PLANNING AND ANALYSIS YOGYA TEGAL TOSERBA STRUCTURE

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ABSTRACT

The strategic geographical location of Tegal City supports the development of business and services. YOGYA Group is a Supermaket and Department Store company. In building construction there is a structural analysis that is used as a method or system to achieve development as planned.

The method used in this research is qualitative method. Literature method by collecting data, studying and identifying. Observation method by conducting a survey to the research location. Adhering to the guidelines of SNI 2847: 2013 (Requirements for structural concrete for buildings), SNI 1727: 2013 (Minimum load for building design and other structures), Guidelines for house planning and building loading (PPURG 1987) and SNI 1726: 2012 (earthquake resistance planning procedures for buildings and non-building structures).

This analysis obtained a result of dimension data and the number of beam reinforcement, column, plate and the number of pile needs for the YogyaTegal department store building.

Keyword: Analysis, Building, Concrete, SNI, Strategic
I. INTRODUCTION

1.1. BACKGROUND

Tegal city is a city located in the north of Central Java Province, with a total area of 39.5 km² and is divided into 4 districts and 27 villages that are directly adjacent to the sea. Lately, Tegal City has a fairly rapid development in the field of business and services. With the support of a very strategic Geografis location, the city that connects the district consisting of Brebes Regency, Pemalang Regency, not only that as the main driving force for economic activity in the city of Tegal.

Yogya Group is a modern Indonesian retail company. YOGYA Group is a retail company with Supermaket and Department Store formats. In building construction there is a structural analysis that is used as a way or system to achieve development as planned.

On the basis of criteria of safety and prime service, the loading planning process must be in accordance with SNI 1727 - 2013 and the structure planning of this building must refer to SNI - 2847-2013 reinforced concrete, which is the latest regulation adapted to the development of the latest material technology with reference to AISC, besides that in the calculation of earthquake engineering must also refer to SNI 1726 - 2012.

1.2. FOCUS OF THE PROBLEM

In this study focused on designing with concrete structures and analyzing the building of Yogya Tegal Department Store using reinforced concrete structures.

1.3. PROBLEM FORMULATION AND PROBLEM IDENTIFICATION

1.3.1. PROBLEM FORMULATION

1. How to design Yogya Tegal Toserba using concrete structures (SNI 2847: 2013)?
2. How to plan the dimensions of the plate, beam and column?
3. How to analyze using Etabs?
4. How to plan the foundation for the construction of the Yogya Tegal Department Store?

1.3.2. PROBLEM IDENTIFICATION

This problem identification is focused on designing and analyzing the building structure of Yogya Tegal Toserba using concrete structures with the help of Etabs application.

1.4. PURPOSE AND OBJECTIVES

1.4.1. PURPOSE

The thesis proposal entitled "ANALYSIS STRUCTURE AND DESIGN YOGYA TEGAL TOSERBA " will explain building planning with concrete structures.

1.4.2. OBJECTIVES

1. To redesign Yogya Tegal Toserba by using a concrete structure.
2. To find out the details of dimensions, plates, beams, columns and foundations accordingly.
3. calculate the cost of the budget only in the building structure.

1.5. LIMITATION OF PROBLEM

In the thesis with the title " PLANNING AND ANALYSIS YOGYA TEGAL TOSERBA STRUCTURE" there is a writing limitation that aims for the preparation of the Thesis, the limitation of the problems raised as follows :

1. Only plan and design the construction of the Yogya Tegal Toserba building in accordance with SNI 2847: 2013 Reinforced concrete and SNI 1727: 2013 for loading.
2. Planning the plate, beam, column structure using reinforced concrete structures.
3. Don’t plan the structure of stairs and shear walls, or retaining walls.
4. Planning the Pile foundation
5. Don’t plan electrical installations, drainage, pavement.
6. Visualize through 2D drawing.
7. Calculate the Budget Plan (RAB) only on the structure.
8. Don’t calculate the budget for architectural and plumbing work.
9. Analyzing building structures using only the Etabs application.

