

## Introduction

1.1. I worked for ////////// Company located at ////////// Iran. The email of company is//////. Name and nature of project is //. The project physical location is //. Client and contractor of project is //. The total duration of project was 35 months starting in April 4<sup>th</sup>, 20//// and completing in March 6<sup>th</sup>, 20////; However, I worked for two years in this project starting from September 23, 20//////// to September 23, 20////////. I was civil engineer lead hand person managing a team of 44 personnel. I was a workshop superintendent at some points throughout the project as well.

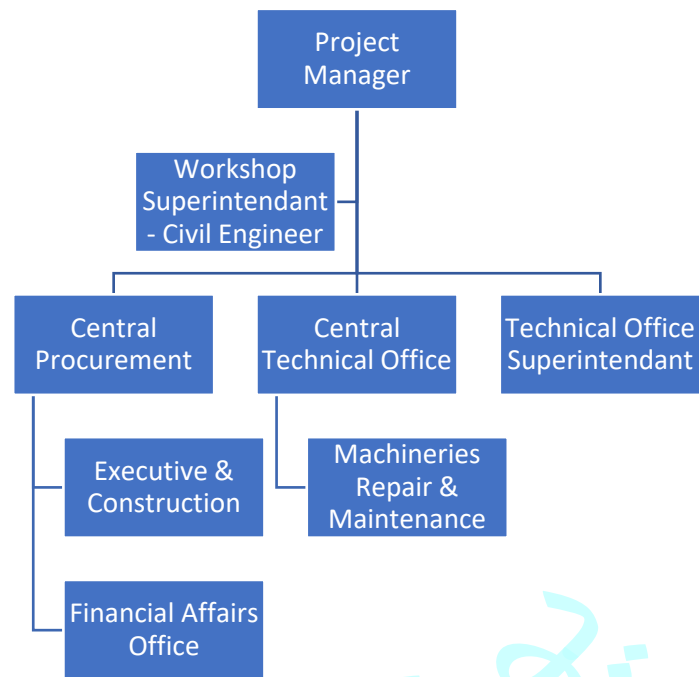
## Background

1.2. Project phases were excavation operations and foundation execution, 5-storey skeleton execution including weaving of bars, form and shuttering work and concreting operations in each story followed by partitioning and finally finishing completing interior operations and façade of building. I was assigned a set of duties and responsibilities according to my employment contract and by the project manager. I worked with internal departments of the company including project management, central procurement, and central technical office. I worked with client and consultant department including financial team, supervising team, and technical office.

1.3. Other than general civil engineering responsibilities, I was also assigned with duties such as project process progress and leading, preparing communication programs, invoices, and project progress reports. I also determined building methods and obtained pertinent verifications from supervising system. I equipped workshop and supplied materials.

1.4. Project was ////////// in a land acre of approximately 6000 square meters in seven blocks and each block was constructed in 6 storeys within a land area of 16800 square meters. Type of the structure was reinforced concrete skeleton and we used special reinforced moment frame as well as shear walls. Partitions were break panels connected to the structure using steel frames and connector components. The equipment applied in the project were two crane towers, one dynamic portable concrete machine, concreting batching, and procurement as well as lab equipment.

1.5. An organizational chart of the project could be depicted as below:



## Personal Engineering Activity

- 1.6. The start of my activities was mainly after stationing and equipment of workshop administrative equipment; I attended meetings regarding the final approval of executive drawings as provided by the consultant engineering company conducting feasibility study and supplying mechanical equipment of the workshop. To make sure of the information gained, I performed correspondence and had meetings with project control unit and technical office of the consultant engineering company.
- 1.7. In one part of the project, I had challenges for displacement of one of the interior columns inside the building in 70 centimetres toward one direction after full execution of a 6-story skeleton of ceiling in other words planting of a single column 0.6 metres away from the axe and elimination of the original column to make changes in drawings and area of several units as requested by the owners and purchasers.
- 1.8. In this design, considering the fact that one column had to be displaced only in the first floor from its place for 70 centimetres while the loads of upper story's column were in its place, as I analyzed there was a shear force of approximately 80 tons to the neighbouring beam and a maximum bending moment of about 160 tons (according to seismic analysis) to the column which could cause shear breakdown in that specific beam. Different solutions were prepared such as construction of a column of double-headed joint plus an additional steel beam in the neighbouring span with length of 7.5 metres under the original beam to increase shear capacity,

