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ANALYSIS STRUCTURE OF THE BOARDING HOUSE TEGAL PARANG AT SOUTH JAKARTA

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ABSTRAK

Jakarta City is a city that became the heart of the unitary State of the Republic of indonesia has potential as the city develops. Jakarta is already good enough if compared to its neighboring cities – city, seen from there is a lot of building skyscrapers. Therefore the population in this city is very solid plus the number of communities outside the city looking for work, education and so on, and many choose to find a place the residence then the role of the existence of an agency that handles problems a place to live and help with much needed to help the business community in order to be better, as there are Houses kost. Currently, the central building were built as high as five floors with one basement, exactly on JL. Tegal Parang Utara, South Jakarta.

To meet the criteria of safety and service required the existence of a design careful planning. Therefore the imposition of planning process must comply with the SNI 1727-2013 as well as planning the structure of the building should be referred to with the SNI-2847-2013 reinforced concrete, which is the latest peratuaran which refers to the AISC and has adapted to the the latest materials technology development. In the calculation of earthquake engineering, this refers to the SNI 1726 – 2012.

Based on data obtained from a Home Building project, tegal parang kost has an area of approximately 3224.86 m2. The author will meredesain a building material by using the concrete structure which consists of 5 (four) along with the basement 1 floor.

Analysis of the structure of the used software SAP2000, a material used for reinforced concrete beams, columns, roof and floor plates are plates. The results obtained in the form of analysis and design drawings of the structure of the building House kost tegal parang.

Key Words : Analysis, Boarding House Tegal Parang, Material, Reinforced Concrete, Columns, Beams, Plate.

A. BACKGROUND

Boarding house business is promising business. Such as in city and the plates near university or school, the quantity of student who come in the place what near university or school make the business of boarding house increasing.

In structural of design process is very influanced by type and quality of materials, like a steel or concrete. The structure must be able to withstand the forces acting within the structure itself, the quality and dimensions of the material must be directly proportional to the forces acting on the structure. By knowing the amount of force acting on the structure, it can be determined whether the structure is safe or not to withstand external forces or loads, at least can withstand the load from the structure itself. So the necessary analysis of the structure.

With the development of the times and technological advances, computers have become a tool in solving numerical or non-numerical problems in every aspect of science and also in the field of structural analysis. By using a special program, completion of structural analysis for various purposes can be done quickly and accurately, when compared with structural analysis done manually.

On the basis of the criteria of addressability and service excellence, the process of loading planning must be in accordance with SNI 1727 - 2013 and the design of this building structure should refer to SNI - 2847-2013 reinforced concrete.

B. FOCUS PROBLEM

This study focused on analysis the structure of the Boarding House Tegal Parang Building with structural analysis program (SAP2000).

C. FORMULATION AND IDENTIFICATION OF PROBLEMS

a. FORMULATION OF PROBLEMS

1. How the analysis and design the structure at the BOARDING HOUSE TEGAL PARANG building using SAP2000?
2. How the results from the analysis structure at the BOARDING HOUSE TEGAL PARANG building using SAP2000?

b. IDENTIFICTION OF PROBLEMS

Identification of the problem is focused to analysis and design the structure of Boarding House Tegal Parang building with the structural analysis program whether the structure is safe or not

D. PURPOSE AND OBJECTIVE

a. Purpose

Thesis entitled "ANALYSIS STRUCTURE OF THE BOARDING HOUSE TEGAL PARANG AT SOUTH JAKARTA" is intended for problems involving internal forces working on the structure, especially the structure Boarding House Tegal Parang building, can be easily accomplished using SAP2000.

b. OBJECTIVE

1. To Analysis and design of structure
2. To Calculate the budget

E. RESEARCH USE

1. THEORITICAL USE

This research is expected to be input in the study of academic study, observe, and understand the issues related to the field engineering especially in building construction.

2. PRACTICAL USE

This activity is expected to be input for the implementation of the Construction of Boarding House Tegal Parang if you have problems with the foundation structure with the hope that the problems on the foundation can be overcome with good.

a. SCOPE 0F PROBLEMS

In the thesis with the title "ANALYSIS STRUCTURE OF THE BOARDING HOUSE TEGAL PARANG AT SOUTH JAKARTA " will explain the problems that exist in the study area, so look for solutions to the problems.

