CHAPTER 2

PROJECT OVERVIEW

2.1. Project Overview

Convention and Exhibition Centre Building is a project in North Jakarta, which is done by Davy Sukamta Partners. Overall, there are three buildings and writer choose the third Convention and Exhibition Centre. Convention and Exhibition Centre will be used as convention, exhibition, conference, seminar, company meeting, weeding, or big scale event. The building which writer uses in this report is the building which has area 210 x 160 meters^2 with four stories building: first floor, second floor, mezzanine floor, and third floor. Project environmental condition is based on the type of soil. From 0-13 meters depth, consist of very soft clay-silt with $N_{SPT\text{-}ave} \cong 0 \sim 2$. Depth 13-36 meters consist of stiff-very stiff clay-silt $N_{SPT\text{-}ave} \cong 13 \sim 19$. Depth 36-60 meters consist of very stiff silt clay $N_{SPT\text{-}ave} \cong 18$. Depth 60-90 meters consist of very stiff clay silt $N_{SPT\text{-}ave} \cong 20$.

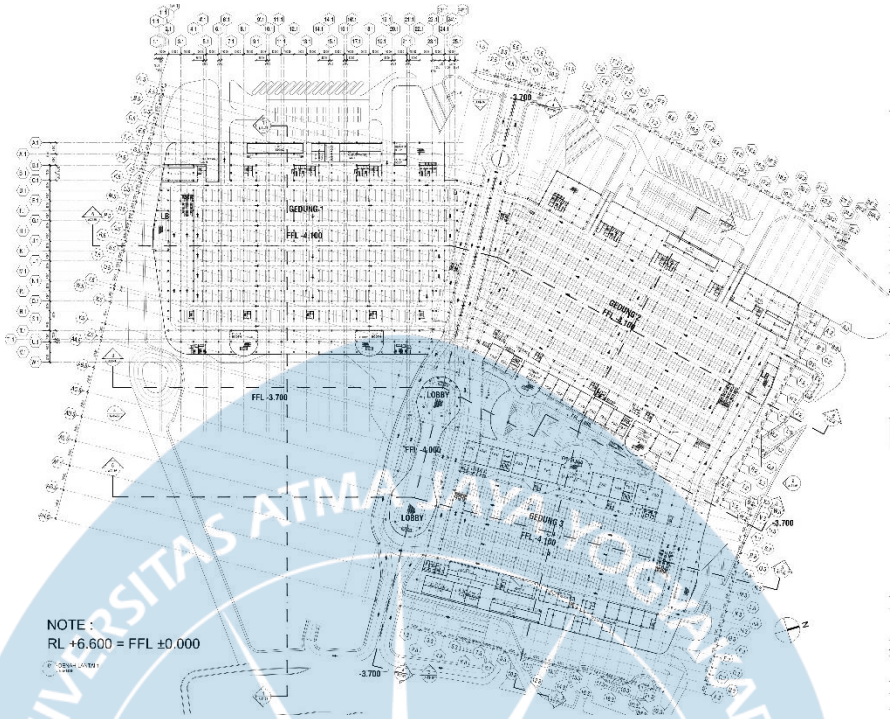

Figure 2.1 Convention and Exhibition Centre Building Siteplan

2.2. Project Management

A project requires optimal project management and organization so that development can run smoothly and be completed on time. The existence of a project organizational structure is a suggestion to help complete the project by arranging the division of tasks so that they can work as optimally as possible. At the writer's internship location, of course there is an organizational structure chart for the Convention and Exhibition Centre Building Project which can be seen in Figure 2.2.