but it proved rather implausible. The other solution was planting a fixed-end column with a bracket-type beam on its top, here there was the possibility that building ends up with momentary breakdown and full collapse, therefore, I ruled it out as not feasible. Finally, I came up with the solution which I had in mind and it was using a bottom-fixed end reinforced concrete column which was surrounded by steel (supporting belts) along with a diagonal 45-degree bracket member which was approved, calculated, and executed. I opted for this method as it was the only method that in manual calculations and software calculations would tolerate that amount of forces.

1.9. During the process, I re-modeled the whole structure and did the software modelling of the building considering the accurate values of exerted loads after applying changes at the place of partitions in the as-built drawings. I obtained the results of concrete compressive strength test from couple of structure members on a random basis to determine accurate resistance of executed members using Schmidt hammer test.

1.10. I used the resources below: "Iran Code 9 on National Construction Regulations", "building code requirements for structural concrete ACI318-05 and commentary" by Farminton Hills, "Notes on ACI318-02" by David A, Rabbat and Basile G. I used internet resources such as ///.

1.11. Some of the software that I used repeatedly in this project were Etabs for remodelling the entire skeleton; SAP2000 as a single software for modelling the considered member and dynamic analysis method using combination of seismic effects in different stretches. In this problem, I used experimental method of collecting information mainly through internet and consulting to one of my university professors. I repeatedly used my knowledge and competency in English language so that I can mention that this project was a great opportunity for me to improve my reading skill in English language.

1.12. Unfortunately, the lack of safe and comfortable residential buildings in Iran is one of the current issues for the Iranian families which led to an unprecedented increase in the number of applicants for the subsidised housing as soon as it was implemented by the Iranian government ,forcing the companies involved to shrink the area of the buildings and to increase the numbers of units instead. Our company also ethically was obliged to estimate this need to obviate the current social obstacle. To include all opinions regarding the proper calculation design selection, in this regard, I spoke to 3 drafters and surveyors from consultant engineering company and analyzed their designs and primary ideas regarding the modelling software.

1.13. Throughout this process, I had meetings with the technical office drafting department of my own and office staff as well including construction operations superintendent as well as central office from inside the company and consultant engineering company supervisors and client financial team. We had several meetings with these entities and made decisions about the above issue. I applied wide variety of experiences and expertise for a better feasibility study and

comments of construction operations expert especially regarding safety regulations during construction activities.

- 1.14. Maybe, it was the first time that such a design was executed in Iran. Combining and using two concrete and steel materials then design and construction of a constructional member with simultaneous performance as column and beam supporter against shear force in a heavy structure was such an innovation that Couple of experts from Iranian Association of Civil Engineers acknowledged to say they would not dare to be involved in it.
- 1.15. I applied Iranian Code of Practice for Seismic Resistant Design 2800, Federal Emergency Management Agency (FEMA) and ABA “the national code of Iran”. I worked with an architectural engineer to determine accurate location for walls and partitions after feasibility study; I also worked hand in hand with mechanical engineer to determine the location for water storage tankers over the roof to reduce load.
- 1.16. Because the member by displacement of the in-question column had to tolerate a weight of approximately 350 tons bending moment; and on the other hand, there was a dimensional limitation for the column, I had to design this column with a strength approximately twice the resistance of other members of the building, therefore, I applied FU 4000 bars with Ø25 diameter and concrete with 350 kg/m strength, cylindrical sample could achieve this strength. For more assurance and gaining required strength, I considered silica concrete to be pumped in to the chamber form.
- 1.17. Management on the progress of as built drawings according to the pre-planned table was carried out by the project control unit and in comparison, to the general schedule of the project, I was controlling progresses. I estimated the costs by preparing interim invoices and using Parsian accounting software. I was well familiar and trained using my experiences with Parsian Accounting Software in cooperation with the central technical office.
- 1.18. Considering risks of corrective operations, I ordered further reinforcement of building by installation of reinforcement interim hydraulic jacks; in addition to make sure of the number of interim loads, I performed some calculations and installed a couple of pressure gauges in different distance all around the considered column we were going to start working on.
- 1.19. Because after the change, the building had to be resistant against gravitational, lateral, and other forces completely, we had to prevent any kind of possible periodical settlement or long term one, therefore, there was a need for accurate computations with higher than normal safety co-efficient. Considering vulnerability and high risk, throughout all stages from design to execution, I was physically present and even in many cases, I had to ask some of my experts and technicians to stay overtime in the project.
- 1.20. I applied some of my management experiences; some that I have gained throughout year of professional practice in the field such as attraction and recruitment of professional and

