



BUILDING DEPARTMENT
FACULTY OF ARCHITECTURE, SURVEYING AND PLANNING
UNIVERSITI TEKNOLOGI MARA
(PERAK)

APRIL 2015

It is recommended that the report of this practical training provided

By

Ruzaini Bin Abdul Rahman

2012714975

entitle

Installation Of Roof Main Trusses

accepted in partial fulfilment of requirement has for obtaining Diploma In Building.

Report Supervisor

En Mohd Najib Bin Abd Rashid

Practical Training Coordinator

Pn. Wan Nordiana Binti Wan Ali

Programme Coordinator

Dr. Mohd Rofdzi Bin Abdullah

FACULTY OF ARCHITECTURE, SURVEYING AND PLANNING
UNIVERSITI TEKNOLOGI MARA
(PERAK)

APRIL 2015

STUDENTS'S DECLARATION

I hereby declare that this report is my own work, except for extract and summaries for which the original references stated herein, prepared during a practical training session that I underwent at Preserve Bina for duration of 5 months starting from 17 November 2014 and ended 4 April 2015. It is submitted as one of the requirements for obtaining the Diploma in Building.

Name : Ruzaini Bin Abdul Rahman

UiTM Student ID : 2012714975

Date : 7 April 2015

ACKNOWLEDGEMENT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Alhamdulillah, all praise to Allah for the strengths and His blessing in completing this thesis. Special appreciation goes to my project coordinator, Mr. Syurahbil Bin Mohd Fadzil , for his supervision and constant support. His invaluable help of constructive comments and suggestions throughout the experimental and thesis works have contributed to the success of this research. Not forgotten, my appreciation to my Site Project Manager, Mr. Murugan A/L Maniam for his support and knowledge regarding this topic. I would like to express my appreciation to the Project Manager Yip Yoe Jiw, for their support and help towards my postgraduate affairs. Sincere thanks to my lecture supervisor En. Mohd Najib Bin Abd Rashid for their guidance, advise and moral support during do this report in successfully. Thanks for their concern in ensure to being success at training time. Not forget, great appreciation go to the rest Practical Training Coordinator Pn. Wan Nordiana Binti Wan Ali and Faculty's Coordinator Dr. Rofdzi Bin Abullah. Last but not least, my deepest gratitude goes to my beloved parents, [redacted] and [redacted] and also to my siblings for their endless love, prayer and encouragement. To those who indirectly contributed in this report, your kindness means a lot to me. Thank you very much.

ABSTRACT

This report, described the Installation Of Roof Main Trusses on construction site of ‘Cadangan Merekabentuk Dan Membina 1 Blok Pusat Pameran Matrade 3 Tingkat Jalan Dutamas 2, Mukim Batu, Wilayah Persekutuan Kuala Lumpur’. This report was reported based on the observation and experience of five month at the construction project. The objective of this report is to identify the procedure of roof main trusses installation and to identify the problem of roof main trusses installation. Besides that, search more information using two method which is from primary data is from book and article and secondary data from internet. The company background will explain about the company where the practical training of students placed. It began with an introduction followed by objectives, information about companies and managers, organizational charts and concluded with a list of completed projects, some undergoing projects and appendix. This report fully explained about procedure installation of main trusses roof and problem and solution installation of main trusses. Next, in this report described about the equipment and process for installing the trusses and problem and solution. There are many problems have been identify during operation about their connection of segment and specification and step by step of installation main trusses. Then, this report was be reported to give some suggestion to solve the problems. For conclusion, this report fully explain and describe about installation of main trusses roof and describe to solve the problem of installation main trusses.

TABLE OF CONTENT

CONTENTS	PAGES
Acknowledgement	i
Abstract	ii
Contents	iii
List of Figures	iv
List of Photos	v
List of Tables	vi
List Of Abbreviation	vii
CHAPTER 1.0 PREFACE	
1.1 Introduction	1
1.2 Objectives	2
1.3 Scope of Study	2
1.4 Method of Study	3
CHAPTER 2.0 COMPANY BACKGROUND	
2.1 Introduction	4
2.2 Company Profile	6
2.3 Project Undertaken	
2.3.1 Completed Project	11
2.3.2 Ongoing Project	16

CHAPTER 3.0	CASE STUDY	
3.1	Introduction	18
3.2	Type of Trusses	19
3.3	Method Of Installation	21
3.3.1	Surveying	21
3.3.2	Temporary Jig Support	22
3.3.3	Main Trusses Installation	23
3.3.4	Bracing Installation	24
3.3.5	Diagonal Member Installation	25
3.3.6	Subtruss Installation	26
3.3.7	Eaves Truss Installation	27
3.3.8	Tapper Column Installation	28
3.3.9	Purlin Installation	29
3.3.10	Fit-up Inspection	30
3.3.11	Welding	31
3.3.12	Ultrasonic Inspection	32
3.3.13	Jacking Of Main Truss	33
3.4	Problem And Solution Of Main Trusses Installation	34
3.4.1	Welding Spatter	34
3.4.2	Backing Plate	36
3.4.3	High And Low Of Jointing	38