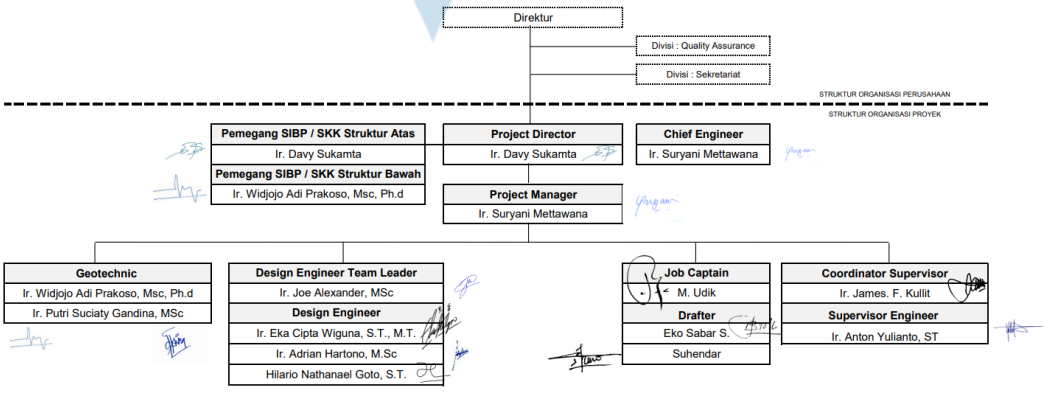

Figure 2.2 Structural Project Organization

These are the following positions at Convention and Exhibition Centre Building project:

1. Director

   Director is a person who lead and takes responsibility of a project or the organization.

2. Quality Assurance Division

   Quality Assurance Division is a division who ensure that the quality management system implemented can produce products or services that meet the specified quality standards.

3. Secretary

   Secretary is on duty to carry out management of correspondence, archives, personnel administration, finances, office equipment and housekeeping as well as coordinating the preparation of program plans, evaluation, and reporting.

4. Upper Structure Work Competency Certificate *(SKK)* Holder

   Construction Services Workers are required to have a certificate issued by the Professional Certificate Institute by obtaining a license from Ministry of Public Works and Public Housing of Republic of Indonesia. This certificate is called Construction Work Competency Certificate. Consultants are required to have several qualified workers and have a work level as proven by having a Construction *SKK* certificate. In Convention and Exhibition Centre Building project there is someone as a holder to manage engineer's Upper Structure Work Competency Certificate.

5. Bottom Structure Work Competency Certificate Holder

   Similar as Upper Structure Work Competency Certificate Holder, there is someone as a holder to manage engineer's Bottom Structure Work Competency Certificate Holder.

6. Project Director

   Project director is a person who has responsibility for overseeing and managing form initiation to completion, include project planning, team organization, risk management, and progress monitoring.

7. Chief Engineer

   Chief engineer is a person who has responsibility for overseeing all engineering activities within an organization, including technical leadership, project management, and team management.

8. Project Manager

   Project manager is a person who takes responsibility to coordinate internal resource and third party for effective implementation, make sure that the project will be done on time, following up team progress, and keep relation between team and third party.

9. Geotechnic Division

   Geotechnic Division is a division who takes responsibility for analysist, planning, and construction which involves geotechnical, rocks, and materials.

10. Design Engineer Team Leader

    Design Engineer Team Leader is someone who lead and design engineer.

11. Design Engineer

    Design engineer is someone who expert in designing structure based on architectural planning.

12. Job Captain

    Job captain is a person who has role in facilitating the profess from design through construction by coordinating various aspects of the work including have coordination the architects, engineers, and team members to ensure that project goals and objectives are met. Job captain also participating in the development of design concepts and assisting in the creation of construction drawings.

13. Drafter

    Drafter is on duty to translate the result of structural design into a working plan which is easy to be understood by field workers.

14. Coordinator Supervisor

Coordinator supervisor is a person who supervises, organize work processes, and implement and enforce systems, procedures, and policies.

15. Supervisor Engineer

    Supervisor engineer is a person who makes sure that technical projects, repair, maintenance is done based on the plan and schedule arranged.

2.3. Internship Work Implementation

The activity carried out as a structural engineer intern involve designing multiple projects. Typically, design assignments are given individually, with a structure engineer contacting the intern directly if they would like to be asked to assist. After that, they will receive planning data in the form of an architect's drawing for modelling application, the location to be entered in the application, and a list of loads that the structure engineer has decided to install on the structure designed for modelling application. Consultation during design is carried out with the structure engineer who assigns the task. Intern send the completed the result of modelling application file to the structural engineer for correction once the design of the application has been completed. The structural engineer will check and ask for revise if there is correction or anything that is deemed lacking. The fixed file will be given to the drafter to make it into PDF file. Intern should check the PDF file to supervise if there is correction or mistakes. If there is a correction, intern should tell the structural engineer so the drafter can fix it. Below are detail activities which has done:

1. Slab identification and reinforcement calculation

   Slab identification is done by mark slabs which have same thickness into a group. The variation of the thickness is around 120 mm, 130 mm, 150 mm, 160 mm, and 180 mm. After identifying the thickness, reinforcement calculation is done based on Indonesia National Standard.