1.6. FRAMEWORK

![FRAMEWORK Diagram]

Picture 1. Formwork

1.7. RESEARCH LOCATION

![Research Location Image]

Figure 2. research location

II. THEORETICAL BASIS

2.1. THEORETICAL BASIS

2.1.2. Basic Planning

Building analysis or building planning must have guidelines or regulations that apply in Indonesia, including:

3. Guidelines for planning the loading of houses and buildings (PPURG 1987).

2.1.3. Structure Planning

The Structure is an element which is united which is able to accept its own load or load received from outside, the criteria for good structure are:

1. Fire resistant
2. Sturdy or strong
3. Economic
4. Safe and comfortable

2.1.1. Structure Analysis

Structural analysis is a process which is needed in a building construction, and bridges to determine the strength of the structure. Analysis can be done with the help of manual counts and application assistance such as SAP2000, ETABS and so on.
2.1.4. Classification of Loading

The loads received by the structure are:

a. Dead Load
b. Live Load
c. Earthquake Load
d. Wind Load
e. Load Combination

Structural elements must be planned to bear the worst possible load combination. The following are, the load combination that refers to load minimum:

1. $1.4D$
2. $1.2D + 1.6L + 0.5 (Lr atau S atau R)$
3. $1.2D + 1.6 (Lr atau S atau R) + (L atau 0.5W)$
4. $1.2D + 1.0W + L + 0.5 (Lr atau S atau R)$
5. $1.2D + 1.0E + L + 0.2S$
6. $0.9D + 1.0W$
7. $0.9D + 1.0E$

Where:
- $D =$ Dead Load
- $L =$ Live Load
- $R =$ Rain Load
- $W =$ Wind Load
- $E =$ Earthquake Load
- $L_r =$ Roof Load
- $S =$ Snow Load

### Table 4. Minimum thickness of non-prestressed beams or one-way plates if deflection is not calculated

<table>
<thead>
<tr>
<th>Structure Component</th>
<th>Two Pedestals</th>
<th>One End Continuous</th>
<th>Second End Continuous</th>
<th>Continues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component that don't hold or are not incorporated into partitions or other constructions that might be damaged by large deflections</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-way massive plate</td>
<td>L/20</td>
<td>L/24</td>
<td>L/28</td>
<td>L/10</td>
</tr>
<tr>
<td>Beams/Trusses one way</td>
<td>L/16</td>
<td>L/18.5</td>
<td>L/21</td>
<td>L/8</td>
</tr>
</tbody>
</table>

### 2.1.5. Basic Planning of Reinforced Concrete Building Structures

The following is the basis for planning reinforced concrete structural elements according to SNI 2847-2013:

1. Plate Planning
   a. One-way Plate
      If the $L_y / L_x$ value > 2 then the plate is considered a one-way plate.

b. Two-way Plate
   If the $L_y / L_x$ value is ≤ 2, then the plate is considered a two-way plate.

- Determine Plate Thickness ($h$)

$$h = \frac{L_n \cdot (0.8 + \frac{L_y}{1400})}{36 + 5 \cdot \frac{L_y}{L_x} \cdot \left[ 2 - 0.12 \cdot \left( 1 + \frac{1}{L_y/L_x} \right) \right]}$$

In accordance with SNI – 2847 – 2013 concerning the rules for determining ($h$) the thickness of the plates as follows:

$h_{\text{min roof plate}} (dak) = 90 \text{ mm}$
$h_{\text{min pelat lantai}} = 125 \text{ mm}$

Keterangan:
- $h =$ Plate Thickness
- $L_n =$ Clean span length
- $L_y =$ Long span of direction $y$
- $L_x =$ Long span of direction $y$

- Counting Moments that work in the $X$ and $Y$ directions

$$M_{Lx}(+) = 0.001 \cdot Qu \cdot L_x^2 \cdot Clx$$
$$M_{Ly}(+) = 0.001 \cdot Qu \cdot L_y^2 \cdot Cly$$
$$M_{Lx}(-) = -0.001 \cdot Qu \cdot L_x^2 \cdot Ctx$$
$$M_{Ly}(-) = -0.001 \cdot Qu \cdot L_y^2 \cdot Cty$$

Keterangan:
- $M_{Lx} =$ Momen of direction $x$
- $M_{Ly} =$ Momen of direction $y$
- $L_x =$ short span length
Clx = moment field direction coefficient x
Cly = moment field direction coefficient y
Ctx = moment support direction coefficient x
Cty = moment support direction coefficient y