Thus the need of writing any restrictions aimed at preparation of the thesis, problems definition in the lift as follows:

1. Only the planning and design structures boarding house with SNI-2013.
2. Planning Structure Only Boarding House Building Grounds.
3. No Electrical Installation Plan.
4. Visualization Through 2D depictions.
5. Calculate Budget Plan (RAB).
6. Analysis Structure Boarding House Tegal Parang.
7. Calculating Earthquake Design

F. FRAMEWORK FOR THINKING

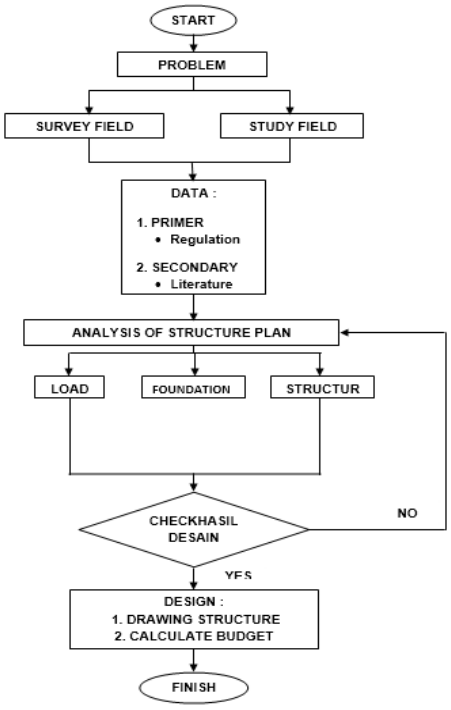


Figure 1 *Flow Chart* Framework For Thinking

1. Similar Planning

The research that has been done before with case study which has problem of analysis and discussion with similarity which can become the material as reference in the preparation that will be done, here are some analysis analysis ever done before, among others are as follows:

First Planning Made by Maulana Yusuf (2017) conducted Analysis Building Structure. The title of the research is "**Analysis And Planning Raya Mosque Plumbon Regency Bandung West Java Structure With Concrete Sni: 2847 2013"**. The problems faced in the form of the need for the construction of this mosque in western Java in order to be increasing the comfort and quality of places of worship regularly and planned.

2. THE BUILDING

The lawof Republic of Indonesia No. 28 of 2002 on buildings. Building is a physical manifestation of the work of construction that blends with its domicile, partly or wholly on the top or in the ground that serves as a place of human activity, either for residential or residential, religious activities, business activities, social culture activities, as well as special activities. There are three chapters setting the building in order to:

a. Realizing buildings that are functional and in accordance with procedures which buildings and in harmony with the environment.
b. Realizing the orderly organization of the building that ensures the technical reliability of buildings in terms of safety, health, comfort, and convenience.
c. Embody legal certainty in the administration building.

Seven function of the building pursuant to Article 5, right in paragraph 4 of which are on the market and ranks. Stating that buildings with business functions referred to in paragraph 1 shall include buildings for offices, trade, industry, tourism and recreation, terminals, and storage.

3. BASIC PLANNING

The main goal of the design is to provide a structure so that space can be used for various functions, activities or purposes SNI 2013 .Excample of utilization of the structure include:

1) The structure of the building (building) used to shelter or activity.
2) The structure of the bridge (bridge) or tunnel (tunnel) that is used to connect one place to another place.

3) The structure of the dam, which is used for the storage and management or utilization of water, and many more forms of structure.

4. THE LOAD

The structure is made of a material having mass, the structure will be influenced by its own weight. Self weight of the structure and elements - elements of the structure is referred to as the dead load. Besides the dead load, the structure is influenced also by the burden - the burden arising from the use of the room. This expense is referred to as the live load (live load). In addition, the structure is also influenced by the effect - influences from the outside due to natural conditions such as the effects of wind, snow, earthquake, or influenced by differences in temperature, as well as damaging environmental conditions (eg, the effect of chemicals, moisture, or corrosion).

5. UPPER STRUCTURE

A. Type – Type Upper Structure

In general the above structure types commonly used for buildings are as follows

- *(steel structure)*

T he steel structure is very appropriate to be used in high-rise buildings, because steel materials have the strength and ductility of high level when compared with materials other structures.

- *(composit structure)*

The composite structure whose a composite structure consisting of two types of materials our more.

- (*reinforced concrete structure)*

Reinforced concrete structure is widely used for building structures midle lavel to high. This structure is the most widely used when compared with another structure for more monolith of reinforced concrete structures if compared with steel and composite structures.

