

SUMMER PRACTICE REPORT

On

STRUCTURAL ENGINEERING

Submitted by

Summer 2018

Under the supervision of

During the period of

Beginning Date: 02/07/2018 /Ending Date: 10/08/2018

Department of Civil Engineering
Faculty of Engineering

ABSTRACT

In this report, I am telling about my summer internship's details. This experience was very important for me because I was wondering very much the application of civil engineering in field. Summer internship was a good opportunity to see real sides of civil engineering and decide the way for future. I saw good and bad sides of construction site and I tried to explain all of my experiences. Also, I mentioned some standards, experiments and applications. I did a lot of observations during my internship and included them in my report with the details. I also included a photo of things that I thought were important.

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I. INTRODUCTION

1.1. COMPANY

1.2. PROJECT

II. DETAILS OF WORK DONE

2.1. INTRODUCTION

This project resides in Beytepe/Ankara . There are 4 blocks (A,B,C,D) which are residences and 1 block is a commercial building. 2 blocks (A, B) are high rise residences and other 2 blocks (C, D)

are villa type. When I began, villas were done, commercial block was done, B block's foundation had not begun and block A was at 23rd floor. In the last days of my internship, block A was reached the last level and block B's foundation was almost finished. We used C25 type for bored piles, C30 type concrete for foundation and C35 type concrete for spire. There was one tower crane for all works. They moved the tower crane between blocks. Residences have two elevators and one emergency elevator. As a heat supply system, down-feed heating system was used.

2.2. BORED PILE

Bored piling is a method that involves boring a circular hole into the ground, installing steel reinforcement and filling the bore hole with concrete to form a pile. Boring is carried out to the design depth by means of either a crane mounted or a track mounted hydraulic drilling rigs. In this project, there are 168 bored piles in foundations of blocks A and B. These bored piles have 80cm diameter and 18m height (Figure 2). They were produced before I began my internship. After that, in a region near block B landslide happened and management decided to produce extra bored piles. In this process I checked the reinforcements to be sure that it is produced properly. Lastly, pile reinforcement was placed (Figure 1) and type C25 concrete was poured by using mobile concrete pump.



Figure 1 - Placing of bored pile reinforcements

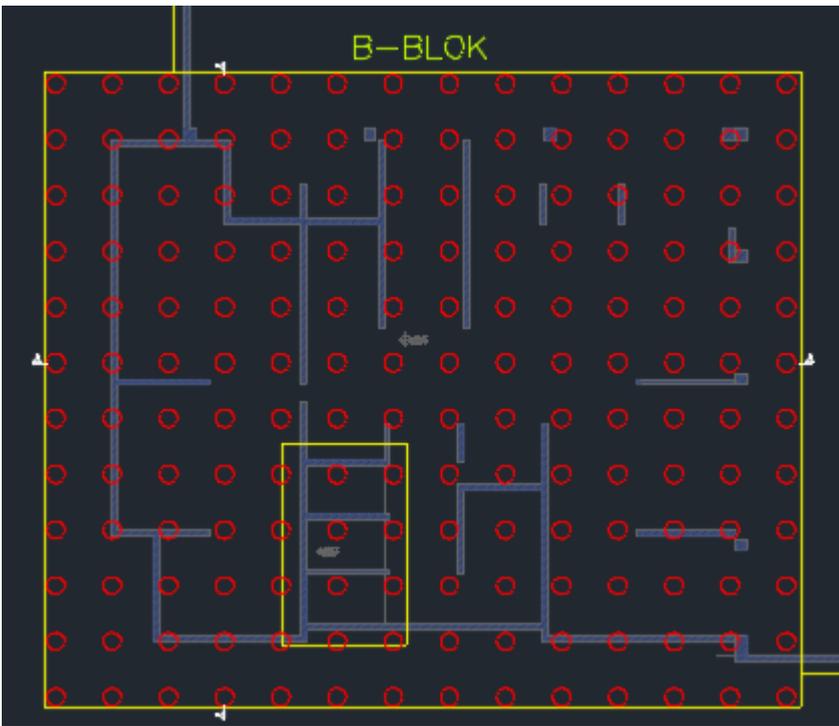


Figure 2-Foundation bored pile plan

2.3. FOUNDATION

Raft foundation is used in this project. This foundation type moves with structure in the case of earthquake and prevents damage. Before excavation for block B's foundation, survey team marked the excavation area with a spray point and we nailed an iron bar. After that, we marked a line between iron bars with using lime (Figure 3).