CHAPTER 4.0	CONCLUSION AND RECOMMENDATION	
4.1	Conclusions	40
4.2	Recommendations	41
	References	42
Appendix A: Permit To Work Form		
Appendix B: Request For Inspection Form		
Appendix C: Management System Certificate		
Appendix D: Main Trusses Drawing		

LIST OF FIGURES

Figure 3.1	Common roof trusses	19
Figure 3.2	Common types of trusses	19
Figure 3.3	Simple truss	20
Figure 3.4	Simple truss	20

LIST OF PHOTOS

Photo 2.1	Capital square	11
Photo 2.2	APM plastic	11
Photo 2.3	Magnesium smelter plant	11
Photo 2.4	Sime Darby Plantation	12
Photo 2.5	Maybank	12
Photo 2.6	The Troika Condominium	12
Photo 2.7	Oleo Chemical Plant	13
Photo 2.8	Aerospace Factory	13
Photo 2.9	GMI	13
Photo 2.10	Jimah Power Plant	14
Photo 2.11	Minister Of Legal Affairs	14
Photo 2.12	Selangor Dredging Berhad	14
Photo 2.13	Three Storey Show Unit	15
Photo 2.14	Double Storey Bungalow	15
Photo 2.15	Double Storey Bungalow	15
Photo 2.16	Haisung Matrade	16
Photo 2.17	Haisung Matrade	16
Photo 2.18	A2 Show Unit	17
Photo 2.19	Prai CCGT Power Plant	17

Photo 3.1	Surveying	21
Photo 3.2	Temporary JIG support	22
Photo 3.3	Main Trusses	23
Photo 3.4	Bracing	24
Photo 3.5	Diagonal member	25
Photo 3.6	Subtruss	26
Photo 3.7	Eaves truss	27
Photo3.8	Tapper column	28
Photo 3.9	Purlin	29
Photo 3.10	Fit-up inspection	30
Photo 3.11	Welding	31
Photo 2.12	Ultrasonic inspection (UT)	32
Photo 3.13	Jacking of main truss	33
Photo 3.14	Welding spatter	34
Photo 3.15	Welding spatter removal	35
Photo 3.16	Backing plate repair	36
Photo 3.17	Backing plate repair	37
Photo 3.18	High and low jointing	38
Photo 3.19	High and low repair work	39

LIST OF TABLES

Table 2.1	Completed Projects	11
Table 2.2	Completed Projects	12
Table 2.3	Completed Projects	13
Table 2.4	Completed Projects	14
Table 2.5	Completed Projects	15
Table 2.6	Project In Progress	16
Table 2.7	Project In Progress	17

LIST OF ABBREVIATION

UT	Ultrasonic Test
AWS	American Welding Society
NDT	Non Destructive Test
MPI	Magnetic Partial Inspection
DPI	Dye Penetrate Inspection
RFI	Request For Inspection

CHAPTER 1

1.0 INTRODUCTION

1.1 Introduction

Roof is a very important part of building. Perhaps it's time to re-roof and you want it to perfectly complement your existing building style. From its function to protect against the elements to taking centre stage as a building defining feature, the roof is an opportunity to top off your most important asset.

A truss, or lattice structure, is a structural assembly of small interconnected element. Trusses are formed by an interconnected assembly of relatively small element, which create a lattice arrangement. The overall form, size and shape as the truss is as important as the strength of the individual component, and a wide variety of design option is available.

Trusses are structurally efficient and particularly popular for long span roofs. Trusses are highly efficient, able to span considerable distance, and they are visually light. The economy in use of materials has led to the use of truss systems in preference to beams in a large number of situation, both in the vertical and horizontal planes. Besides that, main roof steel structure are can save cost and the work more faster because all material are from factory and on site workers only continue joint the segment.

Lastly, roof is a part very important on a building because each building must use a roof to prevent building from weather condition and roof also can make an building look style, expensive and also can make to expose for people or tourists.

1.2 Objectives

This study is focus on procedure of installation of main trusses

- i) To identify the procedure of main trusses installation.
- ii) To identify the problem of main trusses installation.

1.3 Scope of study

Every building needs a roof to make the building are complete. This report is about how to install of main trusses roofing at Matrade Exhibition Centre. The writer have chosen just focus for the installation of main trusses roof for this report.

1.4 Method of study

i) Observation

Observation which observes at the project site. This one of very good method because clearly brief and explained on how the process works and the installation of main trusses in this construction .

ii) Interview

Another method is interview foreman to get more clearly information and details about the procedures of installation of main trusses works. The writer have interviewed and asked a various questions to Ah sang as a foreman and lots of information had been obtained.

iii) Internet

Internet is a global system of interconnected computer networks that use the standard Internet protocol suite to serve several billion users worldwide. Thus, internet is one of the elements that I used in finding more info about installation of main trusses. It helped on finding the general and as an additional reference to me in getting the information regarding the main trusses installation.

iv) Data record

In order to get an evidence or data record of installation of main trusses report to show about the current progress installation for every weekly and monthly. The data records are very helpful to me as references during the industrial training.