6. UNDER STRUCTURE

What whose meant by the lower structure (sub-structure) is part of the building which is located under the surface. The foundation is a construct that serves to forward the loads of the building on the ground who are able to support them.

Foundations generally applicable as a component of the supporting structure of the building and palm bottom of the foundation

serves as the final element that transmit the load to the ground, so that the sole foundation should fulfill the requirements for being able to safely

spread the burden - the burden is passed such that the capacity or the soil bearing capacity is not exceeded.

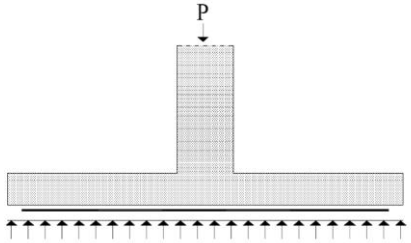


Figure 2 Piece of Foundation

7. ELECTION SYSTEM STRUCTURE

- Selection of upper structure system (upper structure) has a close relationship with the functional system of the building. Structural design will affect the overall design of the building. The factors - factors that determine the selection system structure is as follows:

A. Architectural aspects

This is related to the floor plan and structure selected, in terms of architecture.

B. Functional aspects

This is related to the use of space. Usually this will affect the use of the span of structural elements used.

C. Structural aspects of strength and stability

This aspect relates to the ability of structures to receive loads that work both vertical and lateral loads and structural stability in both directions.

D. Economic aspect and ease of implementation

Usually in a building, can be used several kinds of structure. Therefore, economic factors and the ease of execution of workmanship is a factor affecting the system structure to be selected.

E. The ability factor of structure to accommodate building service systemThe choice of structural system must also consider the abili ty of the structure to accommodate the existing service system, which involves mechanical and electrical work.

8. SOFTWARE SUPPORT

a. Software Autocad

Autocad Whose asoftware that works for graphic design, which can produce 2D images. In addition this software is very lightweight than any other software. Although it looks simple, Autocad allows us to draw faster and more accurately.

a. Program SAP (*Structure Analysis Programs*)

SAP is a program to take into account the loading with the end result of the moment, and the force that occurs in the planned structure. The program is designed to be very interactive, so some things can be done, such as controlling the stress conditions on the structural elements, changing the bar dimensions and designing the code without having to repeat the structural analysis.

METHOD AND OBJECT RESEARCH

1. Research Design

The research design begins by collecting and studying the literature related to planning. Collect data to be used as data in the object. The design used in this study as follows:

1. Looking for data in the form of, existing data in the form of land area of building area and function of building to be planned
2. Study the literature by collecting reference and methods needed as a literature review either from books or other media (internet).Pengolahan dan analisa data-data yang didapat.
3. Boarding house structure analysis
4. SNI for loading of 2013.
5. To Drawing Structure
6. To Calculate Budget
7. Taking conclusions and suggestions from the results of the study.

2. Research The Methods Used

The research method used is quantitative and qualitative methods, the definition is like this:

a. Quantitative method is a method that is done by collecting and studying the literature related to Analysis structure.
b. The qualitative method is a method that is done by collecting data to be used as data in the object.

3. Types and Data Sources

Based on the origin of the data group in:

a. Primay Data

Primary data Whose data obtained from measurement and observation directly in the field.

b. Secondary Data

Secondary data is data obtained from other sources such as government agencies, private, and individuals who have made observations directly in the field.

THE RESULTS OF THE RESEARCH AND THE DISCUSSION

RESEARCH RESULTS

From the results of analysis, construction of Tegal Parang Kost is very important to support the needs of the living quarters for the community.

1. Building Specification

a. Building function :Building House
b. Building area : 3224,86 m^2
c. Building height :16,3 m (including dak roof)

Table 1

Dimensions plan structure for Plates

No.	Building	Elevation (m)
1	Basement	-3,050
2	ground floor	-0,050
3	1st floor	+3,250
4	2nd floor	+6,150
5	3rd floor	+9,350
6	4th floor	+13,170
7	Dak roof	+16,300

2. Material Specification

a. Concrete : fc = 30 Mpa

b. Rebar : D19 (BJTD 40), fy = 400 Mpa
Ø10 (BJTP 24), fy = 240 Mpa

3. Data Frame Structure

a. Slab : Basement slab thickness (h) =15 cm Slab Basement = 15,5 cm 1st – 4th thickness (h) = 12,5 cm Slab dak roof thickness (h) = 10 cm

b. Tie Beam :

