

Design Analysis and Analysis of Roof Structure Work in the Implementation of the Exit Gate and Cafeteria Construction Project at Delta Surya Sidoarjo Hospital

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ABSTRACT: Building design and planning requires a very high level of precision and a relatively long time. Therefore, most consultants and construction implementers (contractors) rely on technical application support during project planning, design, and construction report preparation. A very commonly used application in Indonesia is AutoCAD. Supported with other applications such as SAP2000 and ETABS to create 2D and 3D images and analyze the strength of structures. The definition of design methods is the ways in which a designer creates an object. Some of the design methods that are often used are as follows: a. Exploding, which is a design method by seeking inspiration through critical thinking to produce a design that has never been created. b. Redefining, which is a design method by reprocessing a design to become something different and better. c. Managing, which is a design method by creating designs in a sustainable and continuous manner. d. Phototyping, which is a design method by improving and/or modifying the design of the ancestral heritage. e. Trendspotting, which is a design method by creating a design based on a developing trend. In the implementation process, the contractor PT Muliif Teknik Utama requires technical drawings that are used for work references. Where later the field results will be in accordance with the planning time. In the process of work on the structure of the field team, the implementation team needs shop drawings as a reference for implementation. Here is an example of a working drawing of a roof plan. Based on the results of the observations that have been made, the design needed in the work of the roof of the exit gate and cafeteria in the hospital. Delta Surya Sidoarjo includes: a. Drawing of the roof truss plan b. Drawing of the roof component plan in the form of placing curtains, rafters, battens, and breising column c. Cut drawings d. Detail drawings.

KEYWORDS: Construction project planning and scheduling, Project duration reduction, Easel or rafte roof truss, Roof structure implementation method

1. INTRODUCTION

Building structures are elements or parts that are important parts of the establishment of a building, such as roofs, walls, foundations, columns and so on. The design of the structure must also ensure that these parts of the structure are able to bear the load of the building so that it is able to support and channel to the ground safely. The lower structure consists of a foundation and a sloof, then the middle structure includes walls, columns, and rings, while the upper structure consists of a frame and roof trusses. This fieldwork practice activity is focused on observing the activities of the superstructure, namely the roof of the easel. Easels are structural elements used in the construction of buildings to support roofs or walls. A roof is a skeleton consisting of horizontal beams arranged in a triangular pattern or three-dimensional stacks. Easels are used to support the roof truss and channel the load of the roof to the foundation or supporting structure of the building. The roof itself is a component of the building structure that is located at the top and functions as a cover or protector of the building from rain, heat, snow, wind, sunlight and dust.

Building design and planning requires a very high level of precision and a relatively long time. Therefore, most

consultants and construction implementers (contractors) rely on technical application support during project planning, design, and construction report preparation. A very commonly used application in Indonesia is AutoCAD. Supported with other applications such as SAP2000 and ETABS to create 2D and 3D images and analyze the strength of structures.

2. LITERALUR REVIWE

2.1 Design Analyst

Analysis According to Wiradi (2006) Analysis is an activity that contains a number of activities such as decomposing, distinguishing, sorting something to be classified and regrouped according to certain criteria then looking for its relevance and interpreting its meaning.

Design is planning or designing that is done before creating an object, system, component, or structure. Another opinion states that the definition of design is the process of planning or designing an object with the aim that the object being made has a function, has aesthetic value, and is useful for humans.

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According to Dudy Wiyancoko, the definition of design is everything related to concept making, data analysis, project planning, drawing/rendering, cost calculation, prototyping, frame testing, and test riding.

2.2 Design Function

Design is an applied art, architecture, and various other creative achievements that involve the arrangement of lines, shapes, sizes, colors, and values of an object based on certain principles. Some of the design functions are as follows:

- a. As a tool in the process of creating a new object.
- b. As a means for designers to convey their ideas or works to the audience.
- c. As a forum to expose the appearance of certain objects to the public with an image or actual situation.
- d. As a means to improve human science so that it better understands the shape of the drawing of fields, spaces, arrangements, configurations, compositions, values, and so on

2.3 Design Objectives

As explained earlier, the main purpose of a design is to help humans design an object to be useful to humans. Some of the design goals are as follows:

- a. To create an object, system, component, or structure that is beneficial to humans.
- b. To create something that can improve human efficiency, productivity, and quality of life.
- c. The design combined with elements of art and technology aims to create safety, comfort, and beauty.
- d. So that humans know what abilities and limitations are in themselves and the things around them

2.4 Design Principles

In the design process, there are several basic principles that must be considered by the designer. The design principles are as follows:

- a. Balance
- b. Unity
- c. Comparison
- d. Order
- e. Rhythm
- f. Scale
- g. Focus

2.5 Design Methods

The definition of design methods is the ways in which a designer creates an object. Some of the design methods that are often used are as follows:

1. Exploding, which is a design method by seeking inspiration through critical thinking to produce a design that has never been created.