Figure 3- Marking with lime

During excavation, we measured the elevation with using nivelman and mira. When we measure the elevation, we consider the reference point. In this process, I learned many things about using nivelman. After excavation, we noticed that bored piles heads were taller than required (Figure 4). Excavator reformed them to proper height.



Figure 4- Foundation excavation

Elevator shaft was dug deeper than foundation. 30 cm gravel and 10 cm lean concrete were placed to all foundation (Figure 5).



Figure 5- Lean concrete application

After that, template was built with 32 mm diameter reinforcement. I checked if it is suitable for the project or not. Before concreting, we marked significant steel bars with sticky tape in order to control concrete level. We used nivelman to determine height. Survey team marked the points to determine where we are going to build columns. After that, column reinforcements were build.



Figure 6- Foundation reinforcement

Electric team made electrical grounding with using galvanized ground rod. Waste water installation was set up (Figure 6). Lastly, 2400 m³ concrete was poured to foundation. When concreting, I was responsible for picking up consignment invoice. Also, in concreting process building control officer took several samples to test.



Figure 7- The last look of foundation after filling with concrete

2.4. REINFORCEMENT

Reinforcement is a steel bar that used to increase the tensile strength of concrete. Concrete is a ductile material so reinforcement provides ductility to concrete. I have often checked the stirrup intervals in the columns. There was a machine that used to bend and cut reinforcement. I learned from workers how to connect the reinforcement and I practiced it (Figure 8).



Figure 8-Rebar tying

Workers placed styrofoam (Figure 9) to not fill the beam place with concrete while they are producing shear walls .



Figure 9-Shear wall reinforcement

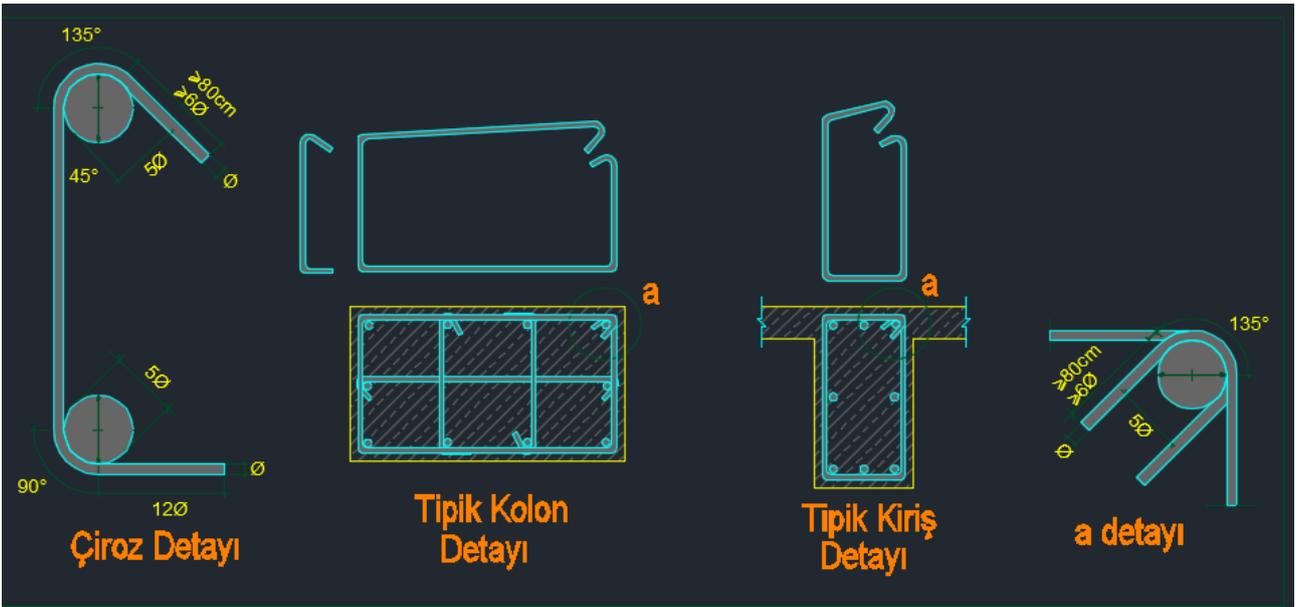


Figure 10- Typical beam and column details

2.5. FILLING THE CRANE GAP

After commercial building finished, there was a gap of crane. Molds placed and rebars were binded. The gap was in terrace so, we should have used an truck mounted pump.



