students who had dropped out, however the topics of interest solely focuses on responses relating to which courses students felt were ineffective in preparing them for the heavy civil industry.

Section I

Questions - 1:

7. Why did you drop the Granite Heavy Civil Minor?

8. If you dropped the minor, was it in part due to extending your graduation date?

Results:
7. Why did you drop the Granite Heavy Civil Minor?

5 Responses

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<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>anonymous</td>
<td>Pushed back my graduation time, even though I was told the labs wouldn’t push it back</td>
</tr>
<tr>
<td>2</td>
<td>anonymous</td>
<td>I was no longer interested in a career in the construction industry for construction engineering, PM, estimating, etc.</td>
</tr>
<tr>
<td>3</td>
<td>anonymous</td>
<td>I could not meet the summer requirement and was no longer interested in working in that industry sector</td>
</tr>
<tr>
<td>4</td>
<td>anonymous</td>
<td>Classes did not seem applicable and schedule one was terrible</td>
</tr>
<tr>
<td>5</td>
<td>anonymous</td>
<td>The department heads were incredibly unorganized and unaccommodating. During the coop class they held mandatory meetings and assignments outside of the summer term. They were not flexible knowing all of us were working full time. The courses were required to be taken during specific quarters and that did not line up with my flowchart or degree progression.</td>
</tr>
</tbody>
</table>

8. If you dropped the minor, was it in part due to extending your graduation date?

5 Responses

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<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>anonymous</td>
<td>[&quot;Yes&quot;]</td>
</tr>
<tr>
<td>2</td>
<td>anonymous</td>
<td>[&quot;Yes&quot;, &quot;Not necessarily extended graduation date, but the additional course load demand would have made taking other classes too difficult and overloaded me with units (namely CM 314 scared me off finishing).&quot;]</td>
</tr>
<tr>
<td>3</td>
<td>anonymous</td>
<td>[&quot;Yes&quot;]</td>
</tr>
<tr>
<td>4</td>
<td>anonymous</td>
<td>[&quot;Yes&quot;]</td>
</tr>
<tr>
<td>5</td>
<td>anonymous</td>
<td>[&quot;No&quot;]</td>
</tr>
</tbody>
</table>

Comments:

As presented, out of the 5 students who had dropped out of the minor and completed this survey, 3 of them had presented their reasonings in relation to either minor courses not being applicable to the heavy civil career field or the curriculum scheduling delaying their expected graduation dates. Students who had associated their reasonings with issues with the minor curriculum schedule, naturally relate poor scheduling to ensuing an extension on their expected graduation dates. To confirm that student reasonings for dropping out of the minor are directly related to extensions in graduation, a follow up question was placed in the questionnaire addressing this proponent directly.
With the results in this factoring question, 4 out of the 5 students who had completed the survey confirmed this hypothesis, with one student explaining their graduation extension would be due to the desire to not overload one’s course schedule. In relation to coursework overload, student success within universities relies on student workload ability and temperament.

Questions - 2:

13. Which courses did you feel were not essential/not very useful in preparing you for the Heavy Civil Industry?

14. Briefly explain why you felt that these courses were not useful? (Reference question above)

Results:

13. Which courses did you feel were not essential/not very useful in preparing you for the Heavy Civil Industry?

3 Responses

<table>
<thead>
<tr>
<th>ID ↑</th>
<th>Name</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>anonymous</td>
<td>[&quot;CE 321: Fundamentals of Transportation Engineering&quot;]</td>
</tr>
<tr>
<td>4</td>
<td>anonymous</td>
<td>[&quot;CE 222: Introductory Experiments in Transportation Engineering&quot;,&quot;CE 321: Fundamentals of Transportation Engineering&quot;]</td>
</tr>
<tr>
<td>5</td>
<td>anonymous</td>
<td>[&quot;CE 222: Introductory Experiments in Transportation Engineering&quot;,&quot;CE 321: Fundamentals of Transportation Engineering&quot;,&quot;CM422: Professional Preparation&quot;]</td>
</tr>
</tbody>
</table>

14. Briefly explain why you felt that these courses were not useful? (Reference question above)

3 Responses

<table>
<thead>
<tr>
<th>ID ↑</th>
<th>Name</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>anonymous</td>
<td>Designing highways isn’t a CM’s job</td>
</tr>
<tr>
<td>4</td>
<td>anonymous</td>
<td>They are irrelevant to the heavy civil industry</td>
</tr>
<tr>
<td>5</td>
<td>anonymous</td>
<td>These courses were mostly busy-work and didn’t supply me with any new knowledge that I felt I would find useful in my career.</td>
</tr>
</tbody>
</table>

Comments:

As directly stated above, the courses in the minor curriculum that drove students away from the program are primarily CE 222 and CE 321. CE 222 is a course titled “Introductory Experiments in
Transportation Engineering” which primarily focuses on gathering traffic data and learning about the history of interstates and highways. As this course is a one-unit course that meets once a week for three-hours, students who have dropped out of the minor have primarily found that this course is not very useful in terms of preparation for their future careers in heavy civil construction. CE321 titled “Fundamentals of Transportation Engineering” focuses primarily on design of intercity passageways such as roads, airways, railways, and other forms of urban transit. This course is a three-unit course that meets twice weekly. As the overwhelming opinion of students who had left the minor, these two courses, CE 222 and CE 321, require quite a bit of busy work but do not contribute to student learning development in preparation for the heavy civil industry. Many courses at Cal Poly university follow this model of providing too much “busy work” without putting in place forms of learning for students to develop within their choice of study. As previously referenced, student success depends on students’ ability to accomplish the amount of workload acquired, and with an overflow of student workload, learning success is not achieved and therefore interrupts their ability to graduate at an appropriate time. In this specific case with these two courses, students should not be overloaded with busy work, as it does not influence the knowledge of these students. However, the time and energy spent on these courses should better attune and focus on what the students can learn in the ten-week time allotted quarter system. For instance, these two courses should overall be replaced with courses that directly impact the knowledgebase of students wishing to enter the heavy civil industry, with courses focused on bridge demolitions, estimating highway projects, or overall interwork relational conflict resolution skill development. There are various factors within the heavy civil industry that must be learned and adapted to, and these students and those who are dropping out of the minor in the like, don’t desire to waste their university efforts on learning about the history of the interstate.