Table 2

Type and dimension Tie Beam

No.	TypeTie beam	Dimension (cm)
1	TB1	50 x 30
2	TB2	50 x 20
3	TB3	50 x 30

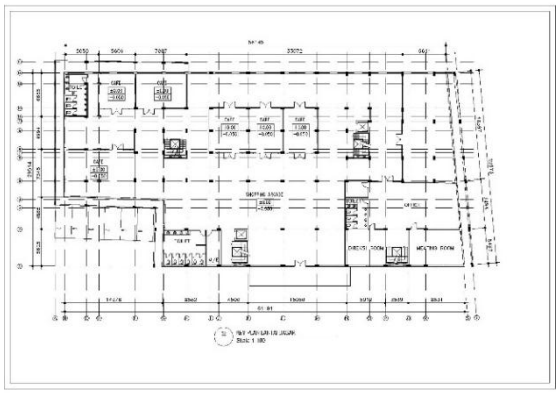
c. Beam and Culumb

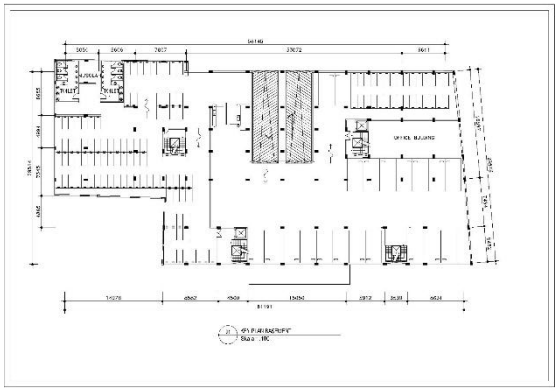
Tabel 3

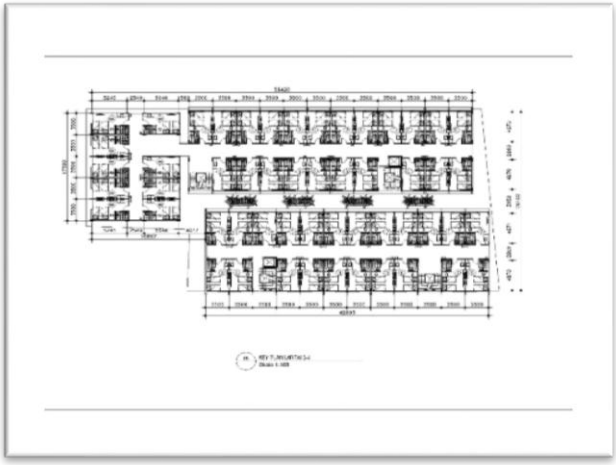
Dimension structure plan for beams and columnsFloor Dimensions

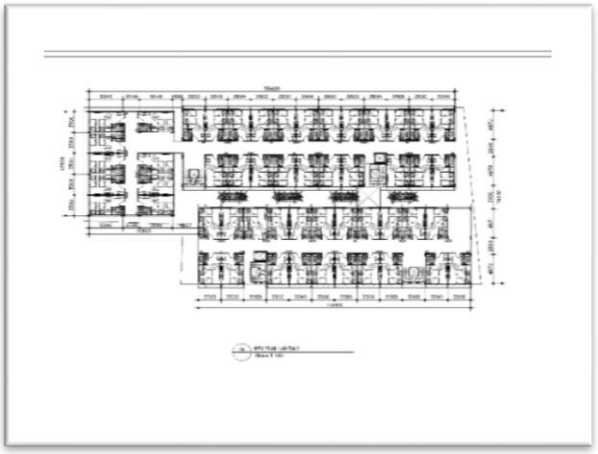
	Floor	Dimensions
BeamsB1	1	30x50 cm
BeamsB2	1	20x50 cm
BeamsB3	2	60x40 cm
BeamsB4	2	83x35 cm
BeamsB5	2	90x35 cm
BeamsB6	1, 3, 4	25x40cm
BeamsB7	3, 4	20x40 cm
Column K1	Basement – 1	30x60 cm
Column K2	2 –Roof	20x60 cm