CHAPTER 2

2.0 COMPANY BACKGROUND



2.1 Introduction

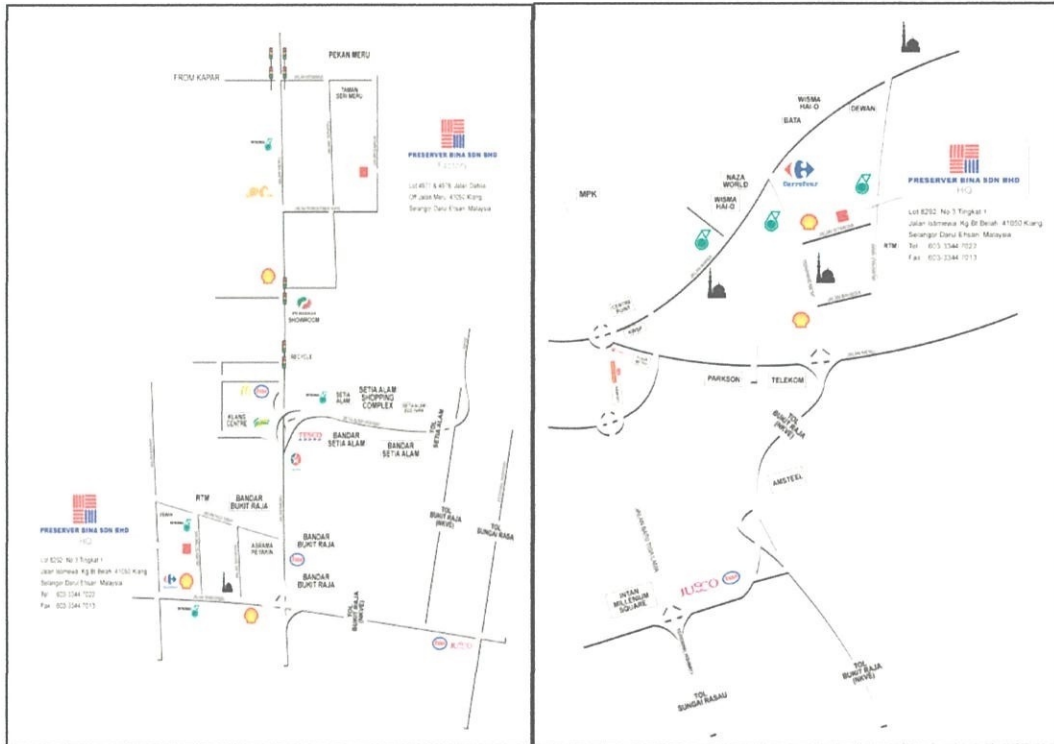
PRESERVER BINA SDN BHD (610805-M) was incorporated in April 2003 as a general contractor with a steel fabrication factory. Its long list of services includes the construction of Factories and Warehouses, Power Generation, Petrochemical and Oleo Chemical Plants, Heavy Equipment Installations, Bridges and Infrastructural, Architectural Steel Structures, Commercial Buildings and High Rise Buildings, High-end Show Units, Bungalows and Residential Buildings. It's registered as a Grade 7 Contractor with the Construction Industry Development Board Malaysia (CIDB) and within a decade, this Company has secured the prestigious ISO 9001:2009 Award.

PRESERVER BINA assures the best performance to deliver results as promised and work towards win-win deals .

This company pioneer more effective and cost-effective construction and engineering methods that produce superior end results. It's channel all breakthrough innovations into developing better solutions to complete projects that meet international standards while fulfilling our client's meticulous requirements.

It's keep abreast with the latest developments by studying market developments and constantly upgrade our manpower skills and machinery, to boost quality, precision, productivity and efficiency. This results in superior quality products, improved services and optimum output.

PRESERVER BINA had a multi-talented team of experts who works cohesively as a single force to provide technical expertise and consultancy. This company can design and tailor-make solutions according what clients needed. Besides have their own Steel Fabrication factory and Head Quarter Office .



Address (Factory)

Lot 4977 & 4978 ,
 Jalan Dahlia , Off Jalan Meru
 41050 Klang , Selangor

Address (Office)

Lot 8292 , No.3 Tingkat 1 ,
 Jalan Istimewa , Kg Batu Belah ,
 41050, Klang, Selangor

2.2 Company Profile

Company Name : Preserver Bina Sdn Bhd

Incorporate On : 1st April 2003

ROC Registration No. : 910805-M

CIDB Registration No. : 0120040628-SL 096423
Grade G7 (unlimited)

Quality Management No. : ISO 9001 :2008
Certificate no. 26998-2008-AQ-MYS-UKAS

Address (office) : Lot 8292 No. 3 Tingkat 1 , Jalan Istimewa ,
Kg Batu Belah . 41050 Klang . Selangor . Malaysia

(factory) : Lot 4977 &4978 Jalan Dahlia Off Jalan Meru ,
41050 Klang , Selangor , Malaysia

Paid- up capital : Rm 1,750,000.00

Authorized capital : Rm 5,000,000.00

Director : - Khoo Beng Aun
- Wong Kok Meng
- Ng Boon Chieng

- Soon Kian Eng

Bankers : United Oversea Bank (UOB)
Ambank (M) Berhad
RHB Bank

Telephone no. :

Fax no. : +603-33447013

Email address : director@pbinasb.org

PROJECT :
 CADANGAN MEREKABENTUK DAN MEMBINA 1 BLOCK PUSAT PAMERAN MATRADE 3 TINGKAT (DOBLE VOLUME) DENGAN 1 I/2 TINGKAT BASEMEN TEMPAT
 LETAK KERETA DI ATAS SEBAGIAN LOT 50978, JALAN DUTAMAS 2, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR.