Section II

Questions – 1:

9. Did you ever take any courses in the minor that you felt were not essential/not useful in preparing you for the Heavy Civil industry?

10. Which courses did you feel were not essential/not very useful in preparing you for the Heavy Civil Industry?

11. Briefly explain why you felt these courses were not useful? (Reference question above)

Results:

9. Did you ever take any courses in the minor that you felt were not essential/not useful in preparing you for the Heavy Civil industry?

- Yes: 11
- No: 7
- Maybe: 4
Out of the 22 students who are still currently in the minor and had taken this survey, a large majority of them were from the first cohort, meaning they are closer to graduation and have taken most, if not all, required courses in the minor. Out of the 14 students who had answered question ten, relating to which exact courses they felt were not useful in their development into the heavy civil industry, 8
students marked CE 222, 6 students marked CE 321, and 7 students marked CE 429. In their explanations, students mostly concluded that these courses specifically did not seem conducive to their learning of practical skills and necessary knowledge to enter into the heavy civil industry. Specifically referencing that the minor courses has too much emphasis on the design of highways which does not completely engulf and encapsulate the necessary components of heavy civil construction. As there are many aspects of heavy civil construction that persist further from highway design, students feel they are wasting their efforts in the heavy civil minor and desire to learn more about the industry that will impact their career. As this section of students who had answered were primarily civil engineering students, this consensus opinion of civil engineering students and construction management students, is to incorporate more aspects of the heavy civil construction industry and have certain classes that help directly with the job positions that will be taken directly upon graduation.

Conclusions

The survey questionnaire has depicted the following results of student disinterest in certain courses in the minor, relating to the overall sense of inessentiality of the topic courses in preparation for the heavy civil industry. As student disinterest is an issue of the industry that can be attuned and fixed for remediation, the attempt of redesigning the minor curriculum is based upon student opinion of which courses were unnecessary for industry development. As such courses were seen as unessential for professional development, CE 222, CE 321, and CE 429, these courses can and should be discarded from the minor altogether. The minor program without these courses reaches the necessary units of a minor program at Cal Poly university, however, it poses the question of does the minor program lose its integrity without these courses.

The minor program without these courses still fulfills the well-rounded expectations of a minor program in preparation for the heavy civil industry. The minor’s course curriculum withstands its intentions of industry development through upholding the essential functions of student technical development and knowledge prep. The options for the minor’s curriculum after these new founding results resides in a settlement of discarding the courses altogether, and therefore allowing the minor to become more feasible for students to pursue without extensions of expected graduation dates. An alternative suggestion, which allows the minor to become more applicable to student learning development, is the replacement of such courses with more direct industry related course material. Courses that specify in heavy civil demolition, bridge estimation and scheduling, team conflict-resolution communication development, or other directly related industry development topics alike, would expand the knowledge base of students in the program and attune their learning abilities to the essentialities of the industry. Construction management students and civil engineering students experience different components of the minor, and their course requirements are separate as the minor prepares these students for different fields in the industry. Regarding professional preparation of managers and engineers, with attempts of intermingling both academic aspects into each student’s preferred major study, the minor emphasizes and suffices these necessary requirements in the remaining courses, and potential future courses, within the curriculum. The minor curriculum currently presumes to maintain required courses for only one major subset of students and not the other, and in doing so fails to spread knowledge appropriately amongst the major studies for necessary industry demand. This bodes with the current issue of failure to prepare students adequately for the heavy civil industry with offsetting preparation successes with overflow and wear-out of unnecessary time and effort in specific learnings.

The heavy civil industry requires a significant amount of knowledge and experience for one to earn status in the division. Student preparation must include theoretical knowledge with reflexed familiarity of the tasks expected in the career-field. Professional preparation of students within the
Granite Heavy Civil Minor should not allocate time to mindless and meaningless remedial tasks at hand but should however fully maximize the capability of a student in a classroom setting. Traditionally, construction engineering teaching practices and principles are based on providing the student with the opportunity of developing technical expertise. As Cal Poly focuses on technical expertise of the subject matter as a proud development of their students, this element of technical development is broadened and secluded into rigidity and status. As Cal Poly course curriculums provide higher and higher levels of rigorous work, so does the self-proclaimed upheld status of the university. What is being forgotten in these times of tradition and upheaval is that the future of the industry is the future of our world, and the exact deficits that are currently being ignored in curriculum are what the university must attune it’s focus towards. As the development of heavy civil construction in a society largely indicates the natural progression of advancement in that society, construction engineering education must abide and simper to the necessities of what must be fulfilled to furnish future growth. Time is of the essence and time is fleeting. Students must utilize their time wisely to learn directly what is missing and needed in the industry. The discovery of exact attitudes and disciplines needed to master this knowledge is essential in bringing success into not only the industry, but the society in which the industry is held.
