

Factors considered in determining the choice of formwork construction essay



Based on the title of my research, this dissertation is to research on what are the factors that has been considered in determining the choice of formwork. Throughout the research you will see various types of formwork details and also the factors, the system or the methods that are being used in our Construction Industry nowadays.

The purpose of determining the choice of formwork mainly is to reduce the cost of construction. The cost of formwork is occupying a big percentage in the total construction cost, as we do not allow to reduce the cost by changing other building components requirement due to they were all specified in the Contract Documents, therefore choose and plan the system of formwork wisely will greatly reduce the cost of construction. In addition, choosing a proper system of formwork will also reduce the time of construction and the wastage thus reduces the total construction cost. Therefore, choosing the system of formwork wisely is a good practice for every construction work.

AIM

To find out what is to be considered while choosing the formwork in construction.

To provide a guideline to developer or builder who are having hard time in selecting which formwork to use.

OBJECTIVIES

To review the concept and details of each type of formwork.

To analyze the suitability of each formwork.

To explore the choices of system formworks available.

To find out the method to determine the choice of formwork.

HYPOTHESIS

Good planning of choosing formwork can reduce time and cost of the construction.

1. 4 RESEARCH METHODOLOGY

1. 4. 1 LITERATURE REVIEW AND PILOT STUDY

A comprehensive review of the relevant literature will be undertaken in order to develop an understanding of the concept of different types of formwork.

The literature review will be followed by a pilot study. An interview questionnaire will be provided during a structured interview with the experienced to make sure how appropriate is the main study questionnaire.

Tape recording is advice as we may leave out something if we were to record in writing. But tape recording must be of respondent's permission. Interview to the experienced will be the main sources of data because sharing through experience is more worth than a thousand words of theoretical studies from the books.

1. 4. 2 MAIN STUDY QUESTIONNAIRE

The results from the pilot study will finalize the questionnaire to be sent out to relative companies. Handing out questionnaire is an approach to determine the current development of formwork system that has been practiced in our local construction industry. Two approaches of questionnaire will be handed out namely quantitative approach and qualitative approach.

1. 4. 3 ANALYZING THE QUESTIONNAIRE

This stage will analyze the feedback of the main study questionnaire. The information and data gathered will be processed by analyzing the majority and minority in relation to the objectives. Descriptive statistic will be applied and the result from the findings will be presented in the form of graphs, histogram and pie chart for easier understanding.

1. 4. 4 WRITING THE RESEARCH REPORT

This stage involves writing up the content of the dissertation and should cover the chapters proposed in the following section.

PROPOSED STRUCTURE OF THE DISSERTATION

Chapter 1 - Introduction

Chapter 2 - Review of the various types of formwork

Chapter 3 - Selections of formwork

Chapter 4 - Research design and methodology

Chapter 5 - Analysis of the result

Chapter 6 - Conclusions

Chapter 7 - References

1. 5 PROBLEM STATEMENT

Formwork system currently accounts for approximately 7% of the world formwork market and the figure will still be growing slowly. Selecting good and suitable formwork system enables speedy completion, cost saving and

neat concrete structure. The problem is that not every formwork is suitable for every types of building. The timeline and cost of the construction can vary depending on which type of formwork is used. For example a typical floor in a highrise building may take up to 8 days or more to complete if you use conventional timber formwork, whereas it would only take 3 to 5 days if system formwork is used. Apart from the time factor, some formwork systems are technically better than others in terms of better quality as well as providing a better safety features during construction.

Selection of formwork is indeed a very important part in constructing a building. Throughout the research you will see the ways to determine and select a suitable formwork based on several factors like the availability of the local resources, type of building design, size of building and a cost comparison of different formwork.

CHAPTER 2

LITERATURE REVIEW OF FORMWORK

2. 1 BACKGROUND

2. 1. 1 CONCRETE CONSTRUCTION

Reinforced concrete is concrete in which reinforcement bars, reinforcement grids, plates or fibers have been incorporated to strengthen the concrete in tension. A quality reinforced concrete structure offers many advantages over structures made with other building materials. For a strong, ductile and durable construction the reinforcement will have high strength, high tensile strain, good bond to the concrete, thermal compatibility and durability in the concrete environment. Concrete is a durable material that reduces building

maintenance costs and provides a longer service life. A concrete structure will reduce energy usage because of its mass and high resistance to thermal interchange. The use of concrete will lower insurance costs by virtue of its high resistance to fire. Buildings made of concrete are also more secure against theft and vandalism. Concrete floors and walls reduce the transfer of noise, yielding a quieter environment and happier occupants. Reinforced concrete possesses considerable strength for resisting seismic and wind loads. These factors and others make the selection of reinforced concrete an economical alternative.

2. 1. 2 CONCRETE FORMWORK

The construction of a concrete building requires formwork to support the slabs (horizontal formwork) as well as columns and walls (vertical formwork). Formwork is defined as a temporary structure whose purpose is to provide support and containment for fresh concrete until it can support itself. It molds the concrete to the desired shape and size, and controls its position and alignment. In the construction industry, there are mainly three types of formwork being the traditional timber formwork, engineered formwork system and re-usable plastic formwork. These formworks are the key components of the construction industry, which itself stand an important segment of the overall construction market. Traditional timber formwork comprises bespoke products manufactured in-situ from basic timber, sheet and section materials. Once used, the materials may be re-worked a limited number of times before being disposed of. Whereas Engineered formwork system uses a wide variety of standard proprietary modules which can be

used together to provide a solution. After use, the components are disassembled and can be re-used many times in different configurations.

