Capacity building training report sample





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## Capacity building training report. Capacity building report template. Capacity building report sample. Capacity building workshop report.

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HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page i Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Declaration I hereby declare that the project work entitled "FINAL INTERNSHIP REPORT" submitted to the HU School of civil and urban engineering, is a record of original work done by me under the guidance of my esteemed mentor DERIES BZUALEM and my site supervisor resident engineer MILAT. And this project work is submitted in the partial fulfillment of the requirements for the internship session of me in this intensity and individuals who support and share idea and also helping me to be like this. I am very thankful to K2N ARCTICT AND ENGINEERING CONSULTANCY PLC. For having given me the opportunity to undertake my four month internship class in their working area. It was Avery good learning experience for me to have worked at this area. I would like to convey my heartiest thanks to resident engineer ANTENH and All staff member works in Hawassa unit. I would also thank my mentor DERIES BIZUALEM for his endless support at site and in his office by consulting me how do things in the site and how to write this report in outstanding manner, All teachers of civil and urban engineering who brought me to my present performance and shape me like this during the last three successive years. Before I finish I would like to give my deepest thanks to all workers from the consultant side starting from engineers to daily laborers. Also for those who do not listed in the above but support me in different areas I would like thank all. Name: Esmael Aragaw Date: 17/02/2014 4. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page iii Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Abstract The internship report in broad-spectrum contains four chapters in which I try to explain my four month experience in my hosting company. The content of all chapters is broadly explained and it is constructed from the practical basis of the site work ended all months. In the opening chapter I give details to the company background including its mission, vision, the project those runs trough the company consultation. In this chapter I put all record or history and futurity of my hosting company with its official address. So, it is give details of the company in terms of reader can easily know and access the company. The second chapter is the most hunted chap and I record on it the overall work I have been executing. It gives a high light what I have been doing and main works of the construction industry. After all those chapters explained above I goes to the third chapter and explains the main benefits of the internship class in terms of different aspects and areas. It is obvious that the internship has a plus in terms of improving skills and different abilities as a whole. The advantages and gains of the internship putted in short and prices way to grasp the attention of readers and evaluators. The final and fourth chapter explains about the winding up and suggestion on the project that our company runs. Inside the site we get many things which are appropriate and inappropriate for work in building construction, thus I comment and give my recommendation in some conditions and workings. 5. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page iv Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. List of table Table 2.1 Figure 2.2 pit excavation and trench excavation and trench excavation column 25 Figure 2.5 form work to elevation column 25 Figure 2.6 form work to elevation column 26 Figure 2.7 shear wall, footing and slab rebar and its appearance at site 32 Figure 2.10 expansion joint in footing and grade beam 33 Figure 2.11 concrete work company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Contents Chapter one 1. Back ground of the hosting company. 11.5 Quality assurance 21.6 Company structure 21.6 Company structure 21.6 Company structure 21.0 Expansion joint and company. 21.0 Expansion for the provided for th Architecture and Engineering Consultancy Plc. is a multi-disciplinary Consulting firm, a reputation for responsive, innovative yet practical design approaches to complex. Through their experience and dedication to the construction industry K2N consulting firm is committed to provide with the most professional,

efficient and cost effective consultancy services. The goal of the company is to satisfy the most demanding construction needs in Ethiopia or elsewhere in the world. Registered in2001 EC, K2N is an architectural & engineering partnership providing design, supervision, consultancy and project management services and engineering solution for elsewhere in the world. various categories of projects. With core staff strength of all professionals in affiliated engineering firms, and the use of the most recent information, the firm has over the years acquired a thorough capability to execute medium to large scale project from feasibility through design and contract administration to completion and project administration. K2N Architecture & Engineering Consultancy plc is a dynamic organization of innovative professionals who share a common goal to render the best and most effective services to the demanding construction industry, which is sensitive to both cost containment and service levels. 1.2.vision Their vision to the future is becoming one of the leading Architectural & Engineering consultants in Ethiopia. 1.3. MISSION: Guided by their vision, they shall provide quality services exceeding client's expectations while adhering to the highest standards of technical and individual excellence through continuous improvement training and innovation. Adding value to clients. Nurturing and promoting talents. Respecting employees' intense efforts and contribution. 1.4.CORE VALUES Unparalleled customer satisfaction and a spirit of challenge as well as change are core components of the K2N Architecture & Engineering Consultancy Plc. K2N have four basic values:- 9. HU ioT school of CUENg Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 2 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. • Clients service They add value to client's project through innovative solutions. Consistency and knowledge in dealing with clients has contributed to fulfillment and corporate success. Excellence They are resilient and persistent in talking on challenging goal and setting higher performance benchmarks that helps them to excel in every way that is meaningful to clients, employees and vendors. • Quality They are driven to attend to client's concern responsively towards delivering commitments. business opportunities that will enable them to be competitive by empowering employees to take on initiative and at the same time promote ownership of responsibilities and accountabilities and accountabilities to results and performance. 1.5.QUALITY ASSURANCE • Quality Policy They are committed to become a leading Architectural and Engineering consultant in thousand engineering consultant in the same time promote ownership of responsibilities and accountabilities to results and performance. country by providing value added services in a guality conscious environment that not only exceeds the expectation of customers, vendors' employees and shareholders, but also raises the standards of excellence in industry. We are committed to achieve our goal by continually improving people, processes and products. Ouality Objectives • To win major projects and attain premier in the industry. • To successfully execute projects undertaken. • Continues development of competence & skill based on K2N human resources. 10. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 3 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 1.6. COMPANY STRUCTURE Figure 1.1 company organization flow chart COMPANY ADDRESS The company currently maintains its office in Addis Ababa on MikeLilandstreet, NB business center 3rd floor office No. 303. The complete profile as follows: Ethiopia, Addis Ababa Sub city - Bole, Woreda - 04, House No. 327/1 TIN 0005244692, VAT: 1058060010 ARCHITECTURE BUILDINGS ENGINEERING STRUCTURAL ELECTRICAL CONTRACT ADMIN. & SUPERVISION FINANCE & ADMIN. SITE COORD. QUAN. SERV. FINANCE LANDSCAPE INTERIOR URBAN PLANNING ADMININSTRATION AUDIT LEGAL SERVICE 11. HU ioT school of CUENG. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 4 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Ministry of works registration: BO/CAE/236 Mike Leland Street, NB business center Third floor, office No 303 Tel /line/: +251-118-965804 Mobile: +251-930-077603 Fax: +251-116-620364 P. O. Box: 33667 Web site - www.K2Nconsultants.com, E-mail - info@k2nconsultants.com, E-mail - info@k2nconsultants.com 1.7.0RGANIZATION AND MANAGMENT In every organization, the most important asset is the people that play essential role in the performance of the company's functions and responsibilities. Thus, K2N architecture & engineering consultancy plc is fortunate to have highly qualified and experienced personnel. Reciprocally, K2N Architecture & Engineering consultancy plc is fortunate to have highly qualified and experienced personnel. Reciprocally, K2N architecture & Engineering consultancy plc is fortunate to have highly qualified and experienced personnel. seminars to enhance their capabilities. The company as organization and the employees, because of the mutual benefits that simultaneously being enjoyed by, has grown tremendously and has blazed a track record of fulfilling its obligation and commitment both the customers and the community. They would like to be on the level where they should be .Having confidence in the organization, they aim high. The teamwork that has been developed through the years of hard work has reaped a harvest of opportunities and wealth. They will continue to improve and develop new concepts both in management and technology. The firm is capable of furnishing well coordinating Architectural and civil engineering design services by utilizing its in-house staff as well as its professional associates. All engineering consultancy Plc. carried out any project by forming a dedicated project team. Each team is headed by a senior design engineering consultancy Plc. and draftsmen enough to complete the project in schedules. Flexible teaming capability enables K2N to undertake large and small project with the lowest overhead coasts thus providing the best value to the client. 