loyal work force, communication skills, resistance against problems, creation of motivation in the working forces by encouraging and rewards and trying to anticipate some conditions in the project.

- 1.21. Throughout the project, to integrate the performance of workshop and create coherence, unify the team, I determined responsibilities and duties of the sub-teams such as technical office, executive office, procurement, and storage team, as well as repair and maintenance as I was responsible for. I determined responsibilities for the financial team in cooperation to the central technical office. Regarding collection of project progress reports, and reminding some of the responsibilities of team members, I was continuously present in the meetings on a weekly basis; I also had meetings with team lead hands; I had technical justification meetings as well as training meetings for a few personnel monthly.
- 1.22. During the project problems, I used resources such as FEMA code, ACI and they were usable not only in solving problem but also in quality and quantity improvement of my personal knowledge in civil engineering. Communication to the project manager either in person or throughout the reports was something maintained by myself. I sent him emails and letter as well as required copying all team leads and operations.

## Summary

- 1.23. The project was perfectly executed but after finishing and completion of the work, I got familiar with another modern material “FRP plates” which would give us a higher level of strength if it was utilized instead of steel belts around the member.
- 1.24. This project increased my knowledge in the field of high strength concrete using chemicals and the formulas of mixing in the workshop which was a worthwhile experience for me
- 1.25. Despite the workshop situation and since it was a remote area not accessing water, electricity, and other facilities and since client promised to provide water and electricity, however since it was not attained, the project took longer and completed with a month of delay and as the first project among the /////////////// was submitted to client in a way that client appreciate our work in many ways. However, some authorities after the delivery of project so far have not been able to provide infrastructure facilities as agreed before the project and residents are not happy about it.

## Introduction

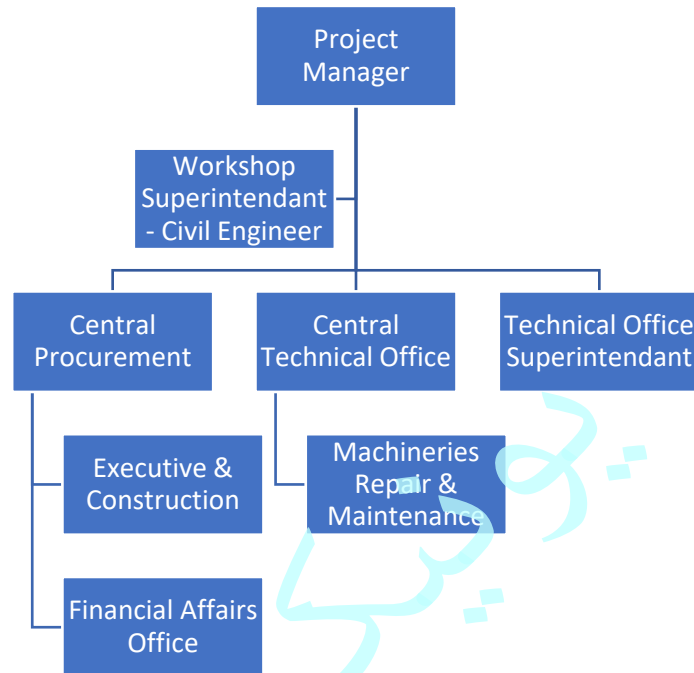
2. 1. The title of this project is ////////////////; the initial estimate was a year and 6 months. The term I was active in this project was about 2 years. The full address of project was ///////. The company I worked for was ////////////////) located in ////////////////. I was civil engineer on site. The project started on April 30<sup>th</sup>, 20////////// and completed on November 1<sup>st</sup>, 20////////// and I worked there for the whole project period in the position of a civil engineer.