PROJECT DIRECTOR
 WONG KOK MENG


SENIOR PROJECT MANAGER
 Name : TAN KEAT CHOONG
 Contact No. :



SENIOR PROJECT MANAGER
 Name : YIP YEW JOE
 Contact No. :


SAFETY SUPERVISOR
 Name : SANPATHKUMAR A/L SUPPIAH
 Contact No. :



SAFETY SUPERVISOR
 Name : SASHI KUMAR
 Contact No. :



MAIN ROOF

CONSTRUCTION MANAGER
 Name : MURUGAN SUPRAMANIAN
 Contact No. :



FOREMAN
 Name : THAM KAI SANG
 Contact No. :



CONCOURSE

CONSTRUCTION MANAGER
 Name : LIM KIAN CHAI
 Contact No. :


FOREMAN
 Name : LUM CHEE MENG
 Contact No. :


BOH / EMBEDDED ITEM

PROJECT ENGINEER
 Name : AHMAD SYURAHBIL
 Contact No. :


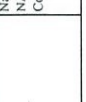
FOREMAN
 Name : GOH HOCK SENG
 Contact No. :



SURVEYOR
 Name : MOHD RIZAL
 Contact No. :



QA / Q C
 Name : ABDUL ZAINI
 Contact No. :

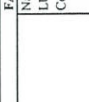

SURVEYOR
 Name : HAFILIZ MUSADDAD
 Contact No. :



QA / Q C
 Name : MOHD FAIZAL
 Contact No. :


SCAFFOLDING SUPERVISOR
 Name : NAGU
 Contact No. :


FOREMAN
 Name : LAI AH CHENG
 Contact No. :


LOGISTIC
 Name : MOHD SYAFIQ
 Contact No. :


LOGISTIC
 Name : MAS MAHMUDI
 Contact No. :



FABRICATION
 Name : LUM KIM CHOON
 Contact No. :



TRAINEE


SYIHERUDDIN
 Contact No. :



SIDEK MOHAMMED KHOLLIL
 Contact No. :



MUHAMMAD FAIZ RAHMAT
 Contact No. :



RIYANTO
 Contact No. :


NUROZZAMAN
 Contact No. :


JAHANGIR
 Contact No. :


MUHAMMAD GHAZALI
 Contact No. :


SUHAIRI MAT ALI
 Contact No. :


MUHAMMAD FAIZ RAHMAT
 Contact No. :


ASADU TAHAJUDDIN
 Contact No. :



MUALIMIN
 Contact No. :



RUZAINI ABD RAHMAN
 Contact No. :



ASADU TAHAJUDDIN
 Contact No. :


MUALIMIN
 Contact No. :


RUZAINI ABD RAHMAN
 Contact No. :


ASADU TAHAJUDDIN
 Contact No. :


MUALIMIN
 Contact No. :


RUZAINI ABD RAHMAN
 Contact No. :


2.2.1 Objective

Preserver Bina Sdn. Bhd. aims to get better and stay ahead from other companies in the industries, so that they can remain as the preferred choice in General Construction, Infrastructural projects and Steel Fabrication.

2.2.2 Mission

Preserver Bina Sdn. Bhd. dedication is to constantly improve in all aspects of operations more than just a daily lived philosophy. It's what keeps Preserver Bina Sdn. Bhd. ahead. This company goes the extra mile, design and delivers what clients expect, and it is backed by a great multi-talented team with ultimate potentials. Together this company will drive to take on the most challenging of projects.

Within a short span of less than a decade, this company has made it mission and become one of the most reliable forces in the industry, by mobilizing they edge of technical expertise to transform every projects assigned into a benchmark of excellence.

2.2.3 Vision

Preserver Bina Sdn. Bhd. aims to keep getting better and stay ahead.

2.2.4 Company Awards

The Awards and accolades Preserver Bina Sdn. Bhd. has won over the years prove their capabilities. Among the significant ones are:

Appendix : The Awards and Accolades



Sources : Preserver Bina SDN BHD website

- 2 Awards from the Malaysia Architects Association (PAM) - Excellence in Architecture - Winning Showroom Building PAM 2007 for the Ameera Residences Sales Gallery.
- Honorary Mention Showroom Building PAM 2007 Awards for Excellence in Architecture for the ONE Menerung Showroom & BRDS Sales Gallery Project.
- Achieved 3,000,000 and 2,000,000 Man hours Without A Lost Time Incident at its Coal Fired Power Plant from TAISEI CORPORATION (in 30th September 2007 and 21st February 2008 respectively).