12. HU ioT school of CUENG. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 5 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy plc is specialized in Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. 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FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Engineering Consultancy PLC. 1.8. FIELDS OF SPECIALIZATION K2N Architecture & Eng management of commercial, residential, industrial, educational, military, sport facilities, hotel and office buildings as well as earth and rock fill dam, concrete dams, tunnels, water and distribution, drainage, waste water solid waste disposal, motor ways, and high ways, air field, terminals etc... SERVICES: Engineering and Architectural design; civil structural design, Maintenance Management; Cost Estimating, Contract Administration; Pre investment studies; Regional development planning; Resources surveys, Technical feasibility; urban planning; Construction Management and supervision, project management, soil investigations, Topographic Surveys Construction supervision 1.9.INTERNATIOMAL EXPERIANCE K2N architecture & engineering and Architecture firms and worked with them in varies forms. 13. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 6 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. FINANCIAL STANDING The office has been established with a capital of over two hundred thousand birr. It has its own vehicle, office equipments and all accessories which are relevant in the field of specialization. The organization is free from bank loans and other debits. The office maintains sound income and financial stability. REGISTRATION THE OFFICE HOLDS THE FOLLOWING LEGAL REGISTRATION THE OFFICE HOLDS THE FOLLOWING LEGAL REGISTRATION THE OFFICE HOLDS THE FOLLOWING LEGAL REGISTRATION AND LICENSES 1. Addis Ababa city administration urban development and work Bureau 2. Ministry of trade, Industry and tourism principal registration certificate 3. Addis Ababa administration trade, industry & tourism bureau. 4. Value added tax
registration. ASSOCIATION AND PROFESSIONAL ORGANIZATION 1. Ethiopian Architects & Engineers Associations 2. Addis Ababa chamber of Commerce Sectoral Associations 2. Addis Ababa of standard (EBCS), Ethiopian standard code of practice (ESCP), Euro code 2-1992 (used by the software), regional and national standard according to the requirement of the civil structures and Architectural design principles. ENGINEERING & SUPPORTING SOFTWARES K2N uses engineering & supportive software's that are used by all professionals which are the most updated. 1.10. REFERENCE PROJETS AND SERVICES FURNISHED BY K2N Following is descriptions of some of the major projects handled by the company in Architectural, structural design or other engineering schemes. 1. AYKA ADDIS TEXTILE FACTORY AYKA Addis is one of the biggest textile factories in Ethiopia. It lies on 20 Hectare plot of Land. It has five buildings Spinning 1(14,000 m2), Spinning 2 (22,500 m2), Knitting Plant (8000 m2), and Store 2 (2500 m2). 14. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14b 2013 Page 7 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Project: Cable Factory Value: 33 Mill USD. Client: AYKA Addis Consultancy Plc. Service rendered: Structural design, detailing and supervision Figure 1.2 akaki Addis textile factory project 2. HAWASSA UNIVERSITY PROJECT A groundbreaking project in which the company awarded a national Architectural competition in 2012, while the university floated a competition for three packages. The project consists of a mega civil engineering laboratory, Chemical enginee laboratory, Biosystems laboratory, Technology library, Three dining halls, ICT center, main store and kitchen store. The design work for all is completed and now it is in tender process for the selection of contractors. 15. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 8 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Figure 1.3 Hawassa university project library and laboratories picture Project: Hawassa University project library and laboratories picture & Engineering Consultancy Plc. Service rendered: All schemes of design, Contract administration and supervision 16. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 9 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 3. WOLAYTA ZONE POLICE DEPARTEMENT HEAD OFFICE This is also an award winning project in an Architectural competition held in 2012 by SNNPR state design and construction supervision authority. Project: Wolayta zone police department head office Value: 30 Mill ETB. Client: Wolayta zone police department Consultant; K2N architecture & Engineering Consultancy Plc. Service rendered: All schemes of design and specifications AWARDS K2N has the following awards First prize winner Hawassa University Engineering laboratories /package I/ First prize Winner Wolayta Zone Police department head office Second prize winner Ethiopian parliament competition CLIENTS The following are K2N's esteemed clients Hawassa University Wolayta zone police department Addis textile factory Sygen BM SVP textile factory Sygen BM SVP textile Embassy of Gambia Oromya regional state health office and Flintstone engineering 17. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 10 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Chapter two 2. OVER ALL INTERNSHIP EXPERIENCE 2.1. Joining of the company Since we finish 3rd year class we got the application letter for internship from the school of civil and urban engineering. So, I have been searching a hosting company in the summer but I don't get any company that satisfy my own interest because they don't have the ability and the capacity to teach intern student from other universities apply first. Due to those reason and other disabilities I did not find any company in the summer. After I come back to campus from the summer break I was preparing for the holistic examination like other students do. At last we take the examination and waiting for the result till announced cause if we did not pass it, there is no possibilities to take the internship program. Before we take the holistic examination and waiting for the result till announced cause if we did not pass it, there is no possibilities to take the internship program. of our campus and my home town by calling and emailing but I did not have any. So, I come back to campus without getting any hosting company. The university linkage search a company for around two weeks after the holistic result is posted. So, they send me with another student to the company called K2N ARCTHICTURE AND ENGINEERING CONSULTANCY PLC. Then we went there to begin the work and we ask the vorkand we ask we perform throughout the whole internship months and tell as we can begin our work tomorrow. As he told us we begin work and join the company I have been working in the Hawassa university expansion of iot project. The project consists of a mega G+1 civil engineering laboratory, G+1 Electrical engineering labora store. But when I was arrived at the site Civil engineering laboratory, Technology library, three dining halls, main store and kitchen store were the only ongoing project. The library building covers more than 3,300 square meters. In addition to these there are two more buildings which are under the same package. These are Main Store and Kitchen Store. They respectively cover 2,500 and 1,500 square meters. Because of my company was consultant for the building that the new HUiOT campus building I have the opportunity to work in two different department. This are; 1. Engineering consultancy from consultant side. 2. Building works from the contractor side. 18. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 11 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Our hosting company was a consultant it has so many responsibilities. First the client compute bid for their drawing (architectural drawing) after they selected by the client they supply a working drawing in one copy based on the agreement and the total project cost(bill of quantity) for the contractor officially announced by the client. Then construction begins starting from mobilization and office building. The consulting work includes so many tasks such as inspecting of the site, quality control and safety of workers. In the site works executed based on the agreement between the client and the contractor. This document is called contract document so the consultant checks every trade of work is executed based on the consultant and the consultant side. 2.2.1. Flow in the section The working flow of the consultant side. every work there is a work flow whatever small is the section, my working site at Hawassa university project the work flow. Figure 2.1 flow in the section 1. Design and supervision team The team includes structural engineer, architectural engineers sanitary engineers, electrical engineers and other experienced engineers in other professions. The design and supervision team is a team from the resident engineer forman skiled and non skiled and non skiled and non skiled and supervision team 19. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 12 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. consultant side which guide every work executed in that site and gives supervision for the contractor based on the drawing and the specification (bill of quantity). This team mostly comes to the site when there is amiss understanding on drawings, working techniques, drawing detailing error, and for meeting between the three parties. The team provides continuous service to the project from start to finish, establishing and maintaining the quality and integrity of each design. 2. Resident engineer Position is responsible for multiple construction projects or a single project of a large scale requiring multiple disciplines. This includes reviewing design; supervising construction progress and scheduling; starting up process systems/equipment or facilities for turning over to the owner's personnel. Supervise field staff and contractors on the site with responsibility for quality construction in accordance with plans and specifications. He/she also responsible for approval of change orders, invoices, and payment applications which may include final payment. So, the resident engineer mostly control every work as much as possible in terms of their quality, cost and time. Testing of materials delivered at site and safety of workers starting from managers to daily labors also the duty of the resident engineer. 3. Project manager The project manager has so many responsibilities at the site and in our site these positions is accountable for the construction company. The main duty of the manager is Manager the whole site work execution, Makes payment to sub contract workers, Approves material request, Analyses the work processes, Executes sub-contracting agreements, Reviews and checks the reports made by the office engineer shall be accountable for the following tasks and responsibilities: Studying the work plan submitted by the contactor and suggests any modifications. To watch and inspect the construction work and assure that it is done in full accordance with the drawings, technical specifications and bills of quantities. Supervising the template and procedure established by the consultant. Inspecting and testing materials prior to their use at site as per sample approved by the consultant and ensuring removal of rejected materials out from site. Ensuring the correct implementation of the works according to technical specifications, to designs and quality of materials of the works according to technical specifications. completed works before they are covered by the contractor, taking photos
on a regular basis and also on account of defective work. Ensuring that health and safety measures are adopted and followed to the full extent. prepare weekly report and suggest and instruct additional safety measures are adopted and followed to the full extent. report Written by: ESMAEL ARAGAW 2013/14 Page 13 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Maintain a filing system for all site memos and instructions, measured quantities of work and materials on site, reports and other documents and correspondence pertaining to the construction activities and Maintain a site order book to be made available for the consultants and senior officers to write comments or defects in construction noticed during site visits and carrying out compliance at site. 5. Forman A foreman is the work side by side with the project manager, property owner, and other construction design engineers in order to complete the job, and supervise all phases of the construction project from start to end or supervise only a portion of the building process Normally these of the construction design engineers in order to complete the job. foreman is a construction worker with many years of experience in a particular trade who is charged with organizing the overall construction of a given trade who has moved into the position and is now focused on an overall management of all trades rather than any particular specialized group. A good foreman is the keystone of their projects since they control every work more closely than the others like project manager, site engineer etc. the Forman also have a duty of motivating workers and choosing good workers for every aspects of work. 6. Surveyor In any construction a surveyor is mandatory so, in our site the surveyor works starting from setting out to checking verticality, keeping the natural level of the building, checking elevation of columns. 7. Skilled and non-skilled persons This group includes masons, carpenter, bar benders and the daily laborers. In our country workers of such group are appointed only by experience these have its own advantage on the constriction. They work everything as they ordered by withier the Forman or the site engineer. 2.3. Work piece or task I have been executing Actually I assigned from the university to work with consultants but consultants in the field and most of the work is not parallel with civil engineering it has different field within it. So, to know every work what civil engineers do I try to work and share experience with contractor in addition to consultant. And also the consultant main work at the site is controlling time, cost, quality and safety of workers so those work needs inspection, test conducting and taking different measures when the contractor don't execute it properly. Their main work is to advice and provides abettor idea how the project will finish with a minimum cost, time and quality. 21. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 14 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Generally I have been executing on the site is supervising, working as a site engineer, surveyor and Forman. 2.3.1. Office work In my four month internship period I experience Office works that are worked mostly at the site this includes some tasks performed by office engineer and quantity III. Report writing IV. Reading off This is the process of preparing / defining a detailed list of all labor and materials necessary for the work and entering the items on properly dimensioned paper. The standard form used for entering the dimensions taken or scaled from drawings to determine the accurate quantity in each trade of work, except reinforcement steel, is called take off sheet or dimension paper. The main aim of this sheet is for payment and cost estimation for purchasing and preparing bill of quantity. The dimension paper used for taking off is double - ruledA4 size paper as shown below 22. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 15 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Table 2.1 format of take off sheet we have been used in the site. Take off sheet Project: block type; Client; location; Consultant; 12341234 Column 1 is used for stating the number of times an item occurs and is called the timesing column. Column 2 is called dimension column as it is used to enter the dimensions of the Contractor; items of works. The dimensions are entered in the order indicated below: Length, Width, Height or thickness. Column 3 is called squaring column. The stated dimensions in column 4 is called description column and description of the work item is briefly stated. Based on the above format I have been calculating the quantity of concrete in m2 and in m3, formwork in m2 and excavation in m3. We were use m3 for depth greater than 30 cm and if it is less than we use m2. A separate sheet (Bar Schedule) is used to prepare reinforcement quantities as shown below. Bar schedule is used to know the amount of rebar used on the site and to tell the bar bender that the amount of bar needed in some position of the building and its number. The following tasks are part of the taking off (used to facilitate defining the item, bracketing (relating the item, bracketing (relating the description to the guantity), timesing, dotting on (adding to the timesing factor), the ampersand (ditto), waste calculations, deduction of items, correction of dimensions (nullifying). 23. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 16 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Table 2.2 the format of bar schedule working Block type; Date; Location; paper we have been use at the sit Sheet no. Bar schedule sheet Project; Client: Consultant : Contractor ; Item location Dr.no. Shape diameter length No. of bars No. of floor No. of member length  $\Sigma$  L for each diameter Ø8 Ø10 Ø12 Ø14 Total length Weight in kg/m 0.395\* 0.617\* 0.888\* 1.209\* Total weight in kg Contractor Site supervisor Consultant \* This numbers is drive from the formula Weight per unit length for  $\Phi 6$  is 0.222 kg/m; for any other diameter  $-d\parallel$ , with weight per unit length  $-W\parallel$ :  $W = (d_2/62) \times 0.222$  where  $-d\parallel$  is the diameter of the bar. Bill of widespread use of elemental bills. A contractor can also make use of the bill of quantities in many ways, for example: 24. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 17 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 1. To plan material purchasing (note the danger in ordering from a bill: the contractor should always order materials from drawn information and the specification, making the contract to ensure work is within budget. 