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BUILDING DEPARTMENT

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It is recommended that the Practical Training Report is prepared

by

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Title

The method construction to build roof trusses

accepted in partial fulfillment of the requirements for obtaining a Diploma in Building.

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STUDENT'S DECLARATION

It is hereby , this Practical Training Report was produced entirely by me except as described in the practical training that I went through for 5 months from 12 November 2012 to 12 April 2013 under the Company Dincobena Enterprise. It is also one of the requirements to pass the DBN307 course and to be accepted to partially fulfil the requirements for obtaining a Diploma in Building.

.....

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With that, thank you again.

ABSTRACT

This report briefly describes the processes and methods involved in the construction of roof. It is produced based on the experience of five months stationed at the project site. This report is divided into several sections and it starts with the background of the company and the background of the construction project. The result of the observations made has found that the construction of the roof frame house is not as easy as it looks. It involves many committed parties and construction processes. In this report, it explains the types and major components of a roof truss. Then it describes in more detail about the methods involved and used in the construction of roof frame that includes the construction process of the roof truss itself and the connection process between the roof trusses, followed finally by the installation of roof finishes. During the construction stages, several of the roof construction methods have been identified and the report ends with the installation steps or procedures of the roof frame. In conclusion, this report can be a good reference for the reader regarding the entire processes and methods of the practical construction of roof framework with the details.

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LIST ABBREVIATIONS

UITM: Universiti Teknologi Mara

CIDB: Construction Industry Development Board

CHAPTER 1

INTRODUCTION

1.1 INDUSTRIAL TRAINING INTRODUCTION

The industrial training is one of the strictly requirements for every fifth semester student in the building course to attain the diploma graduate. It is one of the subjects in the building course DBN307. Industrial training program also aims to provide a wider exposure and experience to the students about the real ambience of the workplace and acts as a preparation for students before they jump into the real world of employment. For session 2012/2013, this industrial training run for five months, which started on 12 November 2012 to 12 April 2013.

Student have applied to several contractor companies around Selangor and Johor even before student accepted to do it finally in a company named Dincobena Enterprise which is located somewhere in the Ledang district of Johor. Dincobena Enterprise company operates from 7.30 am to 4.30 pm and provides a one-hour rest period commencing 1.00 pm to 2.00 pm. They work for 6 days weekly compassing full-day work on Monday to Friday and half-day work on Saturday only. In this company, the manager has placed a student practical under the development and road construction supervisory. During the industrial training student was also being given the opportunity to follow the committed technicians to the project sites.

Therefore, student had the opportunity to learn and gain invaluable experience from them especially in the field of road construction. The knowledge student got could help to understand the real requirements in the project, thus enhancing the understanding of the theory student learned more clearly and know the ins and outs of required for road construction. In addition, student also had the opportunity to mingle with different characters and different ranks of worker and learn their working methods and learn how to handle the problems that arise from time to time. In whole, the industrial training exposes students to actual site conditions.

1.2 INDUSTRIAL TRAINING OBJECTIVE

Basically, each student of UiTM is required to pass in industrial training to enable them to resume their studies to the next semester. It is also a program made for the fifth semester student of diploma. The industrial training has several goals to be achieved by the UiTM students, in which some of them are:

- To expose students to the real working environment.
- Provide opportunities to practice each theory students have learned in campus in performing every task entrusted to them.
- The students are able to improve individual skills and work experience.
- To train the students to interact with employers and workers professionally and create a positive communication.
- Increase self-discipline towards the rules set by the Company or Firm and UiTM regulations existed.
- Prepare the industrial training report according to the regulations provided.
- Cultivate good teamwork and closer relationship with each other.
- Able to build creativity and contribute some thoughtful ideas for the organization.
- Able to expose students to the organizational structure and the role in a particular position in an organization or firm.
- Establish bilateral relations between the organization or firm UiTM where students are placed for the good and benefit for all.

1.3 IMPORTANT OF INDUSTRIAL TRAINING

Industrial training has its particular importance in which some of them are:

- The students trained in the industry will be able to get familiar with the real working environment and at the same time do self-train to prepare for the real employment upon graduate.
- It also makes students to become more proficient in interacting with other workers as well as install teamwork.
- It can also improve the discipline and responsibility of the student towards the task given.
- It also teaches students a positive attitude and makes yourself more open minded skillfull, hence aspire himself to become a model to others.