2. Column schedule checking

Colum schedule checking is done to make sure every column is built based on the height and stop at what floor which have planned. Column schedule checking is done by check column drawings every floor with overall column schedule drawing. The fixed PDF drawing will be used as the guidance of building implementation.

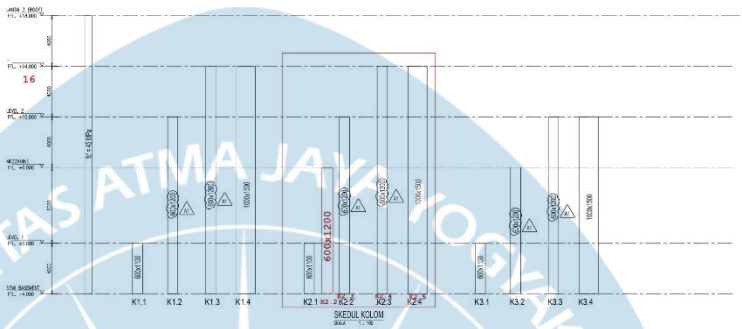

Figure 2.3 Column Schedule

3. Beam reinforcement calculation

   There are two types of beams that should be calculated: Special Moment Frame (SMF) and Ordinary Moment Frame (OMF) beam. Both reinforcement calculation is done based on Indonesia National Standard and based on the guidelines for Davy Sukamta Partners. After calculating the reinforcement, the result will be given to drafter. The beam drawings which have done by the drafter should be checked again to make sure there is no mistake miss type.

4. Stair modelling and reinforcement calculations

   Modelling is made by using SAP2000 based on the drawing plan that have been drew. After the model has done, reinforcement is calculated based on the Indonesia National Standard and Davy Sukamta Partners guidelines.

2.4. Internship Work and Conversion Subject Correlation

2.4.1. Building Information Modelling (BIM)

The digital depiction of a building or infrastructure's structural and operational features is known as building information modelling, or

BIM. Creating and maintaining a 3D model that includes all the geometric and non-geometric data associated with a building project is part of the collaborative BIM process. In internship period, writer uses SAP2000 dan ETABS. Writer uses SAP2000 to draw staircase and ETABS to draw ramp part. Structural modelling is drawn based on the drawing of architecture plan to define the dimensions and focus position. The load is defined based on Indonesia National Standard, include dead load, live load, and earthquake load. After draw, the load is assigned to each section and joints. The result of "run" process is define whether the structure is safe or not. There are some reasons why the structure is not safe. It can be the thickness or dimension cannot sustain the load assigned (overstress) or it can be misdraw. If the structure model already safe, then the reinforcement can be defined.