2. Redefining, which is a design method by reprocessing a design to become something different and better.
3. Managing, which is a design method by creating designs in a sustainable and continuous manner.
4. Prototyping, which is a design method by improving and/or modifying the design of the ancestral heritage.
5. Trendspotting, which is a design method by creating a design based on a developing trend.

Broadly speaking, designs can be divided into two types. Referring to the definition of design above, the following are the types of designs:

1. Structure Design

Structural design is a design that describes the form of an object or object consisting of several design elements. Some of these design elements include:

1. Arrangement of lines
2. Shape
3. Size
4. Color
5. Texture
6. Value

2. Decorative Design

Decorative design is a design that is specifically designed to give decoration to the structural design of an object. The purpose of the decorative design is to add beauty and quality to the design of the object's structure

2.6 Shop Drawing

Work drawings (Shop Drawings) are drawings that are used as a reference when carrying out work in the field. To use Shop Drawing as a location guide, it must be approved by and signed by various parties. Starting with the contractor, PPK (owner) and supervisory advisor.

Shop drawings or working drawings are drawings made by contractors. This picture will be the basis or foundation for the implementation of the development project on the site. These drawings are very important in construction projects. It can be said that the construction project is running smoothly based on the working drawing guidelines. This image is a clear reference for all parties working in the area.

In addition, working drawings also reduce the possibility of errors in the field. If the errors are minimal, the construction time and costs will not add up. These working drawings play an important role in achieving the effectiveness of the implementation of construction projects. Field workers can follow clear guidelines to ensure that every step is not in vain. The working drawing also has an important function in the handling of the use of building materials. This working drawing not only serves as a reference for project progress, but also plays a very important role in supporting the calculation process.

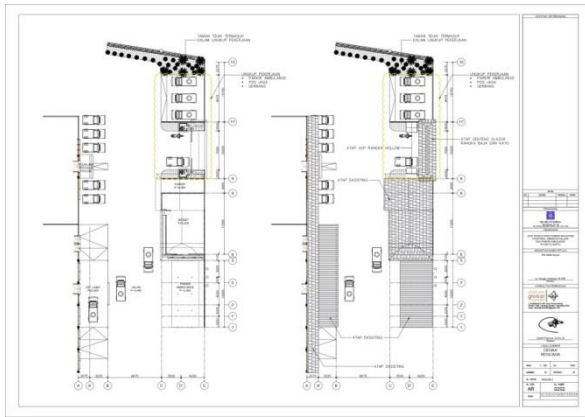
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3. RESEARCH METODE

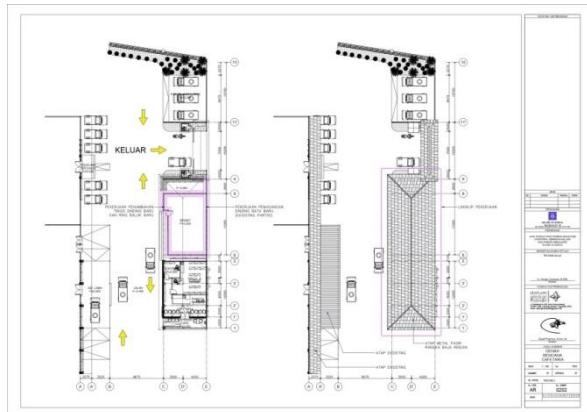
In the implementation process, the contractor PT Muliif Teknik Utama requires technical drawings that are used for work references. Where later the field results will be in accordance with the planning time. In the process of work on the structure of the field team, the implementation team needs shop drawings as a reference for implementation. Here is an example of a working drawing of a roof plan.

3.1 Roof Plan Drawing

The drawing of the roof plan is intended to determine the coordinate point of the roof location in the Exit Gate and cafeteria Project area in the hospital, Delta Surya Sidoarjo. The roof plan drawing is also accompanied by the elevation of the land in the project. This image also serves as a floor plan drawing for roofing work.



