Learning Portfolio

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Arch -331 / Dr. Anne Nichols

SU '10

Reflection…

When I first registered for this class I knew it was going to be a lot of work to learn new concepts about structural designs of buildings. Especially because I have not had to any structural analysis in any of my studios since I came to A&M. I knew they existed and I knew I would need them in my more advanced designs, but I did not really understand how much of an influence on a building's design a load bearing column could make. I now know that my designs must implement all the load factors along with dead and live load. For if my designs do not implement these crucial parts of architecture my designs in not possible. During the 5 weeks I have been in this class I think back to past projects and ponder if they can actually be built and what changes would have to be made in order to build many of my classmate's designs. Many of those designs in the past two years are almost impossible to support in real life without significantly altering the entire design and their design process. Which I can understand since we have not been told to worry about how are projects would stand in real life. Which if we had to design projects that were structural realistic is would be a huge challenges due to the fact that this class can't not be taken until we are in upper level. Which I believe students should learn about how to make a building stand up and then be able to design around that concept more and be able to effectively implement an effective design process into their work. This in my opinion would make more effective projects throughout the 4 years of studio without having to wait until the last two years to really begin to understand how to incorporate the structure of a building into design process from the very beginning instead of having to change the design towards the end to be able to support the building.

One aspect of taking this class has taught me in team work and time management. I would have had a very hard time understanding concepts in this class and learning how to solve problems without a group of us working together pretty much every night of the week. This not only helped everyone learn the material, but saved a lot of hours a day in trying to solve problems alone. Another thing that affected me was that I am taking other classes along with this one, partially my business class which I had tutoring every day at either 3 or 4 o'clock. This made me have to balance and spread out my workload depending on what day it was, and when my next test, quiz, or homework was due. That is one reason that working together as a group helped me a lot, I simply don't have enough hours in the day to do thing the long hard way. It's always better to work smart rather than hard, but due to my workload I must always work smart and hard, which is always better and more time efficient.

The first couple assignments made me glad I took physics last semester since most of what I have to do in this class relates back to physics problems. One thing that surprised me was how much I begun to understand the physics material I learned from last semester. Things began to click and after I began to understand the way things work and how everything affects everything else. Especially in Assignment 2 when we started practicing how to find forces acted

on certain points with very little given information. I never quite got the full confidence in myself that I knew how to work through problems like this in physics, but after a few practice problems it, like most other things in this class became a little easily. This is also partly due to the way I have learned to solve problems by setting up a free body diagrams. Even though I have used Free Body Diagrams less and less threw the last few weeks using them routinely for everything in the first few assignments helped me understand how forces affect the whole and help me see whole picture. Without having to think about it a whole lot, which is why now one simple sketch of the problem is really all I need to understand what I'm looking for, how I need to go about solving it, and what my answer that I find should look like once I have solved it. To me that was when I first took a sign of relieve that when I know exactly what my answer is going to look like form just looking at the problem that I would not or for the most part shouldn't have much of a difficult time working that particular problem. Another thing that not makes a lot more sense to me know is the use on Sin and Cos. In physics I would always get the two confused and have to think about which one to use, however now I know which one to comfortably use every time.

One thing I have also definitely learned the value of is this class is to use unit of measurements, and to use those units often. Because in most every other class I was able to get by without having to mark each number with feet, inches or something like psi of kips. However I found out real quick that I was not going to be able to get by without units for almost everything quick. There are simply too many different units of measurement used in architecture to ignore any of them. Which is why learning how to convert efficiently is a must and one is not able to over look and miss any conversion that needs to take place or a build could easily come falling down.

By assignment 3 I had no problem finding forces and support reactions in hardly any problem. Support reactions are basically the counter force similar to the normal force we used in physics which basically follows the same set of rules as any other force acting on an object does, so mastering that concept was not very difficult. Than on Assignment 4 everything really came together when we start implements shear moments and bending moments. Doing this kind of gave me a different view point of how forces on beams for example effect the beam itself on the inside and how it reacts , which for the most part are things we don't in buildings or many other things unless it's an obvious and extreme bending or shear moment.

Assignment 5 to me just mad a horizontal beam into a vertical ones, I learned that the same rules apply just in a slightly different way. However, the process of solving remains much the same,just take what's given to you, draw a free body diagrams and chop it up in step to make it simple to solve. I take simple steps in the first few times in trying to solve a problem than after that material becomes lot easier. When starting off in doing something new I like to chop it and in lots of small steps and work it out one step at a time in small baby steps. Basically doing it the long hard way, but once I see the big picture it takes little time at all to go through the motions and solve the problem in a much simpler quicker way.

A few weeks ago I did not realize that a wooden timber and a teal beam acted differently than each other are supporting loads. Steal is obviously stronger, but when we got into live loads and dead loads and how they affect wood a few things made complete sense to me. For example how a wooden structure can support a huge live load for a short amount of time, but slowly warp to dead load if not sufficiently enough braced. Which to me makes perfect sense from what I have learning in horticulture about how fibers in plants and trees grow and are how they hold the plant upright to allow all to plant to function.

I feel a lot more knowledgeable in the area relation to concrete after going over it, before all I really knew is that it was strong, cheap, and well under compression and that steel rebar was added in it. But did enjoy finding out that rebar is used for economically in building to support the loads, I had no idea that the spacing was so different in many places, and the stirrups were only used in certain locations as well. I just assumed that it was just used all throughout the beams and help keep it from cracking and becoming weak. But it turned out that once you find out where the force loads and how big they are you are able to use a lot less rebar and still have a very strong support system.

I choose to rework Quiz 5, my main problem from taking this quiz was overlooking a few small details.

A) . I failed to calculated the Mu max properly. In my equation I did not use the formula for find W, which is W=wl/2. This is why my answer was skewed and not near big enough. This caused me to pick the wrong size from the chart.

To solve this problem: use the formula Mu= ((wl^2)/8)+(Wl/2)/6 W=wl/2 after this answer is found you take it and look in the chart given to find the right size to use. After which you calculate how much it can support with it's self weight included and it must be able to support a load greater to or equal to the load given and must be the most economical.

B) my main mistake was using an equation used to find the dead load, instead of using the live load method. After using the right formulae the problem is nearly infallible to solve.

To solve: use the formula (wl^3/60EDeltamax) and note that self weight is not included

C) in this problem I failed to use the right theoretical K value. Which I used .7 instead of .5. Other than I had a little bit of bad math which needed to be calculated correctly.

To solve: find governing axis by using Kl/ry and Kl/rx. After finding answers for both the higher of the two is the governing axis. Use this number to find P allowable which is (Fa)(a). after which you compare the number to the max load it can support.

Several pages of original graded work with marking

Several reworked pages
(none with *required*, detailed narrative)

Conclusion

After learning the material I have from this class I feel in the future I may not remember exactly how to solve a problem related to the material but I should have a relatively good idea of how to solve it. I also strongly feel I should be able to carry on a conversation with a structural engineer over a building or a design. To me just knowing a little bit about everything is extremely beneficial in becoming an architect.