## Background

2. 2. Project original objective was construction of ////////////////. The project phases were project primary estimation, holding the tender and selecting contractors, building permit obtaining from the related organizations and construction stages implementation (building, mechanical and electrical).
2. 3. My responsibilities and duties were: leading, supervising, and organizing site activities, equipment, and commissioning workshop, planning toward the objectives attainment and workshop activities, planning, organizing, and monitoring on the progress of every stage of production, studying and interpreting architectural and structural drawings, design and supervising on the corrected drawings (as built), executives details and plans and obtaining its verifications from supervising consultant engineering companies and or client. The other activities that I had were designing structural systems and skeleton of the building using the related engineering software and making sure of its strength according to the related codes, interpreting structural drawings and details to the team of engineers and technicians at the company, selecting proper construction methods, inspecting quality of materials according to the standards and then its verification to commit to purchase. In some other points of project, I also analyzed and designed building skeleton system according to both static and dynamic seismic methods. I sampled and tested soil to determine quality and base strength of structure; I also estimated overall costs and corrective measures. I negotiated to the client financial team and or consultant in this regard. I arranged for technical meeting and I was either part of a teamwork, lead a team or integrated my activities into a teamwork.
2. 4. On the other hand, I was also personally conducting the following responsibilities and duties as well as a professional civil engineer: selecting the most fit construction methods, studying, and testing the quality of materials according to the standards and then verification to purchase. I analyzed and design skeleton system of buildings according to both static and dynamic method; I sampled the soil and tested to determine the quality and base strength of the structure. I estimated overall costs and took corrective measures and negotiated to the client financial teams and consultants in this regard. I redesigned parts of structure according to the new use titled as built. I prepared the contract with subcontractors; I studied drawings and

prepared proposals for executive operations. I prepared work order for modification in the primary drafts according to the suggestions and I prepared invoices as well.

2. 5. An organizational chart of the project could be depicted as below:



## Personal Engineering Activity

2. 6. In the analysis of existing structure, I performed strength evaluation test to make sure of quality of executing existing skeleton. I inspected over 50% of the welds in the steel connections through MT and UT tests. In this part, I realized many connections are not strong enough. I applied rewelding to improve. To determine the compressive strength of concrete, I randomly performed core testing which afterwards, I realized that the test is acceptable. I remodeled the current structure for analysis of structure, design of the remainder of skeleton and designing stiffener parts including eccentric braced frame with dual vertical links, stiffener parts, wall posts etc. I sent the results to the central head office and client. Some of the changes and reinforcements that I made were as following: stiffening columns connection at higher storeys using seismic column splice, changing some of the girder connections to column one using rigid connections schedule, adding some gusset plates and cover plates in rigid joints. I tried to minimize the number of dead loads and replace it with lighter materials in loading new model including reduction in the weight of interior partitions using new generation walls of fiber cement board (FCB) with stone wool and polystyrene layer (German Technology). I replaced ACP (Aluminum Composite Panels) instead of stone panels in the facade. I changed flooring materials from ceramics to light weighted floor covers. I upgraded the cooling system from wet cooling

tower to the new technology of VRF (Variable Refrangent Flow) giving us the capacity of eliminating tower load from the roof. Final list of required steel parts after drawings detailing using AutoCAD software by draftsperson and my final verification were submitted to the central office for construction in plant.