- Special Recognition as a Specialist Sub-Contractor for The SUNCON GROUP OF COMPANIES' Overseas Projects (Sunway Construction).
- Achieved 2,500,000 Man Hours Without Lost Time Accident Safety Performance For The Superstructure Works - 3A University Technology Petronas, Tronoh, Perak. Recognition by NAMFATT-ZAQ JV (31st March 2004).
- ISO 9001:2008, CONSTRUCTION OF STEEL STRUCTURE.
- Preserver Bina has also won numerous recognition for architectural excellence, outstanding reliability and superior performance from numerous other leading developers.

2.4 List Of Project

2.4.1 Completed Projects

Table 2.1 Completed Projects




Bil	Photo	Project Name
1	 <p>Photo 2.1 Capital square</p>	Capital Square Retail Center, Kuala Lumpur.
2	 <p>Photo 2.2 APM plastic</p>	APM Plastic, Bukit Beruntung.
3	 <p>Photo 2.3 Magnesium smelter plant</p>	Magnesium Smelter Plant, Taiping.

Table 2.2 Completed Projects




Bil	Photo	Project Name
4	 <p data-bbox="421 824 853 857">Photo 2.4 Sime Darby Plantation</p>	Sime Darby Plantation HQ, Damansara.
5	 <p data-bbox="505 1332 766 1366">Photo 2.5 Maybank</p>	Maybank “1 Malaysia Sculpture”
6	 <p data-bbox="399 1812 876 1845">Photo 2.6 The Troika Condominium</p>	The Troika Condominium, Kuala Lumpur.

Table 2.3 Completed Projects



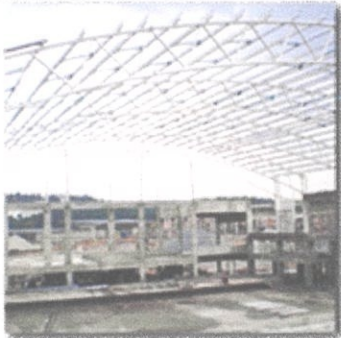
Bil	Photo	Project Name
7	 <p data-bbox="427 831 839 864">Photo 2.7 Oleo Chemical Plant</p>	Oleo Chemical Plant, Kuala Lumpur, Kepong, Port Klang.
8	 <p data-bbox="440 1272 828 1305">Photo 2.8 Aerospace Factory</p>	Aerospace Factory, Subang.
9	 <p data-bbox="531 1727 735 1760">Photo 2.9 GMI</p>	German Malaysia Institute (GMI), Bangi.

Table 2.4 Completed Projects







Bil	Photo	Project Name
10	 <p data-bbox="432 801 836 846">Photo 2.10 Jimah Power Plant</p>	Jimah Power Plant, Negeri Sembilan.
11	 <p data-bbox="400 1288 890 1332">Photo 2.11 Minister Of Legal Affairs</p>	Minister Of Legal Affairs Tower, Port Of Spain.
12	 <p data-bbox="400 1774 906 1818">Photo 2.12 Selangor Dredging Berhad</p>	Selangor Dredging Berhad Show Unit (Ameera)

Table 2.5 Completed Projects

Bil	Photo	Project Name
13	 <p data-bbox="403 813 874 857">Photo 2.13 Three Storey Show Unit</p>	Three Storey Show Unit ONE Menerung, Bangsar.
14	 <p data-bbox="403 1283 890 1328">Photo 2.14 Double Storey Bungalow</p>	Double Storey Bungalow, puchong.
15	 <p data-bbox="419 1765 906 1809">Photo 2.15 Double Storey Bungalow</p>	Double Storey Bungalow, Shah Alam.

2.4.2 Project in Progress

Table 2.6 Project in Progress





Bil.	Photo	Projects Name
1	 <p data-bbox="443 891 826 936">Photo 2.16 Haisung Matrade</p>	<p data-bbox="975 510 1278 544">Haisung Matrade – KL</p> <p data-bbox="975 577 1337 947">Structural Steel Work for Block Pusat Pameran Matrade 3 Tingkat (Double Volume) dengan 1 ½ Tingkat Basement Tempat Letak Kereta for TTDI KI Metropolis Sdn Bhd</p>
2	 <p data-bbox="462 1525 845 1570">Photo 2.17 Haisung Matrade</p>	<p data-bbox="991 1137 1353 1238">Malaysia Academy Of Han Studies - Melaka</p> <p data-bbox="991 1272 1358 1697">Proposed Development of Malaysia Academy Of Han Studies On Lot 10147, Mukim Of Bukit Katil Daerah Melaka Tengah, Hang Tuah Jaya, Melaka For Tetuan Malaysian Acedemy Of Han Studies</p>

Table 2.7 Project in Progress

Bil	Photo	Project Name
3	 <p data-bbox="459 936 807 972">Photo 2.18 A2 Show Unit</p>	<p data-bbox="983 479 1278 562">A2 Show Unit – Johor Bahru</p> <p data-bbox="983 584 1331 949">Cadangan Pembangunan yang Mengandungi 1 Tingkat Pejabat Jualan, 1 Tingkat Cafeteria, Pagar Dinding Keselamatan Dan Satu Unit TNB Sub Compact Di Pilot 11.</p>
4	 <p data-bbox="400 1503 863 1538">Photo 2.19 Prai CCGT Power Plant</p>	<p data-bbox="983 1072 1315 1211">Prai CCGT Power Plant - TNB Northen Energy Berhad</p> <p data-bbox="983 1256 1310 1451">Structural Steel Work for CCGT Power Plant for TNB Northen Energy Berhad</p>