- Calculate the \( As \) needed (area of reinforcement)

\[
M_n = \frac{M_u}{bd^2}
\]

\[
\rho = \frac{0.8fy - \sqrt{(0.8fy)^2 - 4(0.4704 \frac{fy^2}{f_c})(M_u/bd^2)}}{2 \times (0.4704 \frac{fy^2}{f_c})}
\]

\[
\rho_{\text{min}} = \frac{1}{fy}
\]

\[
\rho_{\text{maks}} = 0.75 \times \rho_{\text{balance}}
\]

\[
\rho_{\text{balance}} = \beta_i \times \left( \frac{0.85 \times f_c}{fy} \right) \times \left( \frac{600}{600 + fy} \right)
\]

if \( f_c \leq 30 \text{ Mpa} \) then \( \beta_i = 0.85 \)

jika \( 30 \leq f_c \leq 55 \) then :

\[
\beta_i = 0.85 - \frac{0.85 \times (f_c - 30)}{7}
\]

\[
\beta_i = 0.85 - 0.007 \times (f_c - 30)
\]

if \( f_c > 55 \text{ Mpa} \) then \( \beta_i = 0.65 \)

Terms :

- jika \( \rho_{\text{min}} \leq \rho \leq \rho_{\text{maks}} \) (then the value is taken \( \rho \))
- jika \( \rho > \rho_{\text{min}} \) (then the value is taken \( \rho \))
- jika \( \rho < \rho_{\text{min}} \) (then the value is taken \( \rho_{\text{min}} \))
- jika \( \rho > \rho_{\text{maks}} \) (then the value is taken \( \rho_{\text{maks}} \))

So :

\[
As = \rho \times b \times d
\]

2. Beams

- Calculate the effective height of the beam and width (b) the cross section concrete

\[
d = h - p - \Ø \text{ stirrup} - (1/2 \Ø \text{ main reinforcement})
\]

- Calculate the latitude style of beam design

\[
U = 1.2 D + 1.6 L
\]

- Calculate the maximum beam design moment

\[
M_u = 1.2 M_{DL} + 1.6 M_{LL}
\]

- Determine the quality of concrete and reinforcing steel :

\( f'c \leq 30 \text{MPa} \) then \( \beta_1 = 0.85 \text{MPa} \)

\( f'c \geq 30 \text{MPa} \) then \( \beta_1 = 0.65 \text{MPa} \)

- Determine the reinforcement and reinforcement ratio

\[
M_n = \frac{M_u}{\rho}
\]

\[
\phi = 0.8
\]

\[
R_n = \frac{M_n}{bd^2} \quad (b = \text{beam width})
\]

\[
\rho = \frac{0.85 \times f_c}{fy} \times \left( 1 - \frac{2R_n}{0.85 \times f_c} \right)
\]

\[
\rho_{\text{min}} = \frac{\sqrt{f_c}}{4 \times fy}
\]

\[
\rho_{\text{maks}} = 0.75 \times \rho_{\text{balance}}
\]

\[
\rho_{\text{balance}} = \beta_i \times \left( \frac{0.85 \times f_c}{fy} \right) \times \left( \frac{600}{600 + fy} \right)
\]

if \( f_c \leq 30 \text{ Mpa} \) then \( \beta_i = 0.85 \)

if \( 30 \leq f_c \leq 55 \) then :

\[
\beta_i = 0.85 - \frac{0.85 \times (f_c - 30)}{7}
\]

\[
\beta_i = 0.85 - 0.007 \times (f_c - 30)
\]

if \( f_c > 55 \text{ Mpa} \) then \( \beta_i = 0.65 \)

Terms :

- jika \( \rho_{\text{min}} \leq \rho \leq \rho_{\text{maks}} \) (then the value is taken \( \rho \))
- jika \( \rho > \rho_{\text{min}} \) (then the value is taken \( \rho \))
- jika \( \rho < \rho_{\text{min}} \) (then the value is taken \( \rho_{\text{min}} \))
- jika \( \rho > \rho_{\text{maks}} \) (then the value is taken \( \rho_{\text{maks}} \))

so :

\[
As = \rho \times b \times d
\]

Pilih tulangan dengan dasar As terpasang \( \geq As \) diperlukan.
• Plan shear re
\[ V_c = \phi \left( \frac{1}{6} \sqrt{f'_c} \right) x b x d \]
\[ \phi = 0.6 \] (sliding reduction factor)
\[ V_u \leq 0.5\phi V_c \] (then there is no need for shear reinforcement)
\[ V_u > 0.5\phi V_c \] (then a shear reinforcement is needed)
\[ V_s = \frac{\nu}{\phi} - V_c \]
\[ V_n = V_c + V_s. \]