1.4 THE OBJECTIVE OF REPORT

Industrial training report making is compulsory on each student who has completed the training session, and all the activities done must be recorded during the training period. Activities done reported must be valid and reasonably presented either involving office management or technical skills learned. Some of the objectives of making the report are:

- i. Documentation of activities throughout the training.

Every activity that has been done can be recorded properly in a report.

The report can be used as a reference when needed.

- ii. Make proof of training done by the students.

It can avoid the students from doing task idly and turn it to useless practice after 5 month training. It also increases the student's enthusiasm in making the report accordingly.

- iii. Help students in the future.

The availability of the report will assist students in gaining employment easily after graduation. It will serve as a reference to know the experience that the student have obtained.

1.5 OBJECTIVE OF THE RESEARCH

The objective of the report is to provide a reference on research that has been conducted to achieve the aim of the study on the use of building materials. A detailed understanding on the relevant construction work done by the company and the contractor should be emphasized more.

1.6 SCOPE OF STUDY

The scope of the study is determined during the early stage of the training to make it easier to focus on the collection of information regarding the related field, the project site and the aspect so that the main objective can be achieved in the study developed. The scope of the study throughout the session is diminished to the project of construction and the materials used.

1.7 METHOD OF STUDY

To meet the objectives of the study, several methods was conducted in sequence. Once the activity done, the analysis was conducted on the information that has been obtained. The study began by collecting crucial information from the construction site. Then the information is analysed using specific methods. Besides, some supervisors and site leaders have been interviewed for extra information and complete explanation.

1.8 DATA COLLECTION

For this study, the collection of information was divided into two stages which involves two types of data that are closely interrelated which are secondary data and primary data. Secondary data is the most important to meet the primary objective while the primary data as the ground basis for carrying out the study.

1) Secondary Data

Secondary data must be referred prior to the study. Information received will be used as a guide. It provides an overview of the theoretical topic to fulfil the first objective of the study which is the use of the construction materials at site. Such information can be obtained from the internet, magazines and reference document from the company itself. These informative materials are needed to consolidate the basic method conducted in this study.

2) The primary data

Primary data is the original data collected for this study to analyse and get the results. This can be obtained through on-site observations and interviews with the committed individual involved. Primary data can be used to find out the type and method of building materials used at the construction site. On-site observations should be done first to get an overview of the materials usage. This kind of approach is important for data collection, by getting pictures around the site to record the observations that had been made. In addition, the interviews were done on the individual who had been managing the construction materials at the site. This method was carried out to obtain more detailed information pertaining to the materials used in construction sites. Then the data was analysed to obtain the final results.