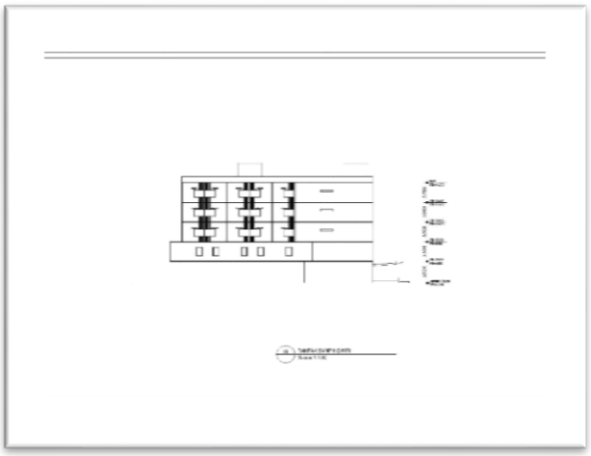
DATA DESIGN STRUCTURE DRAWING OF BOARDING HOUSE TEGAL PARANG

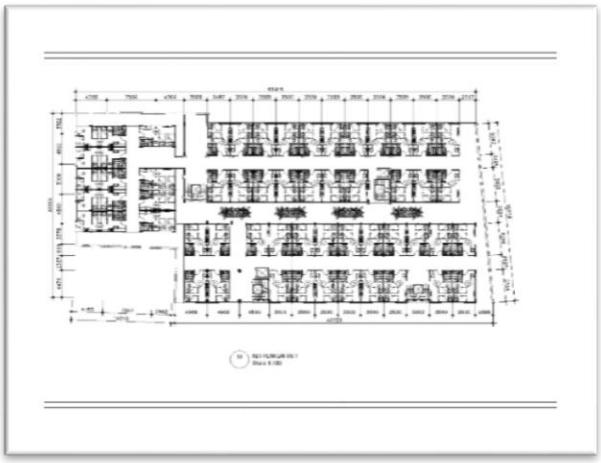


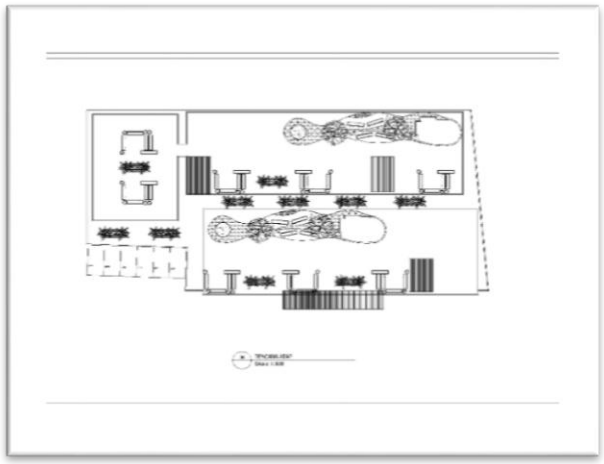


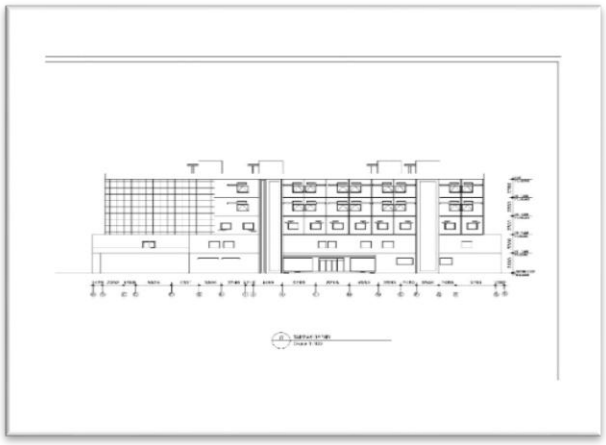








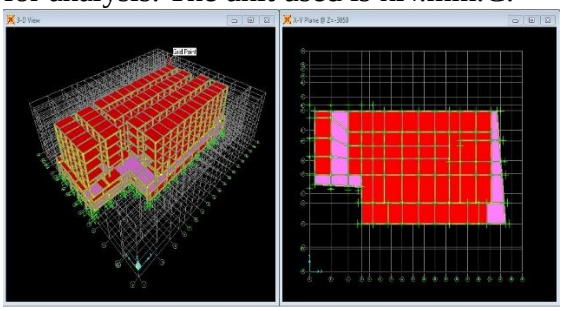




ANALYSIS STRUCTURE WITH SAP2000

Modeling Structure

In modeling structures with SAP2000, the first thing done is set the unit to be used for analysis. The unit used is kN.mm.C.