3. Column
Here, are the steps of planning the appropriate column SNI - 2847 - 2013:

➤ Calculate the necessary reinforcement area
\[ A_S = \rho x b x h \]

➤ Calculating the amount of reinforcement used
\[ n = \frac{A_S}{(\pi x D^2 / 4)} \]

➤ Calculating the wear reinforcement size
\[ A_s = \frac{(nx \pi x D^2)}{2} \]

➤ Checking Pu of the load balanced
\[ OPN = 0.80 \phi \left( 0.85 x f_c 'x ab + \frac{A_s'x f_s'}{A_s x f_y} \right) \]

➤ Maximum nominal axial force
\[ \phi P_n = 0.8 \phi \phi \left( 0.85 \phi f_c + (f_y \phi A_s) \right) \]

➤ Planning reinforcement confinement in
SNI Section 21.6.4.4 Menyataka hoops that the total cross-sectional area of not less than one of the greatest of:
\[ A_{sh} = 0.3.1 \left( \frac{s. bc. f_{c'}}{f_y t} \right) \left( \frac{A_g}{A_{ch}} \right) \]
And
\[ A_{sh} = \frac{0.09 \times s. bc. f_{c'}}{f_y t} \]

➤ Nominal shear strength
\[ V_c = \frac{\sqrt{f' c} x b x d}{6} \]

➤ Gayar shear reinforcement stirrup bear
\[ jika \left( \frac{Vu}{\phi_{shear} - V_c} \right) \leq 0 \text{ maka nilai } V_s = 0 KN \]
\[ jika \left( \frac{Vu}{\phi_{shear} - V_c} \right) \geq 0 \text{ maka nilai } V_s = \left( \frac{Vu}{\phi_{shear} - V_c} \right) \]

➤ The maximum stirrup distance
If the Smaks = d / 2Vs < \( \frac{V_c}{3} \)
If the Smaks = d / 4Vs > \( \frac{V_c}{3} \)

➤ Calculate the area of reinforcement stirrups need
\[ Av_perlu = \frac{\frac{1}{3} b x s}{F_{ys}} \]

➤ Calculate the area of reinforcement stirrup wear
\[ Av_wear = nx 0.25\pi D^2 \]
Table 5. Thick concrete covers minimum, for reinforced concrete

<table>
<thead>
<tr>
<th>type Concrete</th>
<th>Concrete Blanket Minimum Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Cast concrete on top and always in touch with the ground</td>
<td>75</td>
</tr>
<tr>
<td>b) Concrete weather-related</td>
<td></td>
</tr>
<tr>
<td>- D57 D19 rod</td>
<td>50</td>
</tr>
<tr>
<td>- D16 wire rod M16 threaded or plain and smaller</td>
<td>40</td>
</tr>
<tr>
<td>c) Concrete that is not related to the weather or in connection with the land</td>
<td>40</td>
</tr>
<tr>
<td>- Reinforcement rods D44 and D57</td>
<td>20</td>
</tr>
<tr>
<td>- Reinforcement rods and a smaller D36</td>
<td></td>
</tr>
<tr>
<td>d) Beams, columns: Main reinforcement, binder, stirrups and spiral</td>
<td>40</td>
</tr>
<tr>
<td>e) Components shell structure, spiral stirrups</td>
<td></td>
</tr>
<tr>
<td>- Reinforcement rods and larger D19</td>
<td>20</td>
</tr>
<tr>
<td>- D16 reinforcement rods, wire M16 threaded or plain, and smaller</td>
<td>13</td>
</tr>
</tbody>
</table>

* Source: Planning Procedures for Concrete Structures Building (SNI - 2847 to 2013).

4. Foundation

In planning the foundation using piles of data to use the data sondir Tegal area Yogya Department Store project. Sondir necessary data is data and data qc JHL.

III. METHODS RESEARCH

3.1. METHODS Research

3.1.1 Design The research

The research design begins with collecting data and literature related to planning. The data used in this study are as follows:

1. Existing data in the form of land area and building area and the function of the building to be planned.
2. Building image data of Yogya Tegal Toserba
3. Literature study by collecting references from books and the internet, which are intended as preparation for the thesis.
4. SNI - 2847 - 2013 (Structural concrete requirements for buildings)
5. SNI - 1726 - 2012 (Procedures for earthquake resistance planning for building structures and Non-buildings)
6. SNI - 1727 - 2013 (Minimum load for building design and other structures)
7. PPIURG 1987 (Guidelines for Loading Plans for Home and Building)

3.1.2 Research Methods Used

The research methods used are quantitative methods and qualitative methods, the explanation is as follows:

1. Quantitative method is a method which studies existing literature for the preparation of a thesis.
2. Qualitative method is a method that is carried out by collecting data from research objects for the preparation of a thesis.