CHAPTER 2

COMPANY BACKGROUND DINCOBENA ENTERPRISE

2.1 INTRODUCTION



Figure 1.1: Office

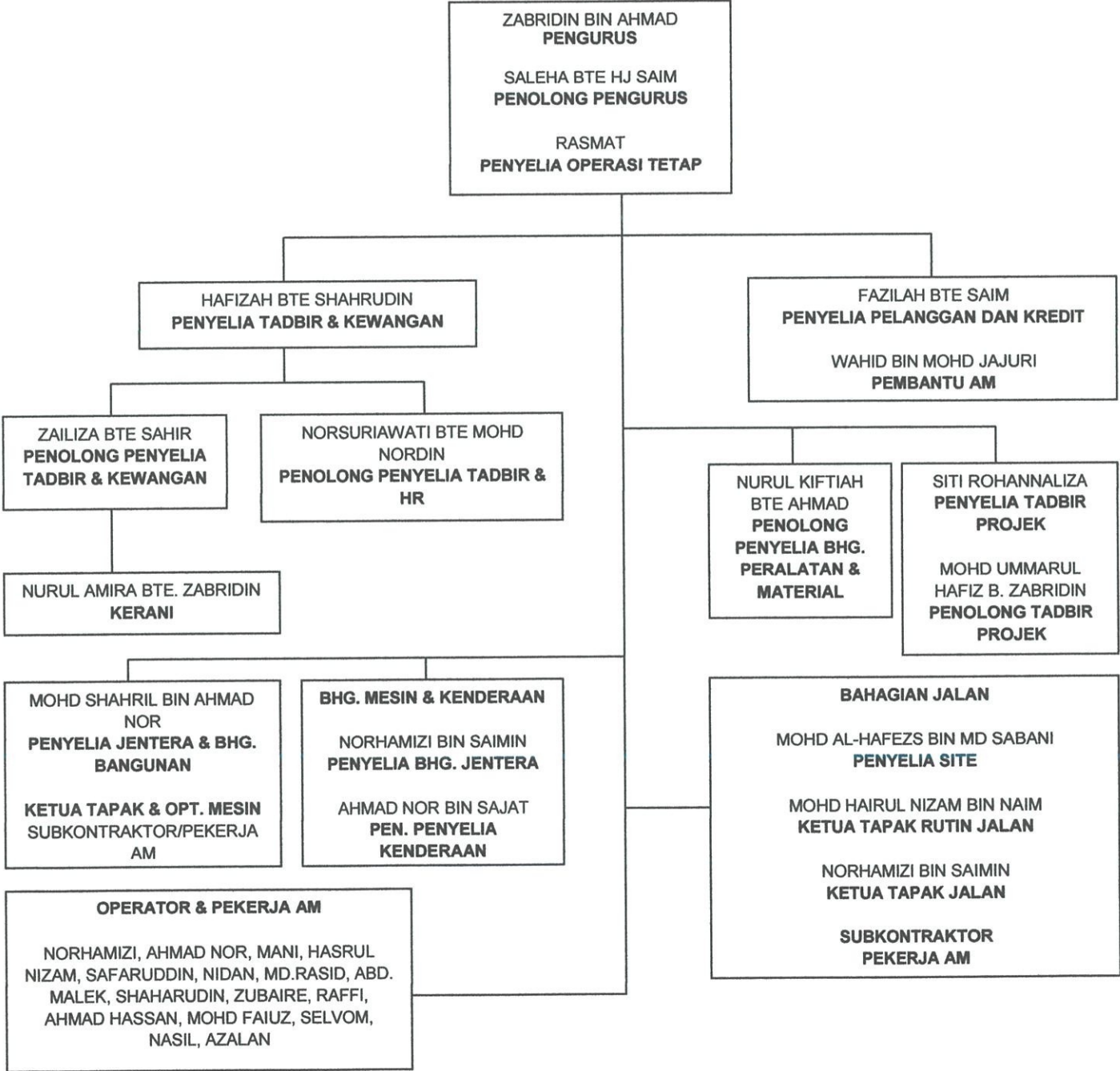
Dincobena Enterprise Company was established in October 21, 1997. It is based in specifically at Kampung Seri Makmor in Ledang district. Dincobena Enterprise Company is a company which doing business as a private sub-contractor. Dincobena Enterprise Company was divided into two parts, which are Dinco and DCS enterprise.

In February 2002 the company was registered in the Contractor Service Association (CIDB) and the Ministry of Finance as a bumiputra company led by a visionary entrepreneur. In addition, Dincobena Enterprise has a fairly extensive

experience, competence and ability in the performance of tasks and activities such as house construction work, road, services, suppliers, maintenance of buildings and areas. Besides that, the company is also active in the construction both inside and outside the province and outside the country.

Based on the record of activities and the credibility they have, Dincobena Enterprise is excellent in planning a systematic strategy, management and proficient implementation, which fulfil the needs, wishes and preferences of customers. Additionally, the company Dincobena Enterprise also has held a number of companies who have the contractor licenses like Tuah TR Enterprise, DCS Makmur Enterprise, HZQ Enterprise and others.

2.3 ORGANIZATION OF DINCOBENA ENTERPRISE



2.3 LIST OF PROJECT

2.3.1 Table 1.1: Project completed

BIL	JABATAN	NAMA PROJEK	JUMLAH
1.	JKR (jabatan kerja raya)	- Kerja-kerja memperbaiki kerosakan jalan dari parit 2 – parit 3. Jalan parit kassan, sagil serta jalan berkaitan muar johor.	RM113,789.50
2.	IDJ (infra desa johor)	- Kerja-kerja menghampar crusher run di jalan pt. Pankang sari.	RM110,624.00
		- Kerja-kerja menaiktaraf jalan dan memasang pembentung termasuk kerja-kerja berkaitan di ft 023 sek. 13.30 – 13.80 dalam daerah muar.	RM490,072.00
		- Penyelenggaraan jalan kampung di negeri johor darul takzim di jalan seberang gajah, tangkak.	RM118,254.50
		- Kerja-kerja penyelenggaraan jalan-jalan kampung di jalam kg. Pt. Tunggal bukitserampang.	RM103,480.00
		- Kerja-kerja penyelenggaraan jalan naib peei sempang jeram.	RM127,488.40
		- Kerja-kerja penyelenggaraan jalan kampung di jalan kampung	RM115,913.50