CHAPTER 3

3.0 CASE STUDY

3.1 Introduction

Roof steel structure are divide in two category which is space frame and portal frame. Matrade Exhibition Center project are using roof steel structure and the project use space frame. Preserver Bina Sdn. Bhd. are combine with another contractor is Haisung Civil Engineering. All the material or main trusses are come from Haisung factory in korea and until at site workers just install the main trusses. This project located at Jalan Duta. Preserver Bina also have own factory to fabricate material to used in site.

A truss is a structure composed of slender members joined together at their end points. Planar trusses lie in a single plane. Typically, the joint connections are formed by bolting or welding the end members together to a common plate, called a gusset plate. Besides that, in this project more used welding to joint the connection. In this project are more used steel hollow pipe than I beam because it lighter than used I beam.

In one gridline of main trusses have fourteen segment to install, all the segment must refer on drawing before start installation. All the work or procedure in this project must follow the procedure and target date if the target date late can cause extension of time and got the summons from client.

3.2 Type of Trusses

3.2.1 Pratt Truss

This truss was patented in 1844 by two Boston railway engineers; Caleb Pratt and his son Thomas Willis Pratt. The design uses vertical beams for compression and horizontal beams to respond to tension. What is remarkable about this style is that it remained popular even as wood gave way to iron, and even still as iron gave way to steel.

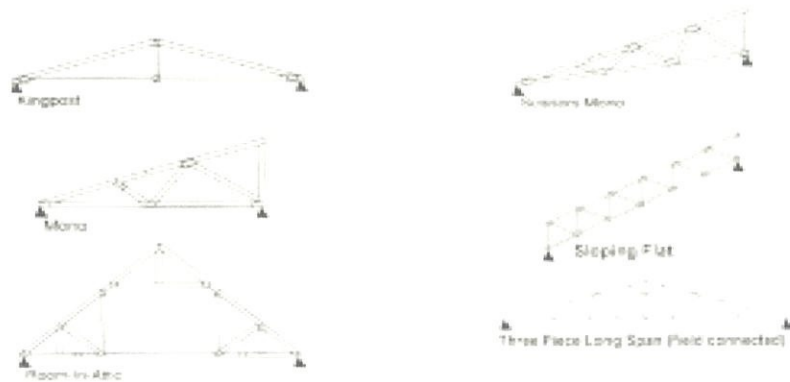


Figure 3.1 Common roof trusses

<http://www.ce.memphis.edu/>

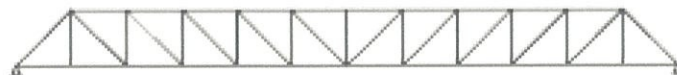


Figure 3.2 Common types of trusses

<http://www.ce.memphis.edu/>

3.2.2 Simple Truss

The simplest framework that is rigid or stable is a triangle. Therefore, a simple truss is constructed starting a basic triangular element and connecting two members to form additional elements. As each additional element of two members is placed on a truss, the number of joints is increased by one.

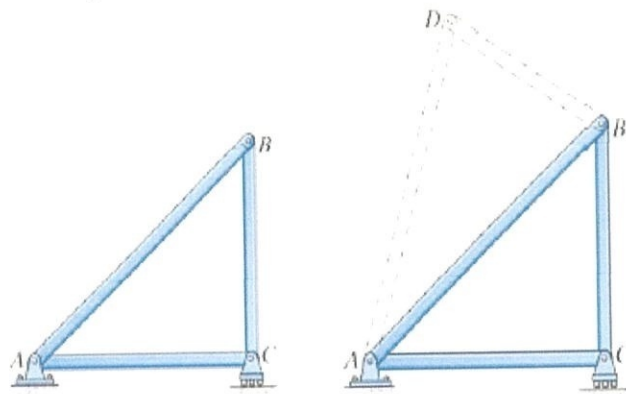


Figure 3.3 Simple truss

<http://www.ce.memphis.edu/>

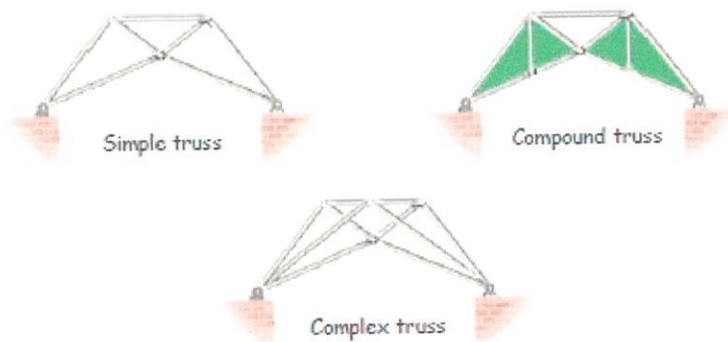


Figure 3.4 Types of trusses

<http://www.ce.memphis.edu/>

3.3 METHOD OF INSTALLATION

3.3.1 Surveying



Photo 3.1 Surveying

Firstly, setting out is the most important in construction before start work. Using this method can get the straight line, coordinate, angle and etc. Before workers start install the supported main trusses, surveyor must take the point first to make sure the supported main trusses want to install is straight and the level same in the drawing.