3.1.3 Types of Data and Sources of Data

Types of data types and sources are as follows:

1. Primary Data

In this study primary data collection is by conducting a field survey, on the object of research in Yogya Tegal Toserba Building.
2. Secondary Data

Secondary data is data obtained from sources or references from books and the internet relating to building planning.
3.1.4 Data Collection Method

Data collection methods used are literature and methodology methods, the explanation is as follows:

1. The literature method:
The literature is a method carried out by collecting, studying, and identifying literature from books and the internet, which are related to building planning.

2. Metode Observation:
Observation method is a method obtained from the survey results directly to the location or object of research. With a survey to the location of the study, it can be known and obtained data from the planning of the building structure of Yogya Tegal Toserba.

3.2. THE THOUGHT METHODOLOGY

![Flowchart Thought methodology]

3.3. OBJECT OF RESEARCH

Yogya Tegal Toserba development project is located on the Tegal-Cilacap road or more precisely the AR HAKIM road.

![Project location of building Yogya Tegal Toserba]

IV. DISCUSSION AND RESULTS

4.1 PLANNING STRUCTURE

4.1.1 Building specifications

a. building functions : Mall
b. Building area :
c. Building height : 25m
d. elevation Building
   - Rooftop : + 22M
   - 4th floor : + 16m
   - 3rd floor : + 10m
   - 2nd Floor : + 5m
   - 1st floor : + 0m
   - Basement : - 3m

4.1.2 Material specifications

a. quality Concrete
   - Plate : K 300-350 kg / cm², Fc ' = 25-30 mpa
   - Beam : K 350-400 kg / cm², Fc ' = 30-35 mpa
   - Column : K 350-400 kg / cm², Fc ' = 30-35 mpa
   - Foundation : K 350 kg / cm², Fc ' = 30 mpa

b. Quality Steel in Concrete
   - Plate type 1: Ø12-13, fy = 240 mpa
   - Beam : D14-22, fy = 400 mpa
     : Ø8-16, fy = 310mpa
   - Column : D14-22, fy = 400 mpa
     : Ø8-16, fy = 310mpa
   - Foundation : D16, fy = 400 mpa
4.2.3. Planning Dimensions

a. Plate

Table 6. Dimensional structure plan for

<table>
<thead>
<tr>
<th>Plate</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plates Roofs</td>
<td>125 mm</td>
</tr>
<tr>
<td>Floor plates</td>
<td>150 mm</td>
</tr>
</tbody>
</table>

b. Beams and Columns

Table 7. Dimensional structure plan for floor beams 1-4

<table>
<thead>
<tr>
<th>floor</th>
<th>Type of Beam</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fourth First Floor</td>
<td>B1</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>B3</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>B4</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>BA1</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>BA2</td>
<td>400</td>
</tr>
</tbody>
</table>

Table 8. Dimensional floor plan structure for the roof beams

<table>
<thead>
<tr>
<th>floor</th>
<th>Type of Beam</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof Floor</td>
<td>B5</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>BA1</td>
<td>200</td>
</tr>
</tbody>
</table>

Table 9. Dimensional structure plan for column

Figure 5. Plan building looks on

Figure 6. As Plan As A and B direction Y
Figure 7. As Plan C direction Y

Figure 8. As the US Plan D and E directions Y

Figure 9. As Plan F direction Y

Figure 10. As Plan 6-14 x direction

Figure 11. As Plan 5-4 x direction

Figure 12. Plan As 3 directions x
V. **CONCLUSION**

From the results of Tegal Yogya Department Store Building planning using concrete structure is obtained dimensions of each work its structure. Such as beams, columns, plates, and tiebeam. For the calculation of the initial dimensional search using the ISO 2847-2013 with the help of ETABS, and his pembebenan using ISO 1727-2013, ISO 1726-2012, and PPIURG 1987.