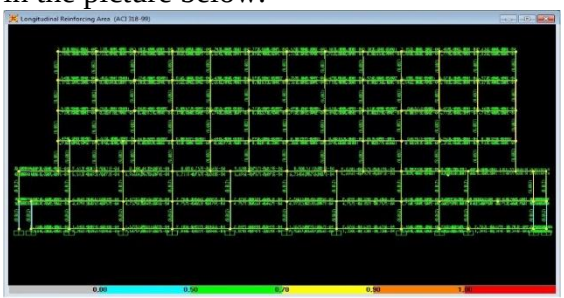


➢ **Run Analyze**

- Click the Analyze menu > Set Analysis Options.
- from the dialog box that appears select the Space Frame and click OK.
  Analyze menu click Run Analysis >> Run

a. checking of Design Structure

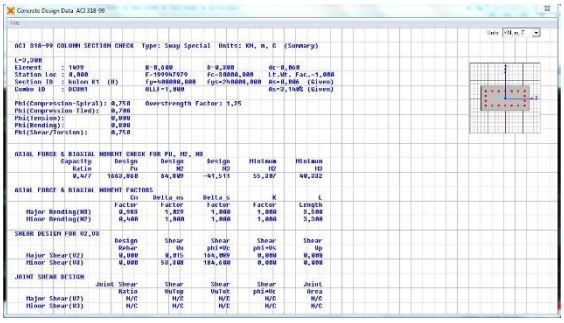
Click design, click start and then click design concrete design/check ofstructure. As in the picture below.



b. retrieval of PU and MU in the SAP

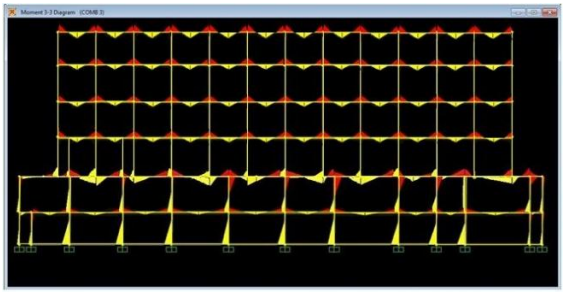
How select the desired column profiles continue to right-click > click summary

select PU and Mu is the largest to be admitted in the calculation column.



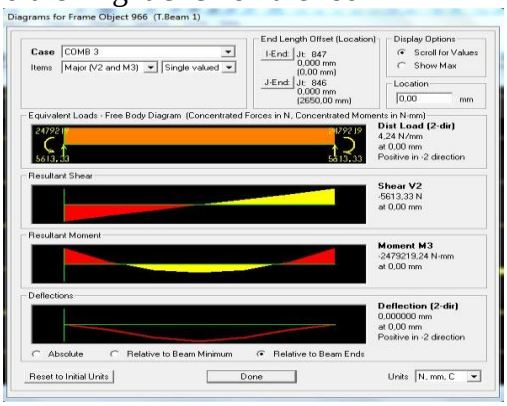
c. Showing moments of Lithe

Click Display > Show Force/Stress > Frame/Cables then select moment of 3-3

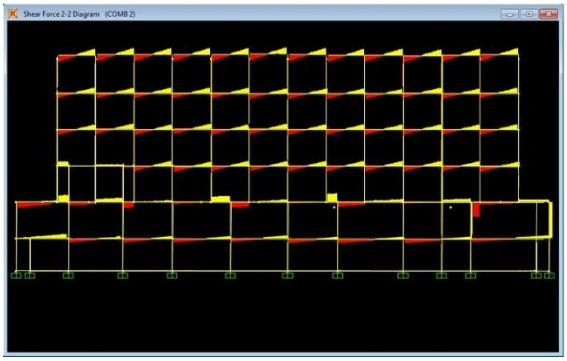


d. how to display the value of the result of a moment of bending

How to display the value of the result of a moment of bending that is click on the stem that will be seen lenturnya moments and then right click on the rod