Figure 11-Truck mounted pump

Concrete pump and concrete mixer came at the same time. The gap was filled with concrete. Meanwhile, workers used vibrator to evacuate air in the concrete.



Figure 12- Crane gap



Figure 13- Vibrator

2.6. EXPERIMENTS

When concreting, lab technicians come and take samples to determine the quality of concrete. These samples are taken to the laboratory to curing for 28 days. TS 500, TS EN 206, TS EN 12350-1, TS EN 12390-1, TS EN 12390-2, TS EN 12390-3, TS EN 12390-4 are standards that used for this experiment.



Figure 14- Concrete samples

Also, they do slump test to determine the consistency of fresh concrete (Figure 15). TS EN 12350-2 is the standard of this experiment.



Figure 15-Slump Test



Figure 16-Measurement of slump

2.7. PROJECT MANAGEMENT OBSERVATIONS

Production Schedule was not clear and accessible by all personnel. Actually there was not a real production schedule. They had a draft to follow works. Day to day operations is nearly in compliance with the production schedule because some days there were problems about production or product delivery. The deliveries were on time with minor corrections but for a while, company couldn't buy an iron because of increasing of exchange rate of dollar. Method statements were prepared for some jobs. Some jobs were done according to past experiences.

Duties and responsibilities of the personnel were clearly defined and maintained. The volumes of work volume promptly distributed. When the work volume was too high, company supplied worker to help. Engineers and other technical staff were there when anybody needs help or guidance. Working conditions were sustainable. They have good food, transportation, and enough time to rest. As an intern, my responsibilities were calculating the elevation difference before concreting, picking up consignment invoice, checking the workers when concreting, checking the reinforcements. Sometimes, I was helping the workers when they bending iron. (I was just pushing the machine's button).

Provisions of health and safety were well planned and documented but practically it was not. They did not provide training for occupational health and safety. I was just warned about some dangerous situations.

Several building audit firms controlled the project and production. Usually site manager provides the coordination between the parties involved in project. Supervising companies controlled each field of project, especially concrete, and they made us sure about process.

Working environment wasn't properly designed. There was not enough safety for workers who work at height. Except this detail there were not big problems about working environment. Equipment was well kept. Site was convenient to work for workers and heavy equipment.

There were storehouses to save the equipment. Company employed a man to care about the equipment and nobody can take tools without his permission. They also rented some equipment or vehicles when needed. Sometimes there were some problems about broken tools because it can take a long time to fix them and sometimes there were no backup equipment.

2.8. PERSONAL OBSERVATIONS

I have always wondered about construction site. This internship was a perfect opportunity for me. Also, I got ideas for my future plans. I think structural engineering is more convenient for me. Moreover, I want to work as an supervisor but I think I should learn about project first.

I applied for a few companies, but it was best for me to see both the foundation and the structure. Also, construction site is near my house and it is another reason to chose this company. I can say that my some expectations are not met. For example, I did not learn quantity calculations.

Site supervisor was helpful and he tried to teach lots of thing but sometimes he went to another construction site and at that time, foreman and workers helped me. I could ask what I want and they always tried to answer.

I think the company was respectful of ethical values. At first, they didn't give helmet and shoes. I thought they do not care about work safety. Later, other interns came and company supplied that important things. Workers were pleased. The company met their transportation and food needs properly. Working hours were good.

In my opinion, a professional engineer is a person who knows how to use experimental informations and scientific informations together. Also, a professional engineer should not overlook an error to not argue with boss. A professional engineer must always adhere to standards and project.

I have never worked anywhere before. I did not know about anything about business. Now, I can say that I know how to conduct works on construction site. I met with new people, I learned the relationship between the boss and the worker so, internship was very instructive to develop social and technical skills.

III. CONCLUSION

In conclusion, the internship is one of the most important things for a student. In a construction site, there are lots of things that we can not have the opportunity to see at school. I had the chance to see the information I learned at school as an application. I saw the construction phases of a building. There were lots of problems and I observed how supervisor solved them. Also, sometimes I suggested my own ideas to solve problems and my supervisor commented on them. Beside technical side, I learned a lot about social skills. I talked to the managers and the workers. I got their opinion on some issues. When there is a work, I always tried to be a part of it. Also, I have done my tasks as well as I can. Moreover, it is very important to work as a team on the field. I've improved my ability to coordinate with my teammates. If I take into account all of these, my internship was very informative and it is a memorable experience for me.

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