		semandar, gersik ledang.	
3.	MDT (majlis daerah tangkak)	<ul style="list-style-type: none"> - Menaik taraf parit dari kundang ulu ke taman bakri kundang ulu, ledang. - Menaik taraf jalan di taman serom utama. - Menaik taraf jalan di kawasan industry gersik, majlis daerah tangkak, ledang. - Menaik taraf jalan di kampung baru, ledang. - Pencahayaan di bukit gambir. - Menurap semula jalan di taman tangkak jaya, tangkak, ledang serta lain-lain kerja yang berkaitan. - Kerja-kerja menurap semula jalan di taman sentosa tangkak, ledang serta lain-lain kerja yang berkaitan. 	<p>RM189,940.00</p> <p>RM187,091.80</p> <p>RM190,710.00</p> <p>RM186,002.50</p> <p>RM190,270.00</p> <p>RM365,463.00</p> <p>RM189,906.00</p>
4.	PDL (pejabat daerah ledang)	<ul style="list-style-type: none"> - Menaik taraf laluan kampung baru serom, ledang. - Membina sebuah jambatan lalulintas sederhana (mbt) bagi 	<p>RM161,200.00</p> <p>RM113,798.00</p>

		<p>menghubungi tapak masjid baru kg. Seri makmor.</p> <p>- Membaik pulih rumah untuk jamlah bte yusak di kg. Hang tuah.</p>	RM385,780.00
5.	PPNJ (pejabat pembanguna n negeri johor)	- Membina baru surau taman tiara tangkak.	RM199,600.00
6.	SPNB (syarikat perumahann egara berhad)	<p>- Membina/menyambung dan menyiapkan 3 unit rumah sesebuah dengan keluasan 1000kaki persegi beserta dengan semua kelengkapan. (sadiyah bts yawal) (asmida bt ahmad) (mohdrazali b. Isamil)</p> <p>- Membina/menyambung dan menyiapkan 3 unit rumah sesebuah dengan keluasan 1000kaki persegi beserta dengan semua kelengkapan. (norazli b. Amatisnin) (md misman b. Somon) (normah b teawob)</p> <p>- Membina/menyambung dan menyiapkan 3 unit rumah sesebuah dengan keluasan</p>	<p>RM180,000.00</p> <p>RM170,000.00</p> <p>RM120,000.00</p>

		<p>866kaki persegi beserta dengan semua kelengkapan. (hairani bt. Mohd hassan) (mansorsah bin marsom)</p> <p>- Membina/menyambung dan menyiapkan 3 unit rumah sesebuah dengan keluasan 1000kaki persegi beserta dengan semua kelengkapan di felcra bukit kepong. (ayubb.mesran) (mansor b. Amat)</p>	RM130,000.00
7.	JAJ (jabatan agama johor)	- Kerja-kerja pendawaian semula elektrik dan kerja berkaitan di bangunan masjid lama bandar tangkak.	RM116,000.00
8.	KDN (kementerian dalam negeri)	- Kerja-kerja membaik pulih dan menaik taraf bangunan kuarters dan balai polis sungai mati, daerah ledang.	RM268,020.00

2.3.2 Table 1.2: Ongoing project

BIL	JABATAN	NAMA PROJEK	JUMLAH
1.	SPNB (syarikat perumahan Negara berhad)	<p>- Membina dan menyiapkan sebuah rumah rnr di kampung bunga raya hujung.</p> <p>- Membina dan menyiapkan sebuah</p>	<p>RM60,000.00</p> <p>RM60,000.00</p>

		<p>rumah rmr di kampung melayu raya sagil, daerah ledang.</p> <ul style="list-style-type: none"> - Membina dan menyiapkan sebuah rumah rmr di kampung bunga raya hujung, bukit gambir. RM60,000.00 - Membina dan menyiapkan sebuah rumah rmr di kampung parit kassim sengkang, ledang. RM60,000.00 - Membina dan menyiapkan sebuah rumah rmr di kampung serom 8, ledang, johor. RM60,000.00 - Membina dan menyiapkan sebuah rumah rmr di kampung sri menanti sengkang batu 22, ledang. RM60,000.00 - Membina dan menyiapkan sebuah rumah rmr di batu 4 jalan kesang laut, tanjung gading, muar johor. RM60,000.00 - Membina dan menyiapkan sebuah rumah rmr di kampung seberang gajah, tangkak, ledang. RM60,000.00 	
2.	PDL (pejabat daerah ledang)	<ul style="list-style-type: none"> - Bina semula jalan kampung kemuning dalam, sialang tangkak. RM20,000.00 	