4. Data collection during construction for bonus systems and feedback information for estimators. It is the format which is used in a bill of quantity to list (include) a short description of the specification along with its measuring unit, quantity and unit prices to determine the total Cost for each trade of item. In the site the bill of quantity is done by consultant with the contract document but at site we work it again for payment. Table 2.3 the format of bill of quantity we have been used at the site Project x Item Description Unit Quantity Unit price (rate) Amount Client Contractor There are four clearly defined steps in preparation of Bill of Quantities: Taking off Squaring Abstracting Writing the bill off quantity Report writing Reporting is a controlling / informative mechanism which will help in evaluating the status of a project. It entails us how we are accomplishing our set targets at the onset of a project. It will also help decision 25. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 18 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. makers to follow the status of the project .It should be realistic and self-explanatory. Numbers in a report are far important than number crunching. Putting numbers for a report writer like 10 % or 90% may be simple but the meaning for the decision makers is very vital. Putting wrong figures knowingly or unknowingly are devastating. Report Types The types of reports to be submitted in a project type; complexity; working habit etc. In our project type; complexity; working habit etc. Progress Report: This is the lowest report form. (lowest means the level of view of the project as high). In short - it evaluates the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplishment of the weekly plan and puts the next week schedule . This report will show the accomplication accomplishment of the weekly plan and puts the next week schedule . This report week schedule . This report we have a schedule . This report w solve the shortcomings at the grass root level. Major Contents of a
Weekly Report: Project data , Accomplishment of weekly Plan, Weekly labor and Machinery Deployment, Material Delivered to the site, major Problems of the week , Solutions given to the major problems of the week and the site, major Problems of the site, major Problems of the week and the site, major Problems of the site and the site a Progress Report: This is a report with a view of many eyes. This will be thoroughly seen by second level observers. The contractor, the client and the project status. This is a report where major bottle necks of the project will be narrated and the performance of the parties will be vividly seen. Major Contents of a Monthly Plan, Mon matters -Delay Notifications (if any), variations (if any) ... Reading and interpreting drawings are the means by which the designer conveys the physical structure that meets the objectives of the owner. They are also known as plans or blueprints In our site there were 4 types of drawing; 1.Architectural drawing 26. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 19 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 3.Sanitary drawing 4.Electrical installation drawing This drawing is the main language between the architect, designer and any worker at the site or office to build the model in position as specified by the designer and the client, based on the agreement. Thus to work as an engineer in the construction site it is mandatory knowing drawings and any other specification. Drawings are the most common means of communication for all types and sizes of project. Thus I understand each drawing and knew every symbol abbreviation for every section and I able to communicate with different workers using it. 2.3.2. Site work The site work was the very important task for me because the internship main objective lies over her and I have gain many knowledge from the site like communication skill, handling workers, management skill etc. within four month I have the ability to see many works from the project. The work task I have been executing at site is: - Supervising of works - Inspecting the worked element and how they more task I have been executing at site is: - Supervising of works - Inspecting the worked element and how they more task I have been executing at site is: - Supervising of works - Inspecting the worked element and how they more task I have been executing at site is: - Supervising of works - Inspecting the work based on the given check list - Supervising of works - Inspecting the work - Inspecting task I have been executing at site is: - Supervising of works - Inspecting task I have been executing at site is: - Supervising of works - Inspecting task I have been executing at site is: - Supervising of works - Inspecting task I have been executing at site is: - Supervising of works - Inspecting task I have been executing at site is: - Supervising of works - Inspecting task I have been executing at site is: - Supervising of works - Inspecting task I have been executing at site is: - Supervising of works - Inspecting task I have been executing at site is: - Supervising of works - Inspecting task I have been executing at site is: - Supervising task I have been executing at site is: - Supervising task I have been executing at site is: - Supervising task I have been executing at site is: - Supervising task I have been executing at site is: - Supervising task I have been executing at site is: - Supervising task I have been executing at site is: - Supervising task I have been executing task I have been executed task I have b Testing materials The site work in general overlay over the supervision part so I have been working as supervisor based on the methodology that the contractor provides to the consultant or not. If not the contractor must report the case why they didn't execute upon it. 2.4. Procedure I have been used when I perform work tasks The site work I have been perform was controlling how the office. The checklist for site supervisors is issued in order to ensure a uniform system of supervisior of building construction projects and as a result ensure the quality of construction. In the checklist the responsibilities, liabilities and limitations of the supervisor are briefly mentioned in the general conditions of the contract. The duty of mine was to ensure that the construction works are executed in accordance with the contract requirement. In the application and use of it. There are also tables and forms in the checklist that help as records of the incidences affecting the work and as references. In addition the standard technical specification was used as reference on the preparation of the checklist. Therefore, I have been work most of my time at site to become more familiar with site works and to get more practical knowledge. Site work in general includes every kind of work executed at the site starting from setting out till finishing works 27. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 20 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. based on the given specification and methodology. The site work that I have been trough in the fore month internship period was in the sub structure work and super structure work exclusively. A normal building consists of two parts in general this are the super structure and the sub structure below the ground floor slab level including the basement, retaining walls, ground slab, grade beam, and foundation is called a substructure. In most of the cases, substructure work can be categorized as earthwork, concrete work and back filling. Super structure is the part of a building which extend above the grade beam or everything above the sub structure includes slab(1st floor slab), column, walls, roof etc. the purpose of the super structure is to enclose and divide space as well as spread load safely in to the sub structure. 2.4.1. Setting out A building is set out in order to clearly define the outline of the excavation and the center line of the super structure. according to the plan. The basic coordinates of each building will be set in position in accordance to the given bench mark. Surveying will be carried out by total station through skilled professional. Performing the job by the cited instrument will enable the respective professional to decide and limit the real topography of the site. I didn't see this work but I try to grasp some knowledge by asking the engineers how it was worked and its main procedures. 2.4.2. Excavations Excavation is the first step of constructing foundations, basements, and underground utility lines and for grading of the ground surface. Excavated material required for backfill or grading fill is stockpiled on the site for subsequent use. Excavation work I have seen was including bulk excavation, pit excavation and trench excavation work I have seen was including from chemical attacking. Excavation shall be carried out to the lines, levels, width, depth and grades and shown on the drawings, directed by the Engineer or as appropriate to the works to be placed in the excavation. Site clearance After receiving the approval of the surveying data, using the intended machineries the top soil excavation will be started. The organic top soil found on the upper layer to an average thickness of 20cm will be removed separately from the bulk excavation work. Immediate cart away will be carried out by loader or motor grader as may be suitable to the work. The use of loader will give the advantage of forthwith cart away as dump trucks will be ready available on site, while performing the clearance work. Moreover the clearance work. Moreover the clearance work than the motor grader. Bulk excavation was carried out after the removal of the top soil is executed. 