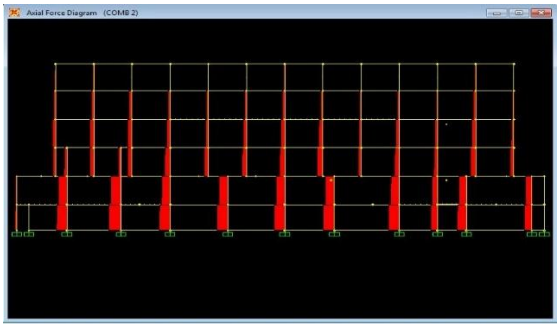


e. Display Style Slide, click Display > Show Force/Stress >Frame/Cables then select Shear 2-2



f. display the Normal Style

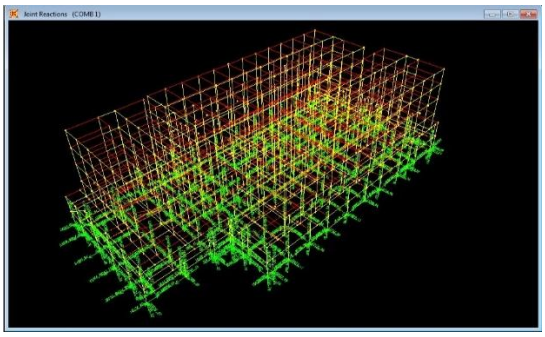
Click Display > Show Force/Stress > Frame/Cables then select Axial Force.



g. style that occurs at the Joint

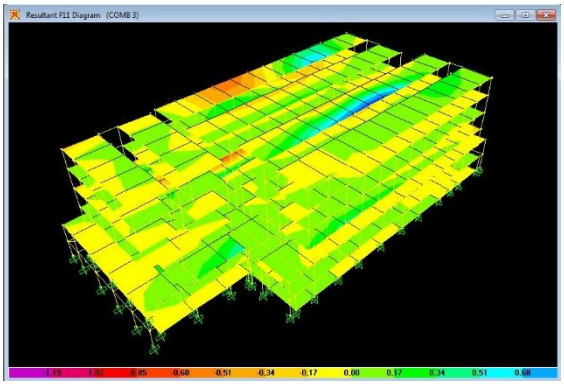
Display styles that occur at the Joint

- to display the style happens to joint Click Display and then select the Show of Force/Stress and Select Joint.
- then it will appear a dialog box Joint Reaction Force, there we select the Load case with COMB1/COMB2/COMB3/COMB4lalu click OK.



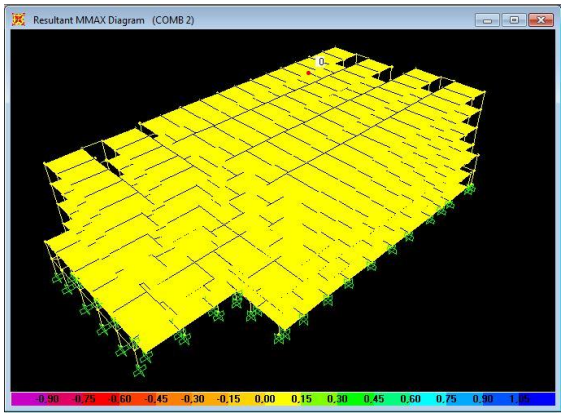
h. Display styles that occur at Plate

To display the style antecedent occurs at the Plate, first display the SAP windo foxes to XY, then click Display and then select the Show of Force/Stress and Select Sheels. After loading Setup Dialog box appears and then select F11 and click OK.



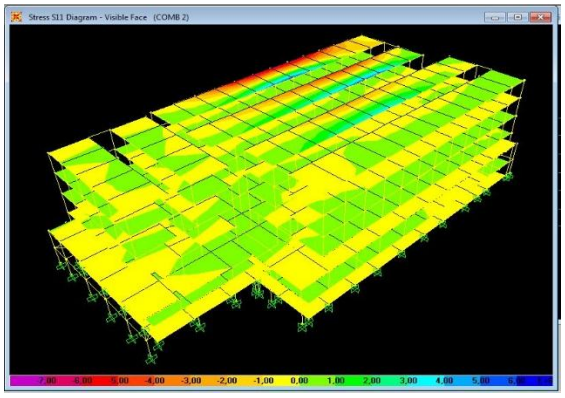
i. moment of maximal happens on the Plate

To display the Moment Max yg occurs at the plate, first display the SAP windo foxes to XY, then click Display and then select the Show of Force/Stress and Select Sheels. After loading Setup Dialog box appears and then select his Mmax and click OK.



j. Voltage that occurs on a Plate

To display the voltage yg occurs at the Plate, first display the SAP windo foxes to XY, then click Display and then select the Show of Force/Stress and Select Sheels. After loading Setup Dialog box appears and then select his S11 and click OK.