CHAPTER 3

CASE STUDY

3.1 INTRODUCTION



Figure 1.2: Roof trusses

Roof is one of the most important components on a building and it is the highest component located in a building. It serves for protection, keeps the people safe inside the building, housing the building facility systems, preventing from the entry of moisture, heat, sound, and etc. as well as giving an identity to a building. Therefore, the roof constructed must be very rigid and firm especially the roof frame. There are also the general principles in designing a roof in which it must have the main traits such as weather resistance, rigidity, endurance and durability, made of fire-insulated material, and serves as a ventilation space.

Construction of the conventional roof frame of the traditional houses back then is made up of timber. However nowadays timber material is used less in the construction of

roof as it turns to be much expensive. Besides, the timber roof usually does not last long because it becomes vulnerable to a variety of problems, for example when the roof is leaking, the timber would be wet with water thus it may expose to rot, termite bites and also dirt. In addition, numbers type of timber found in the market nowadays namely the young timber and wet timber for example, mostly have a problem with their straightness. It is undeniable that there are also some timbers which are protected against rot and dirt namely the buying timber for example, but unfortunately the price is too expensive.

Realizing this, the architects have started to make an evolution to the materials of construction by introducing steel for roof framing. The application of the steel on the roof construction makes the whole roof to be much more robust and durable from any distractions, hence the target of having main functions of the roof can be achieved. On top of that, it reduces the cost of materials used as the usage of steel is reduced into small quantity rather than timber which needs large quantity for the construction.

3.2 TYPE OF ROOF FRAME STEEL

Generally in the housing project of rumah mesra rakyat there is a modification made in the type of material used to make the roof. Government has established the new blueprints of the housing project plan to change the specification of the roof material from timber to steel for goodness. There are two different shapes of steel of the same type are shown in the drawings to construct the roof.

MILD STEEL



Figure 1.3: Type of steel

3.3 TYPE OF ROOF TRUSSES

Generally the roof has a variety of pillars. It normally depends on the type of roof to be used. For example, the banana-comb-shaped roof uses half roof frame only. Therefore, each bond of roof frame has its own function and will be chosen according to the type of roof itself. Some types of bond used in the construction nowadays include:

1) King post

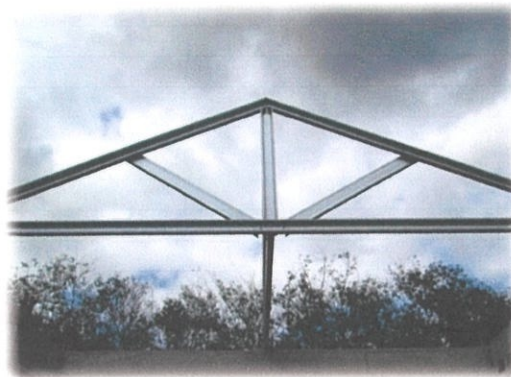


Figure 1.4: King post truss

The king post truss is used for simple roof trusses and short-span bridges. It is the simplest form of truss in that it is constructed of the fewest number of truss members (individual lengths of wood or metal). The truss consists of two diagonal members that meet at the apex of the truss, one horizontal beam that serves to tie the bottom end of the diagonals together, and the king post which connects the apex to the horizontal beam below. For a roof truss, the diagonal members are called rafters, and the horizontal member may serve as a ceiling joist. A bridge would require two king post trusses with the driving surface between them. A roof usually uses many side-by-side trusses depending on the size of the structure.

2) Half warren truss



Figure 1.5: Half warren truss

A Warren truss is a type of structure used in different kinds of construction for supporting a load. Trusses are items that architects and engineers use in both residential and public works design. The Warren truss is often part of the structure professional designer's use in building construction. Some experts define a Warren truss as a truss having a set of diagonals in a "W" design relative to a horizontal structure. Others include trusses with both diagonals and verticals in the definition of a Warren truss. The common Warren truss has a distinctive look, where a series of triangles hooks up to a long span. Building utilizing the Warren truss are blocky, rigid designs, rather than arched ones. Many engineers working with Warren trusses will reference a top and bottom chord, which are the horizontal parts that the individual diagonals attach to. These steel diagonals are sometimes called web diagonals. Warren trusses also commonly include interior railing attached to the web diagonals to prevent pedestrians or others from falling from a building.