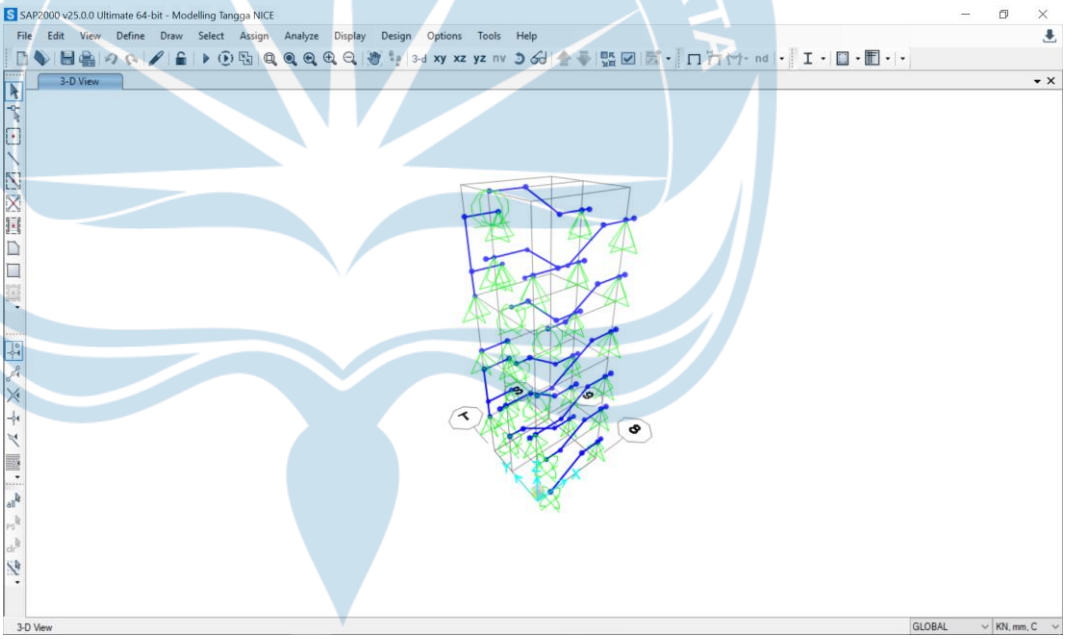

Figure 2.4 Stair Model Using SAP2000

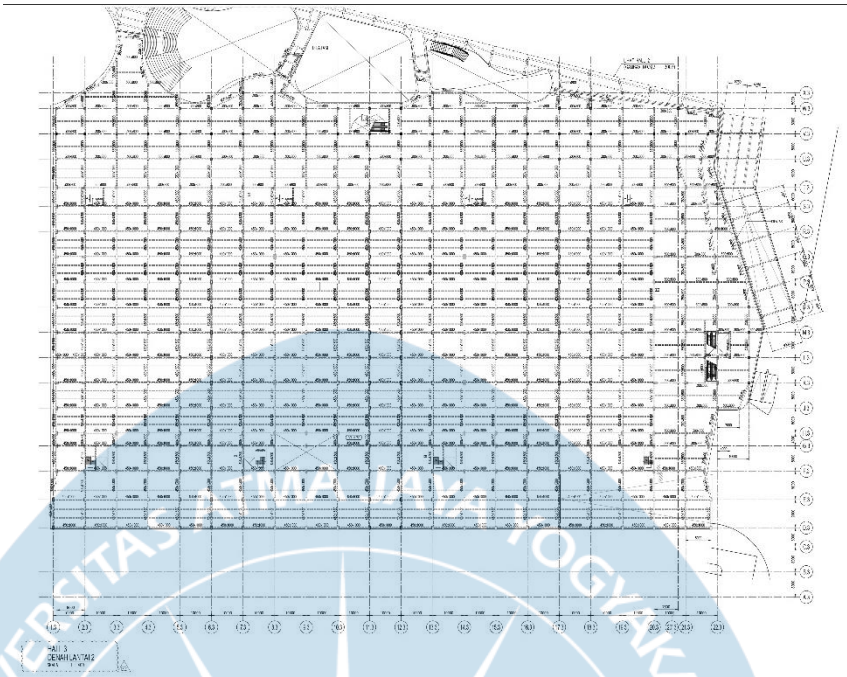

Figure 2.5 Drawing Plan

2.4.2. Prestress and Precast Concrete

Prestressed concrete is a construction material in the form of concrete that is given internal tension so that it can reduce or even eliminate the tensile forces that exist on the inside. The internal stress given in prestressed concrete is in the concrete reinforcement or steel material. Meanwhile precast concrete is a concrete material that has been produced and made in advance at the factory location or in separate from the construction area. This concrete is made based on molds and sizes that have been adjusted to the needs in the field. The manufacturing process will be better maintained and cared for according to applicable standards until it reaches its service life. In Convention and Exhibition Centre Building, can be used precast or prestressed concrete because both concrete has high strength, waterproof, and fireproof. But for cost efficiency, Convention and Exhibition Centre Building could use precast concrete. The huge area of overall project which consist of three buildings will take a lot of cost if it uses prestressed concrete because it needs adequate equipment and maintenance. Besides of the cost, the use of precast concrete can make

the time duration is more efficient. This occurs because the structural job which must done is just bottom structure (foundation). Meanwhile, it just need erection for upper structure. The produce of precast concrete can be done in a same time with bottom structure building.

2.4.3. Construction Method and Heavy Equipment

The goal of construction method and heavy equipment is so the student able to understand the function and estimate the production capacity if heavy equipment in the construction industry and to understand the knowledge and construction methods in the implementation of building and apply the latest technological developments. In internship period, writer had field visit to learn about diaphragm wall as construction method. The equipment needed for this execution plan are diaphragm wall crane and bentonite plant which include bentonite mixing unit, bentonite desanding unit, bentonite slurry storage facilities, bentonite pipe reticulation system, bentonite testing laboratory. In normal soil conditions, excavation is done using a clamshell or grab suspended by cables to a crane. The grab can easily cut through soft ground. In case of encountering boulders, a gravity hammer (chisel) will be used to break the rock and take the spoil out using the grab. During excavation, the sides inside the trench cut can collapse easily so that we use bentonite slurry to protect the sides of soil. The use of bentonite slurry gives more advantages than polymer-slurry because it has good shaft stability and suitable for almost all soils common product. Bentonite slurry should be as close as possible to top level of guide wall and should be monitored and maintained during entire excavation.