2. 7. Some of the resources and books I applied were including the book of Fundamentals of steel construction by Reza Khodadadi, structural Steel Design 5<sup>th</sup> Edition by Jack C. McCormac and Designing Steel Structures based on Iran Code of Construction by Dr. Shapoor Tahouni; I also studied the book in Experimental Study on the Static Behaviour of the Y-typed Bracing by T., Hisatoku, T. Segawa, H. Mukai. I attended in the training course on ETABS by the Educational Vocation Organization of Iran and obtained degree No/////; I also attended training seminar on design and execution of bolted connections in steel structures by Dr. ////////// ////////////// I participated in the training course of SAFE software for modelling slabs and foundation. Some of the software I used were ETABS, SAFE and Autodesk AutoCAD. I applied part 10 from national construction regulations and Code 2800 in seismic forces. I used Primavera to control project considering 3 dimensions of time, costs, and quality all throughout the project execution.
2. 8. I had discussion and joint consulting team meetings in certain intervals to make sure of matching changing in spaces according to the architectural and open spaces standards as well as studying efficiency of new ventilation system and matching to the Iran climate; my team members were ////////////////.
2. 9. I prepared reports after reading all reports I received from teams on structural analysis and prepared a final report to be sent to the municipality for executive permit obtaining; I sent the invoices to the financial team and municipality accounting and project manager to supply project financially. I prepared physical progress reports for the construction operations and forwarded them to the project control unit at municipality and project manager. I had tight meetings daily with technical team experts to expedite project activities. I also had meetings at the discretion of project manager with client reps to study the project progress and obtain supervising team approvals.
2. 10. The virtual model that I designed using software and the help of my team was approved by the client later and its executive details titled as built drawings were prepared and made as work order. In this project, considering FEMA standards and possible hazards including software risk, human resources risk as well as information, I defined the safety coefficient to the ratio of 0.15 for the entire project.
2. 11. Considering the schedule that I prepared for the safety training to be held on a weekly basis for executive personnel and send daily control checklists by HSE expert, using punishment and reward system, I convinced personnel to the use of safety equipment.
2. 12. Another project defined in between was construction/execution of a 6-storey building with parking use including 3 basement slabs as well as 3 up ground floors using Top Down method. Considering loose and cohesionless soil in the region and high depth of excavation



which made the risk of neighboring building total collapse doubled, I held several meetings with the presence and cooperation of different engineers and getting their opinions on the activity. We talked about retaining structure or separate pile driving to stabilize the neighbouring building. After my wide researches and studies, I in a team cooperative and discussed manner, opted for the Top Down method and finally after client and consultant engineering company involvement, this method was approved and executed through the following stages:

- Casting of precast reinforced columns and fixing couplers for the aim of connection of beams at required levels in the workshop next to the site.
  - Excavation then installation of precast members using lean concrete.
  - Excavation to the first basement then construction of the first slab on a stone rubble soling which was laid uniformly.
  - Constructing the two other floors using the same way.
  - Carrying the foundation out and completion of the whole cavitation.
2. 13. I applied the following engineering resources: “Deep Excavation: Theory & Practice” by Chang-Yu Ou, “The Construction of Deep and Complex Basements and underground structures within extremely difficult urban environment” by Raymond W M Wong. I also participated in the training course held on stabilizing of deep cavitation holes. I used 3D Max for modelling; I applied BS 8002:2015 Code for Practice in Earth Retaining Structures. I also used Primavera to control project considering 3 dimensions of time, costs, and quality throughout the project execution. My colleagues were//////////.
2. 14. I submitted project progress reports to the client technical office as well as consultant engineering company. I prepared report regarding some of the equipment and excavation machineries such as Bob Cat from the client equipment supply unit. There was no type of settlement or damage observed in the neighboring building at the end of this project and within the time and expenses as assigned, the project of parking structure was completed.
2. 15. In the second parking project, considering the higher rate of hazards for human resources in execution of this method, other than the training course that was obligatory, as a professional civil engineering considering safety as my number 1 priority, I increased my safety control representatives all over the site so that they control and watch proper use of safety equipment on site.

## Summary

2. 16. Considering the limitations that I had in Farsi language and lack of proper and good resources translated in the filed, throughout the project, I had resort to variety of books and BS standards in English and make sure of proper application of method. I also tried to translate

couple of website materials to find light materials for use; all was a good opportunity for me to improve my English language competencies.