150cm off set from each side of the site will be extended to the outer side. and the work is performed for the intended average depth 28. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 21 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. of excavation, which is 80cm from the reduced ground level. Since they have the real and direct experience of working on the excavation of the University Campus, it was easy for them to manage. The removal of the soil with the mentioned type machine has a positive effect over increasing of the out pit than an excavator. However as they have planned to stock pile partly the excavated soil in the nearby location, which is not more than 200 meters away from the specific block, they also use excavator as a combination. The surplus excavated soil immediately taken off from site. As to whether the excavation is executed to the respective Resident Engineer for which he/ she may give an approval. The Work was arranged in a way before the coming of the heavy rainy season. Pit and trench excavation Naturally this activity follows the bulk excavation. Appropriate site lay out was made and all the positions of the pit excavation in their exact and right place was located. The settings out of these essential structural bases seek the approval of the specific site. Excavation the middle to the edges has the advantage to give right off way for the dump trucks to haul the excavated soil to the designated place. It avoids the unnecessary obstacles which will prohibit access to the pit and trench was carried out by an excavator and manpower respectively Excavation shall be carried out to the lines, levels, width, depth and grades and shown on the drawings, directed by the Engineer or as appropriate to the works to be placed in the excavation. Excavation shall be suitably trimmed and leveled before subsequent work is placed. In the event of over excavation without the approval of the Engineer, such over excavated area was filled with selected excavated or borrowed fill material approved by the Engineer and finished compacted to the compacted or
borrowed material approved by the Engineer and compacted or borrowed fill material approved by the Engineer and compacted or borrowed material approved by the Engineer and finished compacted. Figure 2.2 pit excavation and trench excavation and trench excavation and masonry work 29. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 22 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2.4.3. FILL Fill work will follow the erection of foundation column. Bulk, pit and trench excavations need to be back filled with a better soil type, which will have better compaction character and would bring the minimum required proctor density. In order to attain the minimum standard as mentioned on the Bill of Quantity, they deploy appropriate machineries. Hawassa area has shown that the natural excavated soil alone wouldn't attain the compaction density based on the tested value. The soil should have to be blended with a granular material like red ash. The excavated soil was blended there with the red ash to be borrowed from outside. The blending process involves different machineries like loader, excavator, and dump trucks. After blending it was transported to the right place it has filled. The dump trucks dump it within the site laid out, and then the loader spread it to the required thickness, which is at every 20mm. Eight ton roller self equipped with water sprinkling device ram and vibrate it well. This was done to the bulk fill area. For the pit the same blended fill was utilized, but the machines that compact was different than the bulk fill area. Here the roller wouldn't apply rather it was performed by frog compactors. Water was adjusted, graded and prepared to receive bedding to lay on fill. 2.4.3.1. Test on fill (compaction) An important part of the grading of the site often includes the compressibility, and decrease the permeability of the soil. There are four basic factors that affect compaction: soil type, water content, material strength before it exposed to the floor slab load. In the site for backfill soil the contractors conduct relative compaction test at Hawassa University to fulfill the required fill category based on the specification. They take a test at the field (sand replacing or field density test) and at laboratory (proctor compaction test). Therefore they get the relative compaction using; Relative compaction test). test the material was approved to use as a fill material for the footing, masonry retain wall and bulk excavations. The test result is approved if the relative compaction = (Fd/Ld)\*100 (in %) kg/m3 Laboratory dry density(Ld) kg/m3 Relative compaction = (Fd/Ld)\*100 (in %) Soil only 1146.64 1366.76 83.89% Soil and red ash 1348.04 1395.93 96.57% 30. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 23 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. So, based on the test result the soil and the red ash pass the requirement thus the fill used at site was the red ash and the soil together with the appropriate compaction rate. The ratio of blending is 1:1 ratio. 2.4.4. Masonry work masonry are works that are executed by laying building material units such as stone, brick and HCB of specified dimension by providing a binding material such as mortar. I got the opportunity to see masonry work under the grade beam on the periphery of the building. The masonry was built with roughly dressed stone wall of size not less than 300mm per course and 400mm wide. Stone used for masonry work shall be hard and sound, free from vents, cracks, fishers, discoloration or other defects that will adversely affect strength or appearance. After constructing masonry wall, the grade beam is constructed directly over it. It gives an appearance of additional stability to the building and also the clearance from the ground level. Note that stone wall is measured by volume and the masonry wall over lied in a c-5 lean concrete. 2.4.5. Concrete Form work As fresh concrete is in plastic state when it is placed for construction purpose so, it becomes necessary to provide some temporary structure is called form work. Concrete formwork serves as a mold to produce concrete elements having a desired size and configuration. It is usually erected for this purpose and then removed after the concrete has cured to a satisfactory strength. In some cases, concrete forms may be left in place to become part of the permanent structure. For satisfactory performance, formwork must be adequately strong and stiff to carry the loads produced by the concrete, the workers placing and finishing the concrete, and any equipment or materials supported by the forms. In the site the form work material we use was the plywood is used extensively for concrete forms and provides the following advantages: It is economical in large panels. finished surfaces on concrete. Plywood is manufactured by peeling veneers (layer of wood) from a log in thin layers, then gluing these veneers together to form plywood panels. Depending on the grain direction in different layers of veneer is oriented perpendicular to adjacent layers. Laying panels with veneer grain in perpendicular directions in alternate layers is called cross-banding, the mechanical properties of adjacent veneers are not the same. In our site the plywood used is 10 ply or veneer which is 5 veneers in one direction and 5 in the other direction. The general step used to construct a formwork in the site is: Prepare the false works in the desired position and level. Preparing the form work in a desired position and level. Preparing the form work in the site is: Prepare the false works in the desired position and level. 2013/14 Page 24 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Painting with a releasing agent if needed. Nailing it with appropriate bracing element and false work. The purpose of employing ply wood and timber is to make sure that quality concrete slab the ply wood for the same time for the beams they use plywood for the sides. For vertical reinforced concrete structures ply wood formwork with timber false work was used. As most of the elevation columns assume uniform size, the ply wood was cut in size and was produced in a manner it could be easily fixed and dismantled. The bracing was done from timber and nailed perfectly to confine the fresh concrete slabs and beams formwork was supported and fixed on eucalyptus pops and props. Dismantling of the formwork commenced after the allowable dates have elapsed from the concrete casting and other soffit formworks should stay in position until the concrete gets cured. The dates of dismantling for the soffit formworks were shortened by the use of fast curing concrete admixtures. The use of these admixtures will allow them to move fast forward with the construction and immediate utilization of the formworks of any type and of any place will be required: To be rigid enough to confine plastic concrete at the lines grades and dimensions indicated on the form plans without bulging or sagging under the load, To be easy to remove with minimal damage to the concrete surface. In case of failure to attain the required strength the conventional date of dismantling the formwork will be respected. 32. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 25 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Type of work Duration of Removal Table 2.5 form work removal period in our site Vertical column, walls and beams 16 hour Soffit work to slab and beam 14 days Formwork to Footing Pads: Most of the pads which have larger and similar size were made via plywood formworks. Those of pads with a smaller size were made via together fixed timbers of locally available type. Such formworks was dismantled and directly fitted to their similar type pads, successively Figure 2.4 form work to footing pads Formworks were made ready, in a manner that they could be able to use them in rotation. Figure 2.5 form work to foundation columns: same as explained in Foundation Columns. The only exception here was the height of the columns. Since the height of the columns in some of the blocks is different than the others, the formwork preparations were consider this fact. 33. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 26 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Figure 2.6 form work to elevation column Formwork to Suspended slabs and beams: Plywood formwork was made available to all these parts of the structure. 2.4.6. REINFORCEMENT BAR Concrete is generally used in conjunction with steel reinforcement, which provides the tensile strength in a concrete member. The use of plain concrete without steel reinforcement is limited to pavements and some slabs-on-ground. Steel is the ideal material to complement concrete without steel reinforcement is limited to pavements and some slabs-on-ground. or cooled, both steel and concrete expand or contract equally. Consequently, no stress is caused by differential expansion or contraction. Composite materials that expand differentially are subjected to such stresses. Steel also bonds well with concrete. In a composite material, the bond between two materials is necessary for it to function as a single material. The bond between steel and concrete is due to the chemistry of the two materials, which produces a chemical bond. The mechanical bond is enhanced by using reinforcing bars, or rebar, that have surface Because a mechanical bond is a function of the area of contact between the two materials, surface deformations increase that area, thereby increasing the bond. For the same reason, rebar that have a light, firm layer of rust bonds better with concrete. Rust that is produced by leaving rebar outdoors on a construction site for a few days or weeks is not objectionable as long as the rust is not loose
or flaky. Loose and flaky rust should be scraped using burlap or a piece of cloth. Excessively rusted rebar should not be used. 2.4.6.1. Methodology Before bulk purchase and transporting to the site they was conduct tensile strength test from the store, by taking sample from a place where they are intending to supply the material. Such sampling will involve the Consulting Office and the result will be communicated. When they proceed to the purchase of the same. Place of deposit was made ready before its arrival on site where it should be damped. A platform elevated from the top surface of the soil, that would ensure the avoidance of minimum contact were prepared. Then placed there, and was protected from any detrimental moisture, grease or oil or other substances that may affect its quality. This shop drawing or bar schedule was submitted to the Resident Engineer and upon his approval mass production will be induced. 34. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 27 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Bar bending workshop were situated in a place where it could be close to the site where the bar is going to be placed in position. The bending of all types of reinforcement bars all was tied and placed in position where they are intended to be situated. On the sub-structure work hauling was performed by labor. But on the super structure it is through the help of the mobile crane, that the required amount and type of reinforcement bar and before the concrete pouring any dust particle was removed or cleaned. On horizontal structures like the reinforcement bar and before the concrete pouring any dust particle was removed or cleaned. concrete in order to maintain the allowable concrete spacers was produced and cured and placed in position. Fig 2.7 shear wall, footing and slab rebar and it's appearance at site 2.4.6.2. Splicing of bar Reinforced concrete can function as a structural material only if there is a perfect bond (adhesion) between the concrete and the reinforcing bars. This bond allows two lengths of reinforcing bars to function as one continuous bar through lap splices. Sometimes it becomes impossible to get required to make use surplus small length of bar and may be the drawing recommend to splice bar at that position. Then it is necessary to giv a suitable lap of bar as shown in the figure over each other to develop full strength. Figure 2.8 bar over lapping (splicing) When splicing or overlapping (splicing) when spliced in the site for bottom reinforcement at the support and for top reinforcement at the center in a length of four times the larger diameter of bar for every structure. Splicing length=4ר Where Ø is the diameter of the larger bar. 35. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 28 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2.4.7. Concrete Concrete is a composite consisting of the dispersed phase of aggregates (ranging from its maximum size coarse aggregates down to the fine sand particles) embedded in the matrix of cement paste. This is a Portland cement concrete with the four constituents of Portland cement concrete with the four constituents of Portland cement paste. concrete but other constituents are now often added to modify its fresh and hardened properties. This has broadened the scope in the designers should recognize in order to realize the desired performance in terms of structural adequacy, constructability, and required service life. These are translated into strength, workability and durability in relation to properties of concrete. In addition, there is the need to satisfy these provisions at the most cost effective price in practice. Since our building is a reinforced concrete structure the concrete work was commenced every day for constructing/development of every part of the building. 2.4.7.1. Constituents of concrete The constituents of modern concrete have increased from the basic four (cement, water, stone, and sand) to include both chemical admixtures. These admixtures have been in use for decades, first in special circumstances, but have now been incorporated in more and more general applications for their technical and at times economic benefits in either or both fresh and hardened properties of concrete. Cement Cement may be described as a material with adhesive and cohesive properties that make it capable of bonding mineral fragments (\_aggregates') into a compact whole. In this process, it imparts strength and durability to the hardened mass called concrete. The cements used in the making of concrete are called hydraulic cements so named, because they have the property of reacting chemically with water in an exothermic (heat generating) process called hydraulic cements are called hydraulic cement coats the aggregate surfaces and fills some of the void spaces between the aggregate pieces. The cement paste is either excessively \_harsh' or excessively \_wet', there is a danger of segregation, i.e., the aggregate tends to separate out of the mix; this will adversely affect the quality of the hardened concrete and result in a \_honeycomb' appearance. The freshly set cement paste with the reaction products, also resulting in a decrease in porosity and permeability. Aggregate Since aggregate since aggregate occupies about three-quarters of the volume of concrete, especially strength, durability and volume stability. In general, aggregates in concrete have been grouped according to their sizes into fine and coarse aggregates. The separation is based on materials passing or retained on the nominally 5 mm (ASTMNo. 4) sieve. It is common to refer to fine aggregate as stone. Traditionally, aggregate as stone. Traditionally, aggregate as stone. 29 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC, derived from natural sources in the form of river gravel or crushed rocks and sizes is referred as manufactured sand. Aggregate produced by crushing rocks to sand sizes is referred as manufactured sand. quality of the aggregate, in terms of the following physical and mechanical properties: • particle size, shape and surface texture: \_size' and \_shape' influence strength; \_shape' influence strength; \_shape and surface texture: \_size' and \_shape' influence strength; \_shape and surface texture: \_size' and \_shape' influence strength; \_shape and surface texture: \_size' and \_shape' influence strength; \_shape and surface texture: \_size' and \_shape' influence strength; \_shape and surface texture: \_size' and \_shape moisture content, water absorption and bulking of sand: the moisture present in aggregate or the moisture that may be absorbed by the aggregate, as the case may be, must be accounted for in the water content of the concrete mix; moreover, the presence of water films in between sand particles results in an increase in volume (bulking of sand) that must be accounted for in case volume batching is employed in mix preparation; • Strength: resistance to compression, measured in terms of the aggregate end soundness: which indicates whether or not the aggregate undergoes appreciable volume changes, wetting and drying, freezing and thawing; and • deleterious constituents: such as iron pyrites, coal, mica, clay, silt, salt and organic impurities, which can adversely affect the hydration of cement, the bond with cement paste, the strength and the durability of hardened concrete. From those listed taste the two tests (specific gravity and silt content) was conducted but I didn't have the opportunity to see those tests because our university send as a little bit slow from the anticipated time of intern ship due to different reason. The result was: Table 2.6 silt content and specific gravity lab test result Material type Specific gravity Silt content River sand 2.23 4.68 Coarse aggregate 2.446 Not conducted Water Water has a significant role to play in the making of concrete and in curing of hardened concrete and in curing of hardened concrete. In order to ensure proper strength development and durability of concrete. it is 37. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 30 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. necessary that the water used for mixing and curing is free from impurities such as oils, acids, alkalis, salts, sugar and organic materials. Water that is fit for human consumption (i.e., potable water) is generally considered to be suitable for concrete in its fresh and hardened states. Fast curing admixtures allow curing the concrete within 3 to 5 days after the date of pouring the concrete. Such application will only be made after the conduct of the test and the satisfaction of the Resident Engineer. The amount of the admixture to be added varies in accordance to the manufacturer's specification. All relevant documents and specifications will be available before conducting the mix design and test for approval. After the satisfaction of the concrete structure, the date of removal of the concrete structure, the date of admixtures ensures the early curing of the concrete structure. has been used. This are: Table 2.7 admixture used in the site Admixture name Use Dosage Epoxy resin concrete to existing cement surface. By spraying over the joint (not specified). High performance super plasticizing admixture, accelerator (CONPLAST SP 430) To provide excellent acceleration of strength gain at early stage and major increase in strength at all age by significantly reducing water demand in a concrete work involves three types of concrete grades: C-5, C-20, C-25, Except for the lean concrete to the rest of the concrete types we are going to employ ordinary Portland cement of Derban Cement Factory. For the later prepare test cubes and sample was taken for different curing schedules. Fast curing concrete admixture will bring down the date of cure to a
considerable standard. Taking the advantage of this shortened date of curing, the formworks can be relocated in a speedy manner to the next successive job. The required grade cement was purchased and stored out of Corrugated iron sheet (both the wall and the roofing). A platform elevated from the natural ground level was made from dry eucalyptus in a very close spacing in one direction. A thick polyethylene sheet was placed on top of the wood and then the cement is stored. use different sources. One possible source is own crushing plant. 38. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 31 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. For this option we need strict support both from the Consultant and the Client. We will locate appropriate guarry and to make use of that guarry the respective governmental office should act at the soonest possible. This would be possible if and only if the un-interrupted continuous support is maintained from the Client. The mix design will comprise of the employment of fine aggregate altogether with approved sand guality. The concrete work requires machine intensive approach, so that relevant output could be implied. A stationary mixer of 750lit capacity and mobile mixer was self loading, self watering and self shooting, with the help of extra shooter produced on site. The stationed mixers will be supplied with dumper and the output also will be conveyed by the same to the specific place. As they are going to use fast curing admixture, the workability of the concrete increases, before the setting time begins. As the curing admixture, the workability of the concrete increases, before the setting time begins. the mobile crane. Such mechanized approach is essential to fulfill the interest of the project to complete the task within the specified period of time. The concrete casting was stopped where allowable distances are covered with respect to the structural elements. The continuation was performed by creating a strong bondage methodology. Such bondage points do not exceed more than 1/3 distance from the nearest beam. Joints were treated with special chemicals like epoxy, so that harmonized structural concrete (c-5): it poured and placed in position on a surface which presupposes trimming. The mix was made by utilization of 150kg cement /m3 of concrete in minimum. The cement use for such work was PPC. Footing Pad(c-25): after the form work is done concrete was mixed using the ratio of 1:2:3 ratios. The capacity of the self-feeder mixer was satisfy alone this amount. own shooter the pouring was easy. Foundation Column(c-25): It basically follows the finish of the footing pads. Forthwith the casting of formwork, the same number of footing pads was casted. Concrete was poured by labor receiving from the dumpers. Grade Beam(c-25): Following the finish of masonry wall lean concrete will be poured in order to maintain even and level surface. For thwith the placing of reinforcement bar and the formwork the concrete will be maintained like keeping the distance, 1/3 of the grade beams length. Ground Slab(c-20): c-20 grade of concrete was applied on ground slabs. After the works underneath are finalized and the horizontal level is maintained, the placement of the reinforcement bar mesh was take place. The next thing that will come is casting of the concrete. As all ground slabs are surrounded with grids of the grade beams, it was simple to cast on each grid, following the guide of level given by the grade beam. Elevation column(c-25): The same procedure was followed as the foundation columns. Though the height in some of the blocks is different than the others, the casting was monolithic. 39. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 32 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Suspended Slabs and the adjoining beams executed at the same time. Before the casting of the concrete the placement and tying of the concrete spacers were carefully done, in order to ensure the required concrete cover. Dusts and other detrimental dirt were getting removed. After making sure that all surfaces are clean and the temporary structures are of huge volume. Therefore, highly mechanized casting was deployed to carry out the duty. For the sake of minimizing the joints, the output of the work there was escalated. Into this effect, mobile crane and the self-feeder mixer were used. Working of extended extra hour was also observed, 2.4.7.3. Teste on concrete Testes conducted at site for concrete work was the slump test and the cube test. Un fortunaitly the broking of the cube test is not in the vicinity of our site som I can't see this test ecactly except the know how about it is conducted. Slump test is the most widly used test in the field and laboratory which is used to check the consistancy of concrete used at a construction site. It provides usful onformation on the uniformity in the day to day or even hour to hour production of concrete.the main apparatus used for this test was 30cm hight, 20cm bottom width and 10cm top between the cone and the fresh concrete after tamping and removing of the cone. So, the workability is classified as: Very law when the height is 0-25mm Low when the height is 0-25mm Medium when 50-100mm Highly workable when 100-175mm Figure 2.9 slump cone and concrete illustration Based on the above principle we conduct atest at the site and the result was medium so, we proceed the work. 2.4.7.4. Joints Any joint, as in a physical break or gap between members, in a concrete structure or building is a potential weak link which may lead to serviceability problems, lack of durability or structural failure. Yet seldom, if ever, is a building constructed without them. In many situations they are necessary requirement (e.g. to accommodate anticipated differential movement between members) and are sometimes regarded as a necessary evil. The word \_joint' is used in building parlance to cover elements which have to perform quite different functions e.g. beam-column joints. In the former the joint has to provide continuity of Inverted slump cone Slum p Slumped concrete 40. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 33 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. structural action between the members to allow one member to move independently of the other. Expansion joints were provided to maintain a minimum resistance at a joint. Reinforcements don't extend across expansion joint prevents the continuation of cracks formed due to differential settlement, variation in temperature and long span of the building from one structure to the other. expansion joint runs through the entire building from the ground floor (or the basement, if provided) up to the roof. Two columns are used at the expansion joint. However, a combined footing may be used for the two adjacent columns. Construction Joint A special type of static joint that is provided between two concrete placements is called a construction joint or cold joint. However, in our site expansion joint is provided by the designer in order to separate the building to protect from anticipated accident. Figure 2.10 expansion joint is provided by the designer in order to separate the building to protect from anticipated accident.