2. 1. 3 FORMWORK SYSTEM

Formwork system is defined as the total system of support for freshly placed concrete including the mold or sheathing which contacts the concrete as well as supporting members, hardware, and necessary bracing. It was once built in place, used once, and subsequently wrecked. The trend today, however, is toward increasing prefabrication, assembly in large units, erected, and continuing reuse of forms. Formwork system currently accounts for approximately 7% of the world formwork market and the figure will still be growing slowly. Selecting good and suitable formwork system enables speedy completion, cost saving and neat concrete structure.

2. 2 FORMWORK REQUIREMENTS

The requirements of constructing formwork basically are the strength, Tension, Durability, good alignment, surface finish and economy.

2. 2. 1 STRENGTH

The strength of the formwork must be sufficiently strong enough to carry the load of human and machines that may stress onto or on top of it. It also has to be strong enough to prevent the formwork from being out of shapes. A formwork which is out of shape will significantly affect the design of the building.

2. 2. 2 TENSION

Formwork must be of adequate tension and tightness to avoid possible leaks such as loss of water of the wet concrete poured into it. Loss of water may result in weakening the concrete and moreover causes the surface of concrete to be imperfect.

2. 2. 3 DURABILITY

Formwork must be of materials that are durable enough by reason of it has to be used over and over again to save the time and the cost of the construction.

2. 2. 4 GOOD ALIGNMENT

The alignment of formwork must be smooth and precise with the intention that the finishing surface will be perfectly smooth to avoid out of shape.

2. 2. 5 SURFACE FINISH

The materials of the formwork may affect the surface finishes of the concrete. Different materials used in formwork will have different surfaces for instance rough or smooth surface that will determine the surface finishes of the concrete.

2. 2. 6 ECONOMY

Economy is a major concern since it occupies a large percentage of the total construction cost. Good planning in fabrication and erection procedures, intelligently select materials that are use for the formwork, and widely reuse the formwork as much as possible will greatly reduce the time and cost of

construction. Maximum economy without sacrificing the quality and safety of the construction is the best.

2. 3 CONVENTIONAL FORMWORK

2. 3. 1 INTRODUCTIONS

Conventional Formwork is the traditional type of formwork construction that requires a lot of skilled and unskilled workers to build. Apart from requiring a lot of workers to build, time consuming is also a major dilemma for larger structures as according to today's competitive market, speed and efficiency is of primary importance. In fact, conventional type of formwork are much more flexible in terms that even when system formwork is used, certain critical parts will still be using conventional formworks. Components of conventional formwork usually are the timbers, metals and plastic. There are mainly two types of conventional formwork which is the temporary formwork and permanent formwork.

2. 3. 2 TEMPORARY FORMWORK

Generally, formworks that we use are usually temporarily built to create the mould for concrete as to allow it to be reusable in order to save cost of the construction.

Usually temporary formworks are made of timber or plywood. One of the advantages of using wood as materials is by the reason that woods are easier to be erected make it more flexible when we have to reuse it again and again. Other than following the traditional way by using woods as material, some other reusable materials can be used such as reusable plastic formwork. According to the sources from the web, these interlocking and

<https://assignbuster.com/factors-considered-in-determining-the-choice-of-formwork-construction-essay/>

modular systems are used to build widely variable, but relatively simple, concrete structures. The panels are lightweight and very robust. They are especially suited for low-cost, mass housing schemes.

2. 3. 3 PERMANENT FORMWORK

Although the formworks nowadays are mostly temporary formwork, sometimes some of the formwork will not be removed and will stay permanently. Refer to Formwork: a practical approach written by Peter S. McAdam and Geoffrey Lee, not all formwork is removed when the concrete no longer requires support. There can be advantages in leaving it in place, even if these are only in the elimination of stripping costs. This formwork is generally known as PERMANENT formwork but sometimes as LOST or SACRIFICIAL formwork.

There are a numbers of materials that can be used as permanent formwork such as the timber, steel, concrete, cardboard and plastic. Different construction has different requirements of the materials used for permanent formwork. Basically, these materials requirements are based on the strength, durability and the appearance that require for each particular case. The book Formwork: a practical approach also stated that there are a number of general parameters can be given for the materials for permanent forms:

They must be strong enough to carry the pressures that the fluid concrete can exert.

At a minimum, this strength must endure until the concrete is self-

supporting. For soffit forms this must be at least six or seven days and may <https://assignbuster.com/factors-considered-in-determining-the-choice-of-formwork-construction-essay/>

in some cases need to be more. With Vertical formfaces ten to twelve hours may be sufficient.

Any breakdown of the form material, including corrosion, must not be incompatible with the structural action or durability of permanent reinforced concrete structure. In some cases the breakdown is necessary, for example, with the void formers used to create a gap between suspended slabs and expansive soils, this breakdown of strength is essential.

The obvious advantages is that as the formwork is to be leave in place, no formwork is to be reused and therefore the works of labour will be reduced and so are the cost of the labour. Permanent Formwork can also save times by reducing the needs of false work, reducing the erection times thus precede to the next operations earlier.

2. 3. 4 METHOD OF CONSTRUCTION

A formwork has to be form to meet certain requirements to support the stresses from either the dead load or the live load. Fail in forming formwork will lead to a bad disaster to the construction and also to the people working on it.