The equipment for surveying work which is theodolite, it is capable of finding both vertical and horizontal angles, and when is combined with technical studies also can determinate horizontal distance and a differentiation elevations. Next is tripod use for stand the theodolite, and prism used for take the length.

3.3.2 Temporary JIG Support



Photo 3.2 Temporary JIG support

Second, installation of temporary support for main trusses and call it jig. Temporary support is using I beam size 15mm thickness. Every one gridline have fourteen segment for install the main trusses and every one segment use one temporary jig supported. The high of every jig is different because the design of main trusses is curve. Make sure the location of jig is must at the point surveyor marking. The duration to install one temporary support is about 1 hours and need six workers to install.

The equipment used for this jig installation is a bolt and nut size 30x50mm to screw the joint or connection of I beam. Next is used richet to tighten the bolt and nut.

3.3.3 Main Trusses Installation



Photo 3.3 Main Trusses

Next, after all temporary supported jig already install at their point, then main trusses can install step by step. Firstly, workers install the main trusses from middle which is from segment 6 because it can easy for install the next segment and can make sure the main trusses in straight line in their point. In one gridline have 14 segment of main trusses and continued until finish all segment. Every installation main trusses the connection must proper with drawing and inspection. The duration of installation main truss is about 2 hours to 3 hours and need four skilled worker to install.

The equipment used to install main truss is oxy cutter, it used to cut or setting the temporary plate. Next is welding set, before welder weld all of the joint the workers tack weld at the joint as a temporary to hold the segment of main truss.

3.3.4 Bracing Installation



Photo 3.4 Bracing

Next, every connection of main trusses must install bracing it used for make the connection of segment main trusses more strength. Between connections have two bracing install. The duration to install bracing is about 1 hours and need 3 workers for installation.

The equipment used to install the bracing is oxy cutter, at the between of the joint have backing plate. With oxy cutter, cut a little of backing plate and the joint can closed and don't have a gap. Next, use a hammer to tap the connection of bracing to get closed. Grinder also use, it's for grind the ends of bracing to be smooth. The last equipment is welding set, before welder weld all of the joint the workers tack weld at the joint as a temporary to hold the bracing joint.

3.3.5 Diagonal Member Installation



Photo 3.5 Diagonal member

Diagonal member is for put the cable roof at bottom main trusses for give the tension at main trusses more strength and the welding connection not crack. In one gridline have five diagonal member to install. The duration for install diagonal member is about 3 hours and need four workers to install.

The equipment used to install the diagonal member is oxy cutter, at the between of the joint have backing plate. With oxy cutter, cut a little of backing plate and the joint can closed and don't have a gap. Next, use a hammer to tap the connection of diagonal member to get closed. Grinder also use, it's for grind the ends of bracing to be smooth. The last equipment is welding set, before welder weld all of the joint the workers tack weld at the joint as a temporary to hold the diagonal member joint.

3.3.6 Subtruss Installation



Photo 3.6 Subtruss

Install sub truss between two gridline main trusses. The sub truss connect between the main truss. The function of the sub truss is to support load from main trusses. It is an important part for main trusses installation. The duration time of installation is about 5 hours. The installation need five general worker and two certificate welder.

The equipment used to install the subtruss is oxy cutter, at the between of the joint have backing plate. With oxy cutter, cut a little of backing plate and the joint can closed and don't have a gap. Next, use a hammer to tap the connection of segment subtruss to another subtruss to get closed. Next equipment is welding set, before welder weld all of the joint the workers tack weld at the joint as a temporary to hold the bracing joint.

3.3.7 Eaves Truss Installation



Photo 3.7 Eaves truss

Eaves truss is joint for end of both main truss. Eaves truss is an important part of main truss to joint both of main truss at the end. The function of eaves truss is for a joint for two main truss two stand at top column. The duration time to install the eaves truss about 5 hours include repair work. The installation need six general worker and two certificate welder.

The equipment used to install the bracing is oxy cutter, at the between of the joint have backing plate. With oxy cutter, cut or setting the backing plate and the joint can closed and don't have a gap. Next, use a hammer to tap the connection of eaves truss to get closed. Grinder also used, it's for grind the ends of eaves truss to be smooth. The last equipment is welding set, before welder weld all of the joint the workers tack weld at the joint as a temporary to hold the eaves truss joint.

3.3.8 Tapper Column Installation



Photo 3.8 Tapper column

Tapper column is joint of four pipe to one base. The function as a joint to main truss and connected to the base plate tapper column. When the joint one set main trusses finish so they can lifting the whole main truss to the base on the top of the column. The base of tapper column connected to the top on the embedded plate on top of the column. The tapper column connected to base plate column used plate and bolt and nut to joint. The duration to install tapper column to main truss take 3 hours and need 6 worker to install.