constructed as a monolithic unit in one placement of concrete; the structure or member on one side of the joint at that point so the analysis is simplified. Mixing of concrete As I explained in the methodology part the concrete was casted in two different ways in the site. This are: 1. Using movable mixer (self-loading): this mixer is a wheel mounted; the production capacity is 1.38 m3 concrete per batch. The time required for one batch is 20 minutes. The usual one round batch mix of this equipment is sand 2 boxes (by its own box size), aggregate 2.5 boxes and cement 10pcs was use for c-25 concrete. Expansion joint on footing 41. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 34 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) those are mixers that use — nominal mixing of the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) those are mixers that use — nominal mixing of the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) those are mixers that use — nominal mixing of the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) those are mixers that use — nominal mixing of the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) those are mixers that use — nominal mixing of the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) those are mixers that use — nominal mixing of the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) the company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2. Stationery mixers: (feed by man power) the company end to company end t concrete. Their productive capacity is 0.227 m3 and the time required for one batch is 6 minutes. The general mixing of this type of equipment was first an 18×40×50 box is prepare for c-25 concrete so, the laborer feed it sand 4 boxes, aggregate 6 boxes and 2 pcs of cement for one round batch. Pouring of concrete After the concrete is casted the next step is casting or pouring the concrete in to the required place. Before commencing the casting process supervision is made for the bars, spacers, different installations and the formwork if it was in the expected quality for casting. The equipment used for pouring is bucket to carry the concrete, tower crane and vibrator for compaction of the fresh concrete. Figure 2.11 Concrete work Concrete to ensure that it has no voids and air pockets. On a small job, consolidation can be done manually with the help of a steel rod, whereby the worker simply rods into the concrete up and down and with some sideways motion. It is, however, more common to employ a high-frequency power- driven vibrator is one that vibrator is one that vibrator. This is typically an internal (or immersion) vibrator. This is typically an internal vibrator is one that vibrator. consists of a rod connected to a flexible shaft. The vibrator is inserted into freshly placed concrete. As the concrete in a particular location. Because the vibrator has a finite area of influence, the new insertion point must be fairly close to the previous insertion point. Curing The hydration reaction begins as soon as water and cement come into contact, but the rate at which this reaction proceeds is extremely slow. It takes up to 6 months or longer for concrete to gain its full strength. However, approximately 80% of concrete strength develops in 28 days. Approximately 80% of concrete to gain its full strength is obtained in the first 7 days and approximately half in the first 3 days. This is true only if sufficient water and favorable temperature are available for the hydration reaction to concrete 42. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 35 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. continuously for hydration is called curing of concrete is denser and, hence, stronger and more durable. On construction sites, curing is begun as soon as the concrete has fully set (solidified), which is generally 12 to 24 h after placing the concrete. Curing in the initial stages of hardening is extremely important and should continue as long as possible, not less than 7 days. It is the process of preventing the loss of moisture from the concrete while maintaining a satisfactory temperature regime. Curing is essential for producing good' concrete that has the desired strength. impermeability and durability, and is of particular importance in situations where the water-cement ratio is low, or the cement has a high rate of strength development. So, curing must be conducted using potable water and covering of the structural element using covering material for at least 7 successive days to retain the moisture lost. In our site curing of concrete starts from the finishing of the pouring and ends in a 7 days. Mostly they cure at morning and night time. 2.5. My performance was I integrate with all workers within a short time and get involved in different site works to gain more knowledge about the working environment in the site and improve myself with more site works. Especially the work tasks I have been working in different section to get involved and pass through different peace of works. Especially the work tasks I have been performing in the office work were very impressive because I didn't have any knowledge about the quantity works, cost and report writing etc. In general in the last four month I perform all my duties nicely and get knowledge of the practical world and relate it with the theory I have learnt in the class in the last three years. Also I transform myself to another level of skill, ethics, knowledge and leadership using this internship class and I perform it well. 2.6. Challenges I have faced Construction projects are complex and time-consuming undertakings that require the interaction and cooperation of many different skills, resources, and knowledge to participate effectively in it. In order to integrate and work closely in each section it is a challenging task to one person especially when he/she is fresh or beginner. In fact some challenges may be solved by me but some are above my limit and even the workers at the site also. In general I have faced the following challenges in the internship period. Communication problem with workers in the office and at the site. Shortage of working drawings like structural, architectural, architectural, architectural, sanitary, electrical and some other details. Weather condition of the site. Unsatisfactory answers for questions from engineers. Safety facility. 43. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 36 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. 2.7. Measures I take for challenges communication challenge was the most dangerous challenge from all challenges because of that it blocks me from finding more knowledge from skilled workers and other persons those are closed to the site work. Their language at the site work that makes me more confused and it was uneasy to know those words within a few days. At last I was able to understand those words soffit...... phondo..... ...kerebat......Used to fix the form works together in their position. Those are the main site language I able to ...Used to maintain alignment. Yoke ..... slab and beam at the bottom. Tee .... understand but there are some others language they used to communicate that I didn't able understand it still. Drawing shortage: since I have been working in the consultant side we, asked together the resident engineer. And he gives as in soft copy and hard copy as we want within a week. Weather condition of the site: since I'm fresh to such work I have been in a big nuisance particularly in the first month to adopt this kind of working environment. The main challenge was the sun light and l wear a sun glass to combat this warm condition. Shortage of knowledge in some portion of works like quantity, bill of quantity, taking off, bar schedule and report writing was some challenges I have faced in the site. To solve these problems I try to ask workers at the site and read related literature to know more about this works. Lastly I knew how to work those things. The underestimation and the answer were not solved throughout the month with some workers but I try to communicate friendly with some workers to make myself clear and to know more knowledge from workers. And the answering problem was aroused due to that the contractors have no idea about how the building is designed and some shortage of knowledge about the design. We ask the design supervision team when they come for supervision and monthly meeting of the tree parties and know how the structural design was designed and some other misunderstanding. 44. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 37 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Our safety including employees was in danger throughout the four months because of they didn't have any measure regarding safety. But In the last two month they use signals in the site as well. 45. HU ioT school of CUENg. Final internship report Written by: ESMAEL ARAGAW 2013/14 Page 38 Hosting company: K2N ARCHITECTURE AND ENGINEERING CONSULTANCY PLC. Chapter tree 3. Overall Benefits of the internship is a class healed at site to provide an enhanced understanding of the outside working environment before the student graduate. Student like civil and urban engineering and other fields also take this practice. The main aim of this practice (internship) is that to teach students communication with different workers or employees, to improve their leadership skill, team playing skill and etc. In my four month staying at the Hawassa University institute of technology expansion project with K2N consultant I have acquire much knowledge in different tasks as explained below in different tasks as explained below in different tasks as explained below. mine. 3.1.Improving practical skill The aim of the internship is to address more practical knowledge for student. So, I found a practical knowledge we have learn in the class is helpful to get those practical or real work in the site as much possible within the four month. The knowledge gained from the class. Thus I found some knowledge in the site which helps me to work with the site environment or site peoples. Some of the practical knowledge I gain from the internship class was: Construction of formwork and false work for some reinforced concrete structure. In any construction work the first stage before casting of concrete is designing and constructing of form work. As I explained in the work procedure the formwork and false work must be stiff and must resist the fresh concrete gain its strength. Thus the construction stage of form work was new to me since I'm new for the practical knowledge about how it is worked and erected. Bar bending, positioning, splicing and tying, according the specified drawing (structure. In most case it bending, positioning and tying work is done based on the working drawing) by the design team of that specified structure. In most case it was new for me to see such work since it is a practical work only performed at the site. Surveying on building construction. We conduct the surveying class in the field for its lab session of the course in the normal class. But we don't know about how it is going to be in building construction in particular stage of the construction work it used either the super structure or sub structure. Casting and pouring of reinforced concrete structure and equipment used for casting.

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