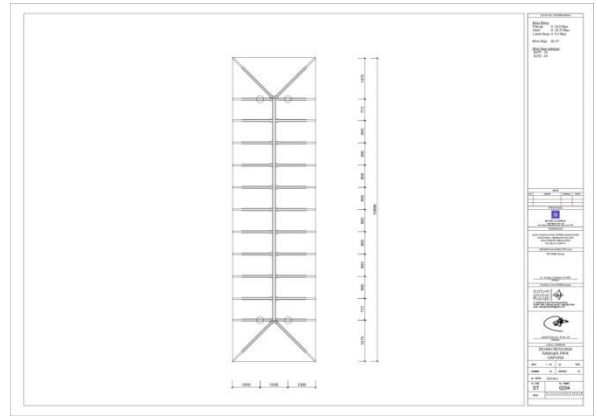
Picture 1. Drawing of the plan of the roof plan of the exit gate



Picture 2. Drawing of the cafeteria roof plan

2.2 Drawing of the Roof Components Plan

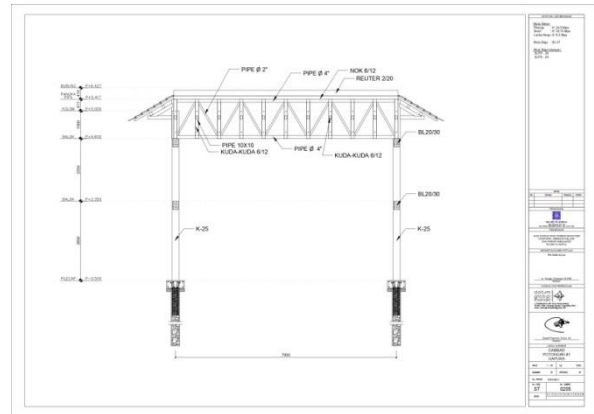
The roof component plan is intended to determine the coordinate point of the roof location in the exit gate and cafeteria project area at Rs. Delta Solar. The drawing of the roof component plan is also accompanied by the elevation of the soil on the project. Drawings of roof component plans include drawings of curtain plans, noks, sagrods, rafters, battens, and trekstang.



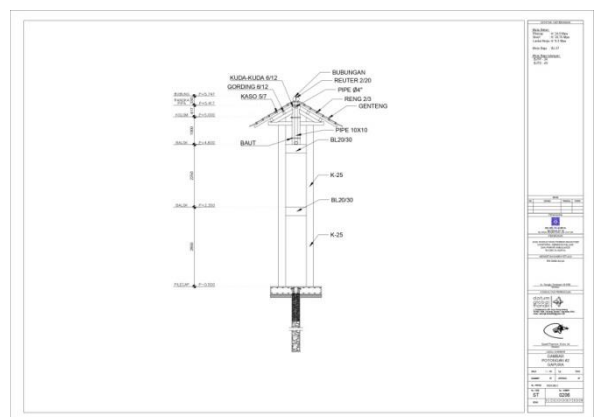
Picture 3. Exit Gate Roof Truss Pipe Plan Drawing

2.3 Cut Pictures

Cut drawings are very important drawings in a construction because in this drawing the executor and workers are expected to be able to detail the parts that have special handling at the time of implementation.

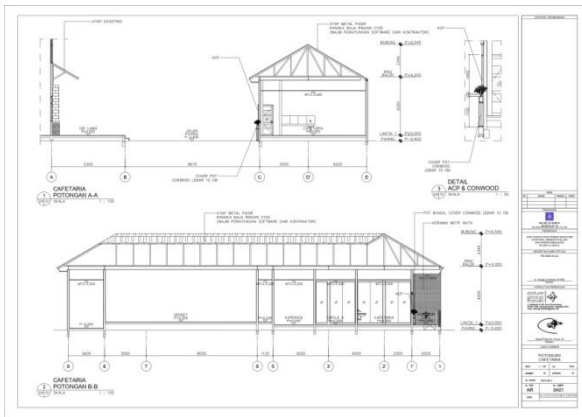


Picture 4. Drawing of Piece A Pipe Plan of the Exit Gate Roof Truss Pipe



Picture 1. Drawing of Piece A Pipe Plan of the Exit Gate Roof Truss Pipe

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Picture 2. Drawing of the Cafeteria Roof Frame Plan

4. CONCLUSION

Based on the results of the observations that have been made, the design needed in the work of the roof of the exit gate and cafeteria in the hospital. Delta Surya Sidoarjo includes:

- a. Roof truss plan drawing
- b. Drawing of the roof component plan in the form of placing curtains, rafters, battens, and column breising
- c. Cutout image
- d. Detailed Images

5. SUGGESTION

Suggestions to improve accuracy and efficiency in the implementation of the Exit Gate and Cafeteria construction project in the hospital. Delta Surya Sidoarjo includes the use of shop drawing as the main guide in roof structure work to ensure consistency with the initial plan. Also use a roof plan drawing to clearly determine the coordinates of the roof location and ground elevation, and include a drawing of the roof component plan such as curtains, nooks, sagrods, rafters, battens, and trekstang to make it easier for the field team to carry out every detail correctly. Also make sure to use detailed

cut drawings to handle special parts during the construction process, according to the plan that has been set.

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