2. 17. Some of my achievements in this project were working out the project within the time and budget as allocated; gaining teamwork skills and team people management within different cultures and behaviours; analysis of technical data, assessment, and finding solution, team decision making, deep cooperation to the project manager and other activities that made this project a model and superior work.
2. 18. There was a great decrease in risks using my proposed suggestion; there was also a 20% time saved in the work execution using the same method. I increased my knowledge in lightweight steel frames, LSF. I gained new experiences regarding weld tests and monitoring on welding process. I gained good dominance in designing steel structure building using Load and Resistance Factor Design, LRFD. Also, I could calculate using Allowable Stress Design. I gained a lot of other experiences making me well and deeply experienced engineer for future.

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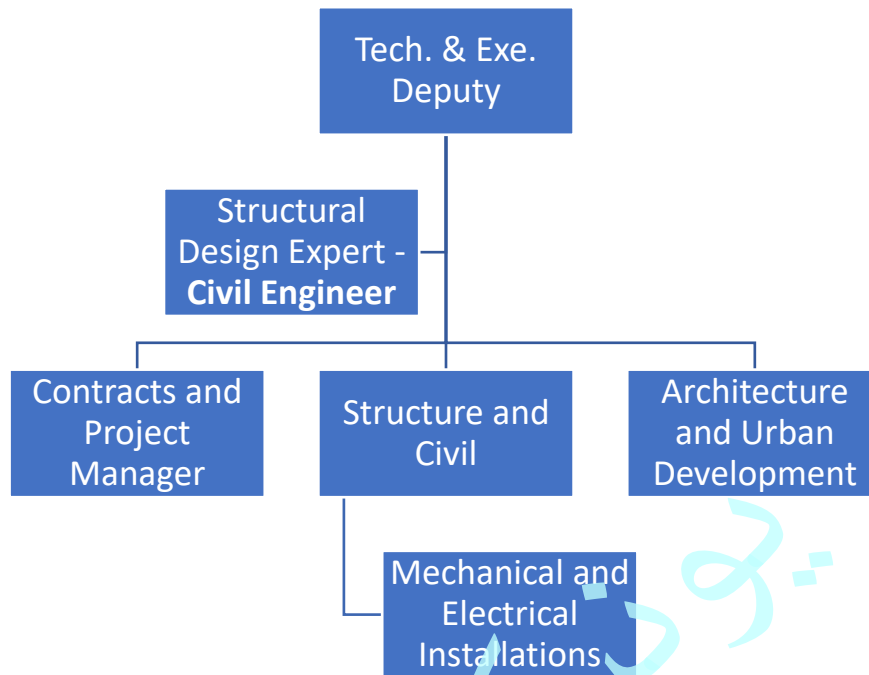
## Introduction

3. 1. The title of this project is ////////////////. The project took 2 months for design and 14 months for execution. 2 months during the design, I worked full time and 14 months was an case by case according to the activities assigned to me in the project. The project physical location was ////////////////. The company that I worked in this project for as mentioned in my curriculum vitae was ////////////////. The office address is ////////////////. The company email is //////////////// I was as a civil engineer- structural design team lead. The design of project started on December 12,20///// and completed on February 12, 20///// which I worked on it in the office.

## Background

3. 2. The main objective of project was construction of mass residential units in a short-term time using new construction methods of earthquake resistant skeleton structures and development of ////////////////. The total phases of project were architectural and structural design of building as the first phase; design and fabrication of required concrete forms at the plant site and transferring to the project site; execution of structure and skeleton using the special instructions and finally façade and partitioning and finishing of the building.
3. 3. As a professional civil engineer, I was assigned with the following duties and responsibilities to take care:
  - Designing structural systems and skeleton of building using related engineering software and making sure of its resistance according to the related codes
  - Analysis and design of building skeleton system according to both static and dynamic methods
  - Research and decision making regarding the most suitable construction methods proportionate with client conditions
  - Coordination and leading a team of 4 people and research regarding the advantages and disadvantages and execution costs using new formwok method
  - Designing skeleton using shear walls system and Cobiax two-way flat slab
  - Designing form types proportionate with tables and flying forms method
  - Interpreting designed drawings in the meetings held with the contractor and describing details of designed forms according to the manufacturing group,
  - Research and learning mentioned formwork system proper execution method and holding meetings to train engineers and technicians of the executive company