3) Half truss



Figure 1.6: Half roof truss

In architecture a truss is a structure comprising one or more triangular units constructed with straight members whose ends are connected at joints referred to as nodes. External forces and reactions to those forces are considered to act only at the nodes and result in forces in the members which are either tensile or compressive forces. Moments (torques) are explicitly excluded because, and only because, all the joints in a truss are treated as revolutes. A planar truss is one where all the members and nodes lie within a two dimensional plane, while a space truss has members and nodes extending into three dimensions. The top beams in a truss are called top chords and are generally in compression, the bottom beams are called bottom chords and are generally in tension, the interior beams are called webs, and the areas inside the webs are called panels.

4) Truncated truss



Figure 1.7: Truncated truss

The truncated truss serves as an intermediate load-bearing truss that other trusses attach to. They are sometimes called girder trusses. These trusses make it possible to use trusses for hip roofs and to span long distances where roofs change direction. The truncated truss is set in a specified place on the building and then Jack trusses fan out from its sides to cover the shorter spans. Jack trusses typically resemble one-half of a pitched truss. Truncated trusses are often designed for specific situations so they may take many forms. Some resemble pitched or dual pitch trusses, but often with more robust chords and truss web members.

3.4 TYPE OF WORKING TOOLS

In the construction of roof framing, there are special tools used during the installation of steel roofs. The tool used for the work is also different from the tool used to build wood roof frame. Some of the working tools are:

1) Drill machine



Figure 1.8: Bore machine

Bore machine is one of the most important handy tools in doing the work of steel roof framing for connection. This machine operates to make the hole in the steel rods to connect so that they can be connected each other with the help of one inch eyed screw. Thus, the work of the steel roof framing connections will be easier and faster

1) Hammer



Figure 1.9: Hammer

In general, this goat claw hammer accustomed we see especially in the construction work. Hammer stone serves as excessive break time to install the roof frame to provide a more consistent surface.

2) Grinder



Figure 2.0: Grinder

Grinder is one of the most important tools in doing the work of cutting for steel roof framing. This tool serves as a cutter of iron rods according to the measurements to

make a roof truss. Therefore, with the availability of this grinder, the cutting work will be easier and faster than using the metal cutting saw.

1) Measurement tape



Figure 2.1: Measurement tape

Measurement tape is one of the very important tools in the construction work. The function of measurement tape is to get accurate measurements before cutting work done. This is to avoid wrong size required during the cutting and waste.

3.5 COMPONENTS OF EXTENSION

In the construction of roof frame, there are a few small components used as well to connect the steel to the other steel and the frame beams to the columns. The connecting components include screws, nuts and bolts, and the 'L' plates. There are two sizes of screw used for the connection.

- 1) 1 inch screw



Figure 2.2: 1 inch screw

- 2) 2.5 inch screw



Figure 2.3: 2.5 inch screw

3) Bolt and Nut



Figure 2.4: Bolt and nut

4) 'L' plate

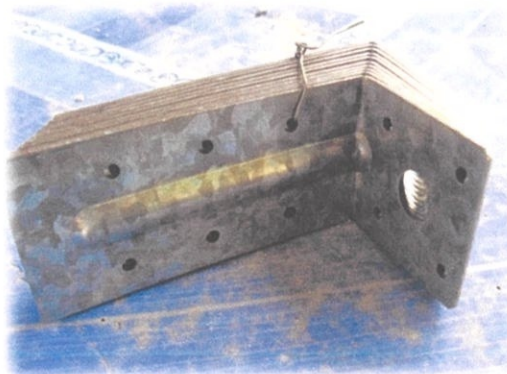


Figure 2.5: 'L' plate

3.6 STEPS TO INSTALL THE ROOF FRAME



Figure 2.6: Marking process

Firstly a mark is made on the steel rod by using the measuring tape according to the specifications given in the drawings. This is made to ease the cutting work of and also to avoid error of the size of the steel rod while doing the cutting process which can as well prevent any wastage.



Figure 2.7: Cutting process

After the marking work has completed, the steel rod will be cut by using a grinder machine according to the marking that was made earlier. Steel that has been cut will be sorted out according to their sizes.