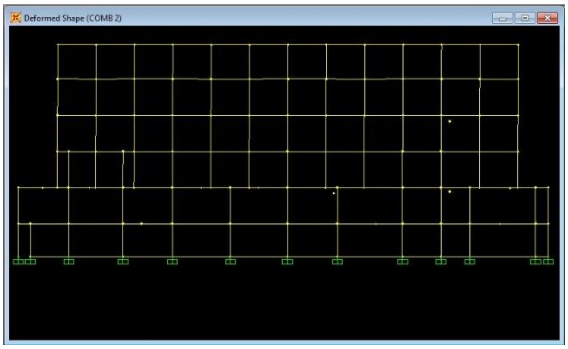


k. The style of Quake happens

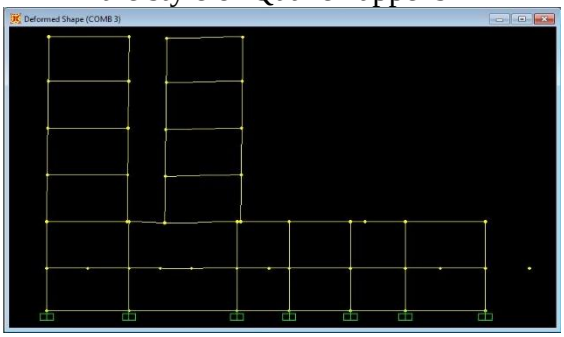
To generate the appearance of earthquake style stride with meng Click Display and then select the Defomed Shape – Select Case/Combo Name be KOMBINASI1 – then OK. Or if you haven't yet Run the analysis carried out step with the meng Difine Click-Add Default Design it Combos – select Concrete Frame Design – Then OK.

Then his analysis for the process of with meng Click Analyze – Analyze Options – Select the XZ plane – Then OK and then run Run Aanalyze.

in the style of Quake happens X



in the style of Quake happens Y



4 Calculation Of Reinforcement Plate (Output Table)

The planned floor plates of concrete casted with thick plates on the ground floor to the 4th floor approx 12.5 cm and for the roof plates as thick as 10 cm. The imposition on the palette is based on the use or uses of the floor and adjusted with SNI 1726 – 2013 of Imposition for the structure of the building. Perancanaan plates are reviewed from two directions namely X and Y, from lx/ly be obtained so that the moment coefficient calculation can be made to obtain the required reinforcement and to process the calculation can be seen in attachment.

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

After data analysis, discussion of each chapter before, then you can drag the following conclusions:

1. Structure Analysis on the project of construction in tegal parang is the Boarding house of all series of the structure that I can only take 3 samples analysis type, and then to load the largest span: take 1 size 7.440 x 5.285 cm and for Another landscape in the same roll out with the sample.
2. Determination of load adapted functions of buildings based on SNI 1727 – 2013 of imposition for designing buildings

and other structures, SNI 2847 – 2013 of concrete Requirements for the building, and SNI 1726 – 2012 about the earthquake and Planning the building of five floors with the function as a place of Asramah with 3224.86 m2 of building area by using the column, Beam and Slab dimension :

- first floor one that is 60 x 30 cm
- floor while 1-4 use column 60x20 cm
- beam 50x30 and 40x60 cm
- beams 25x40, 50x30, and 35x90 cm
- a stem that is 60x40 and 35x90 and 50x30
- a thick basement floor plate 15cm
- base 1-4 floor 12.5 cm and 10 cm roof plates.

3. From the results the calculations on the floor wearing plate reinforcement D 16 floors. To use the beam reinforcement staple D16 D19, reinforcement and ties D10. On calculation of column reinforcement wear D19 and D16.

B. RECOMMENDATIONS

1. The concept of analysis should be tailored to the function of the building according to standards that are already adjusted (SNI – 1727-2013), thus the strength of the building could hold weights in accordance with its capacity.
2. Further Review in determining the dimensions of the structure of either plates, beams, columns or Foundation is planned based on accepted the imposition of each profile.

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