3. 4. The organizational chart of the project is as following:



3. 5. The deadline for the project as set by the client was 14 months for design and construction phase completion, therefore I was thinking of a method to apply to finish early. Considering the shortages and weakness we have in Iran especially in application of modern methods, majority of concrete skeletons are executed by the traditional method of timber form work which is slow and waste of time. Therefore, I resorted to “Utilizing one of engineering form work systems” and so I could expedite the work and complete structure sooner making completion of 288 units in a period of 12 months possible.

## Personal Engineering Activity

3. 6. During the work, my team and I were introduced to new expedite execution methods in concrete buildings construction, especially tunnel form concrete building and after more concentration and better introduction to Fly Forms International L.L.C located in Dubai, I collected a good deal of information and data on design and assembly. In this method, walls and ceiling are simultaneously concreted using special concrete forms and using artificial heat concrete achieves 56% of required resistance and strength within 3 days and makes it possible for form’s removal. In this manner,

each story execution considering its shuttering works, bar weaving and concreting took only 7 days in total foundation and skeleton of each building would entirely complete within only 55 days

3. 7. Simultaneous execution of skeleton, mechanical and electrical distribution paths inside the walls was one of the biggest merits which could expedite the execution procedure. In general, designed structure was carried out in the following manner through the contractor:

- Mat foundation execution and planting of root bars for the purpose of overlapping to wall bars then concreting the foundation
- Manufacturing of table and fly forms at the plant site out of workshop and then transferring to the workshop place
- Crane tower installation in proper elevation besides each building
- Walls reinforcements in the considered places and installing installations ducts between reinforcements
- Transferring cubical shaped forms as assembled from the floor to its precise place and fixing them to one another using bolts
- Weaving ceiling reinforcement mesh first layer and installing Cobiax polystyrene balls in between and then execution of second layer of reinforcement mesh
- Concreting the ceiling and walls using telescopic concrete pump
- Generating heat in the closed spaced under forms for a period of 3 days
- Removal of forms and shifting by special trolley then transferring to the higher level by crane tower

3. 8. I applied the following resources and references as a professional civil engineer resorting to reliable resources and credible references:

- Dr Edward G Nawy; Concrete Construction Engineering Handbook to review and remind shear walls design method
- Concrete Structures Design written by Dr. Davoud Mostoufi Nezhad
- David W Johnston; Design and Construction of Concrete Form Work to get knowledge and information about existing standards in design of parts and components of form including temporary beams, hydraulic proprs and thickness of plates
- Formwork for modern, efficient concrete construction to gain information regarding how to do form work and the most appropriate time to do it

➤ ///////////////and ///////////////to gain knowledge on details and execution procedure.