Figure 2.8: Arrangement process

Then after that the steel parts will be arranged according to the type of frame shape that has been drawn on the plan. For example half frame shape.



Figure 2.9: Connection process

After they have been put into a shape, all of the steel parts will be connected to each other by the one-inch screws with the help of drill machine. This work is done repeatedly until the main frame needed is completed.

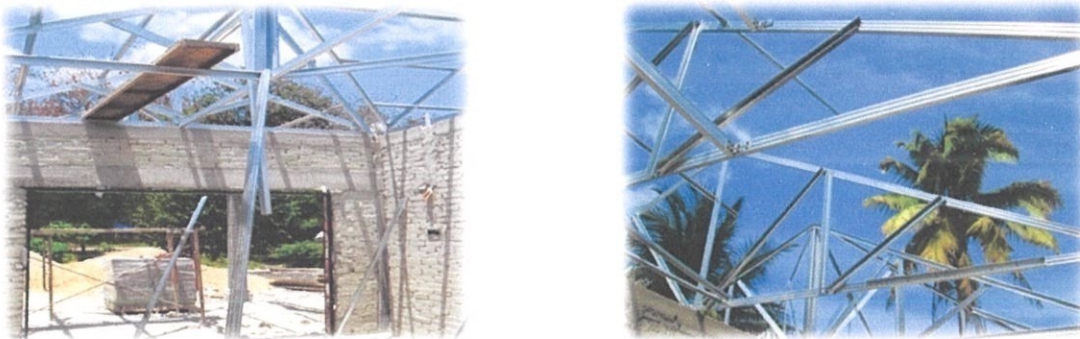


Figure 3.0: Installation process

Then after the binding has completed, they will be lifted up to the house to become the primary roof frame before the other binding works are made.



Figure 3.1: 'L' Plate

The main frame is fastened to the upper beam by using the "L" plate so that the frame does not shift easily from its position.



Figure 3.2: Connection between other trusses

After finished installing the main frame, the other frames will begin to be raised as well and attached to the main frame. The other additional frameworks include the half frame, half warren truss and truss truncated. The frameworks will be connected to the main frame by the help of one inch screws and 'L' plate to completion.



Figure 3.3: Connection between batten and trusses and finishing

After the installation of frames has completed, the assembling of batten is then initiated. The batten is moved up and being attached to the frame with one inch screws and 'L' plate as well. This is the last step made to get a completed roof frame.

CHAPTER 4

CONCLUSION

In construction there are many types of materials that can be used, and material selection is also based on the properties of the material, construction and occupation function. Apart from the various aspects to be considered in the selection of materials for a structure, e.g. in terms of cost, resources, and types of projects.

Conclusions that can be described in the use of this iron is very suitable for use in medium-cost housing project because it is cheaper compared to the use of timber. Apart from that, the installation is very simple manner and able to withstand great strain in structural construction. This project is an excellent project and do not pose much of a problem in the construction industry.

Although the roof truss has a lack of iron in the construction, but the problem is not very serious in the building, as this problem can still be solved in various ways, and this material also emphasizes the goodness of the structure. As was explained in chapter 3. Therefore material selection should comply with the design of a building that does not have a problem building after completion, is also concerned with facilities for workers when they perform the construction work.

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CAHAYA ASLI CONSTRUCTION
NO 43, JALAN BEKOH,
KAMPUNG BEKOH,
84900 LEDANG, JOHOR.

Tarikh : 21 Disember 2012

Kepada :

SPNB CONSTRUCTION SDN. BHD.

Tuan,

Tuntutan 50% Siap Kerja
No Inden : JHR0098 (IBS-H)

Dengan segala hormatnya perkara di atas adalah dirujuk.

2. Untuk makluman pihak tuan kerja-kerja tersebut telah mencapai 50% siap kerja sepertimana spesifikasi dan arahan dari pihak tuan. Diharap pihak tuan dapat membuat pembayaran 50% siap kerja tersebut sebanyak Ringgit Malaysia : Tiga Puluh Ribu Sahaja (RM 30,000.00) kepada :

Cahaya Asli Construction
Maybank Cawangan Tangkak
No Akaun : 501084214106

3. Sekian untuk makluman dan tindakan pihak tuan.

Sekian, terima kasih.

Yang benar,

.....
Nor Azman Bin Samsudin