For the results of the planning and reinforcement beams obtained its dimensions are:

**Table 12. Dimensional structure plan for beam support area**

<table>
<thead>
<tr>
<th>floor</th>
<th>name</th>
<th>Dimension (mm)</th>
<th>reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>b</td>
<td>h</td>
</tr>
<tr>
<td>Beam Floor 1-4</td>
<td>B1</td>
<td>600</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2D25</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B2</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5D25</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2D25</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B3</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5D29</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2D29</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B4</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4D29</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BA1</td>
<td>350</td>
<td>450</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BA2</td>
<td>400</td>
<td>500</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Floor Roof Beam</td>
<td>B1</td>
<td>400</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BA1</td>
<td>200</td>
<td>350</td>
<td>-</td>
</tr>
</tbody>
</table>

**Table 10. Dimensional structure plan for the roof slab plate**

<table>
<thead>
<tr>
<th>Type Plates</th>
<th>Dimensions (mm)</th>
<th>Thickness (mm)</th>
<th>pedestal directions x</th>
<th>pedestal directions y</th>
<th>Field directions x</th>
<th>Field directions y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lx</td>
<td>Ly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>3000</td>
<td>4000</td>
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**Table 11. Dimensional structure plan for floor slab**

<table>
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<tr>
<th>Type Plates</th>
<th>Dimensions (mm)</th>
<th>Thickness (mm)</th>
<th>pedestal directions x</th>
<th>pedestal directions y</th>
<th>Field directions x</th>
<th>Field directions y</th>
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<tbody>
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<td></td>
<td>Lx</td>
<td>Ly</td>
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<td></td>
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<td>4000</td>
<td>135</td>
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<tr>
<td>B</td>
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<td>3000</td>
<td>125</td>
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<td>Ø 13 – 159</td>
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<td>Ø 12 – 150</td>
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</table>
Table 13. Dimensional field beam structure plan for the area

<table>
<thead>
<tr>
<th>Floor</th>
<th>Name</th>
<th>Dimension (mm)</th>
<th>Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>b</td>
<td>h</td>
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<tr>
<td>Beam</td>
<td>B1</td>
<td>650</td>
<td>750</td>
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<tr>
<td>Floor 1-4</td>
<td>B2</td>
<td>500</td>
<td>700</td>
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<tr>
<td>Floor 1-4</td>
<td>B3</td>
<td>700</td>
<td>700</td>
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<td>Floor 1-4</td>
<td>B4</td>
<td>550</td>
<td>650</td>
</tr>
<tr>
<td>Floor 1-4</td>
<td>B5</td>
<td>350</td>
<td>450</td>
</tr>
<tr>
<td>Floor 1-4</td>
<td>B6</td>
<td>350</td>
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</tr>
<tr>
<td>Floor Roof</td>
<td>B1</td>
<td>400</td>
<td>500</td>
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Table 14. Dimensional field beam structure plan for the area

<table>
<thead>
<tr>
<th>Floor</th>
<th>Elevation</th>
<th>Name</th>
<th>Dimension (mm)</th>
<th>Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor roof</td>
<td>+ 22m to +16m</td>
<td>K1</td>
<td>400</td>
<td>4D22</td>
</tr>
<tr>
<td>Floor roof</td>
<td>+ 16m to +10m</td>
<td>K2</td>
<td>550</td>
<td>8D22</td>
</tr>
<tr>
<td>Fourth Floor</td>
<td>+ 16m to +10m</td>
<td>K3</td>
<td>650</td>
<td>10D22</td>
</tr>
<tr>
<td>Third Floor</td>
<td>+ 10m to +3m</td>
<td>K1</td>
<td>400</td>
<td>8D22</td>
</tr>
<tr>
<td>Second Floor</td>
<td>+ 5m to +3m</td>
<td>K2</td>
<td>650</td>
<td>10D22</td>
</tr>
<tr>
<td>First Floor</td>
<td>+ 0m to +3m</td>
<td>K1</td>
<td>400</td>
<td>8D22</td>
</tr>
<tr>
<td>First Floor</td>
<td>+ 0m to +3m</td>
<td>K2</td>
<td>650</td>
<td>10D22</td>
</tr>
<tr>
<td>First Floor</td>
<td>+ 0m to +3m</td>
<td>K3</td>
<td>700</td>
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</tr>
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</table>

For budget cost of the building structure Yogya Department Store worth Rp.**17.077.790.226** Tegal, with a total building area is 8375.8 m². With this budget in its square meter Rp. 2.038,944,37

REFERENCES