3. 9. On a continuing professional development basis, I also attended the seminar of /////////////// in high rise buildings held by ///////////////. In this 8-hour compressed session, I gained good deal of information regarding technology of constructing concrete buildings by the lecturers especially in the part regarding standards of executing Cobiax ceiling.
3. 10. Regarding software and tools, I used Etabs for modelling the entire building and to design the foundation, I used SAFE. To make sure, separately using SAFE, I remodelled and analyzed the ceilings. I used Autodesk AutoCAD software for modelling details of form plates and components. I applied code 2800 in determining seismic forces and time, Iranian national construction regulations as well as ACI318-6.2 "Removal of Forms, Shores, and Reshoring". The method that I applied was artificial heat creation method in closed chamber which was a simple idea I applied as a creative engineer for concreting in the winter time and in lower temperature zones; while in the below zero temperature all civil projects and construction works were halted, we were working.
3. 11. Hereby, my thanks goes to my team of engineer, Mr. ///////////////, senior expert of civil, Mr. ///////////////, manager of ///////////////, Mr. ///////////////, senior expert in ///////////////, Mr. ///////////////, senior expert in electronic installations and senior member of /////////////// as well as Mr. ///////////////, manager of soil mechanics lab.
3. 12. /////////////// had great deal of experiences in Doha, Qatar in execution of such building and I applied his deep expertise. Mr. /////////////// /////////////// also as my team members in pre-design stage of mechanical and electrical installations were experts and Mr. /////////////// helped me in receiving information on regional soil quality after soil mechanic lab tests.
3. 13. I had great deal of communication; I sent and received reports to the research department of /////////////// I also received ///////////////. I sent drafts of designed drawings to the reviewing committee in /////////////// Association to receive the approval for execution.
3. 14. I had repeated meetings with executing contractor company regarding transfer of information and interpretation of drawings. I attended meetings with the engineering of reviewing committee to convince them and obtain agreement for execution using this method as it was the first time this method was ever applied in ///////////////. I prepared executive drawings for main structure and forms along with all details for each

block type within 55 working days. I obtained approvals from pertinent organizations and submitted to the client; however, project started within the time but considering budgeting problems of executing company with 12 months delay it was completed.

3. 15. This system considering the below conditions as of safety had highest percentage of safety comparing to the traditional methods: decking with non-slip surfaces to increase and enhance safety, interconnected truss members to offer safer workplace for the labor, falsework units were assembled on the ground surface so that high elevation work hazards are minimized. The sole hazard that we were facing in this operation was transfer of forms from the underground to the higher floor in which with my instructions was conducted according to the safety instructions so that I could minimize all possible hazards. In the design of main structure, despite application of all precision in design time, defined coefficients in the ACI 318-05 code during calculation were applied manually and in software computation also, I applied a 95% utilization factor limit.
3. 16. Providing safe and proper working environment was one of the contractor company responsibilities, even though during the first times of form work and its transfer by crane tower, I and another team member would be physically present on site and make sure of proper capacity and capability of executive team in handling the work in safe and standard condition.
3. 17. I communicated with the form working company through email and used English as the language of communication; moreover, there were websites that I used their information in English language; in translation of the book Dr. Edward G Nawy and its comparison to the Dr. Davood Mostoufi book also before this project, I had really improved my English language competencies. Repeatability property of forms and its replacement feasibility instead of wood forms after several times of using had imposed lower costs to us; moreover, using the traditional execution method, large quantity of wood was wasted and in this system if replaced to large extent this is prevented and I consider this part as my contribution to the environment and greener earth.
3. 18. Majority of my activities within this project did not have a management nature but mainly a team and knowledge and information and standard based movement in handling a civil and construction engineering project activities toward objectives. 6 people as above-mentioned were my team personnel and all of us in a creative and active team work were eager to conduct the project activities within the best technology application, time, and budget.

3. 19. My team members were all experts in their profession with stronger resumes and almost least need for direction and training; however, I coordinated the activities, designs, and controlled drawing details that they did. In the developing country of Iran, people as well as construction companies considering the concerns of higher costs, resort less than before to the modern tools and methods and so far, ministry authorities have not taken an special move toward making the people use modern methods of construction. Because the method I applied in almost all developed countries is considered a common method, however, /////////////// at the end of this project was used only one more time and that is it and was unfortunately not welcomed.

## Summary

3. 20. Design of this system helped to reduce materials consumption quantities and cut on the labor extra efforts especially by making aluminum lightweight forms easier to handle and use; on the other side, higher resistance of component of this form made it feasible to use it several times and only 2 series of these forms were made for the entire project. Designing was done within 2 months with all detailing which increased client trust to our company as a consultant engineering company and designer. On the other hand, it increased credibility and reliability of our company in receiving more projects in the future.
3. 21. Overall, this project at end improved my technical and executive knowledge to a large extent and in this manner, I gained valuable deal of experiences such as design of concrete lighter structures using lesser bars and improved ceilings, experience in form work for the first time, improvement of my English knowledge in civil area and new experiences in teamwork and team-oriented work.