The bentonite slurry will be monitored during the excavation process to check its density, viscosity, pH, filter cake, and sand content. If the actual values exceed the permitted limits, the slurry will be recycled through a desanding unit.

Property	Units	Stages			Test Equipment
		Fresh Bentonite	Working Bentonite	Concreting Bentonite	
Density	g/ml	< 1.10	< 125	< 1.15	Mud balance
Marsh Viscosity (946 ml)	sec	42 to 60	42 to 55	30 to 40	Marsh cone
Fluid Loss (30 min)	ml	< 25±5	<30	< 30-40	Filter press
pH	-	7,5 to 10	7,5 to 11	7,5 to 11	pH paper
Sand Content	%	n.a.	n.a.	< 3%	Sand content set
Filter Cake	mm	< 1	< 3	< 3	Filter press

Table 2.1 Properties of Bentonite Suspensions

In diaphragm wall method, stop-end joint system is also intended to construct the D-Wall by utilizing a steel stop end at the panel to create the joint. Primary, successive, and closing panel are constructed in sequence with the stop ends and water stop being installed. Stop ends joints are put in place at the ends of the excavated panels once the excavation of each panel is finished. First generation panels with joints placed at both ends, and later-generation panels with joints placed at only one end. Then, insert the water stop to the stop-end joint prior to placing the stop-end unto the D-wall then cast the concrete. During the excavation of the secondary panels, remote the stop end utilizing either the grab, cutter, or a stop end remover. After completion of trench excavation and recycling, a prefabricated reinforcement cage is lowered into trench to the depth as required. Then, the concrete can be poured according with the specification.

2.4.4. Applied Soil Mechanics

It is essential to know the profile and characteristics of soil at the location where a building will be constructed. Thus, investigation is needed as half part of overall structural calculations. Before starting to do structural planning, geotechnic division at Davy Sukamta Partners did soil investigation at Convention and Exhibition Centre Building area. One of the activities is consolidation test to get preconsolidation pressure and compression index. The value of preconsolidation pressure is in range 0,30 kg/cm^2 to 7 kg/cm^2 with compression index value in range 0.252 until 1,274. If the value of compression index value is correlated to the natural void ratio, gotten the correlation in Figure 2.6.

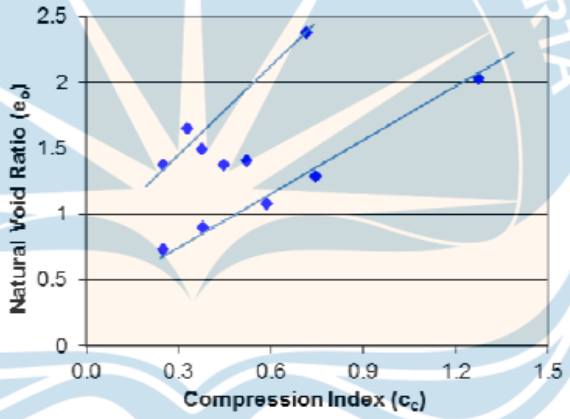

Figure 2.6 Correlation between Index Compression and Void Ratio

The value of preconsolidation value can be used to estimate Overconsolidation Raio (OCR) by divide the value of preconsolidation pressure with efferctive overburden stress. Figure 2.7 below shows the estimated comparison between OCR value with the depth of the soil.

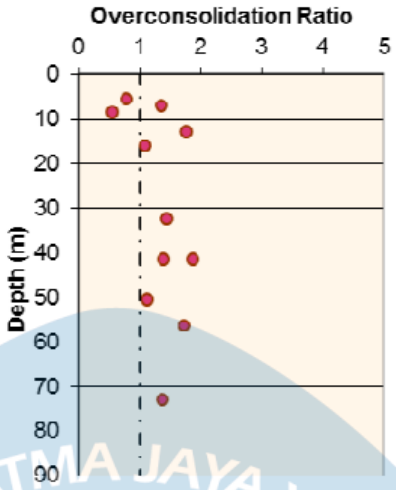

Figure 2.7 Estimated Comparison between Overconsolidation Ratio and the Depth

From the consolidation investigation above, soft soil is indicated still consolidating and should be always checked.