The equipment used to install tapper column is richet, use for tighten the bolt and nut at the jointing of tapper column to base plate, mobile crane used lift up the tapper column to connect at main truss and base plate. Next, use jack to setting the tapper column so it can make the workers easy to screw the bolt and nuts.

3.3.9 Purlin Installation



Photo 3.9 Purlin

Purlin is a frame for others contractor to make a finishes of roof top such as cladding. For one main truss need thirty three nos. For installation, before lifting the purlin need to install the purlin bracket, for one purlin need two purlin bracket. After purlin bracket has install they can lift up the purlin to the actual place on top main truss. Next, after the purlin at the actual place so, the welder can start welding the joint. The duration time for install the purlin is about 1 hours and for one main truss take it 5 days to complete included finishing paint.

The equipment used to install purlin is welding set to make temporary tack weld to hold the purlin then used flux-cored welding machines to weld all the jointing purlin to main truss. Tower crane used to lift up the purlin from ground floor to top of main truss.

3.3.10 Fit-up Inspection



Photo 3.10 Fit-up inspection

Inspection fit up is to confirm that the joint of the connection are follow the specification from the approval drawing. All the inspection is from welder inspector they use inspection test plan (ITP) based on American Welding Society (AWS D1.1) to measure all the dimensional of the connection. Before the inspector inspect the joint the worker weld to plate for each pipe and jointing used bolt and nut to make sure the joint was in the place. After the inspection pass the welder can start to welding the joint. This inspection take about 5 minutes to inspect and two inspector certificate.

The equipment used for fit-up inspection is welding gauge, it's for measure Weld Throat Thickness, Butt Fillet Type Welds, Weld Length, Misalignments (High-Low), and much more depending upon the Gauge selected. Next, calliper use for check the gap of jointing.

3.3.11 Welding



Photo 3.11 Welding

Firstly, need a certificate welder to make sure all the joint and welded parts follow the American Welding Specification (AWS) and their classification according to material. Each of joint need to be weld by layer to layer. One joint need three layer for give more strengthen to the joint. For pass the strengthen test by inspector the thickness must be at 3mm-4mm follow the Inspection Test Plan (ITP). The duration for complete one joint according size of diameter of the pipe. Normally it take 2 hours to complete weld hole diameter of the pipe. For one joint need one certificate welder and two helper.

The equipment used for welding is welding set flux-core and weld the jointing with three layer or 'capping'. Then, used grinder to grind the welding to make the joint smooth and remove spatter.

3.3.12 Ultrasonic Inspection



Photo 3.12 Ultrasonic inspection (UT)

Ultrasonic test inspection is for to check the thickness of the weld layer to make sure the thickness follow the Inspection Test Plan (ITP). Normally, this test use Ultrasonic and operate by certificate inspector. All the data was collected and can be approve the welder part is passed. The ultrasonic operate by sending vibration wave to the welding part and sending data to the ultrasonic reader.

The equipment used for ultrasonic inspection (UTI) is brush, cuplant and ultrasonic test machine.

3.3.13 Jacking Of Main Truss



Photo 3.13 Jacking of main truss

The last method of main truss is by jacking by main truss using hydraulic lifting hoist that can lift weight about 160 tone. It takes several hour to lift the main truss from the floor to the top of the column. To make sure the safety while jacking this huge parts it must to be observe by Jabatan Kesihatan Dan Kebajikan Pekerja (JKKP) and the area must be barricaded. This is one of the important procedure to jacking the main truss by using hydraulic lifting hoist.

The equipment used to jacking of main truss is hydraulic lifting hoist, high tension cable and motor.

3.4 PROBLEM AND SOLUTION OF MAIN TRUSSES INSTALLATION

3.4.1 Welding spatter



Photo 3.14 Welding spatter

Problem in this joint is welding at the segment is not proper with American Welding Specification (AWS) because the joint have a spatter and the welding must be clear. Inspector cannot to inspect if the jointing have spatter and rusty. All joint want to inspect must clear with welding spatter and rusty.



Photo 3.15 Welding spatter removal

The solution to solve is used grinder and remove all spatter welding and power brush. After all joint welding already grinder and power brush, inspector can checking the jointing. The equipment used to repair welding spatter is used grinder and power brush. This repair work need one worker only and duration to finish is about 30 minutes.

3.4.2 Backing plate



Photo 3.16 Backing plate repair

Problems that often occur when connecting the segment of main truss the backing plate difficult to install at the jointing with another segment closely. The gap of the joint is not follow the American Welding Specification (AWS) so it must repair before proceed the next procedure is welding.



Photo 3.17 Backing plate repair

The solution to solve this problem of backing plate at the jointing is repair the connection and take a backing plate and then connect in this joint so the gap can be closed. The duration time to connect the backing plate is about 2 hours and need three workers to repair. The equipment for repair this backing plate use welding set for tack weld the bracing to hold at the joint and use oxy cutter for cut the backing plate if too long.

3.4.3 High and low jointing



Photo 3.18 High and low jointing

High and low jointing is must proper with Inspection Test Plan (ITP) based on American Welding Society. The minimum high and low based on (ITP) is 2mm-4mm. If the joint above so inspection for fit-up cannot pass and welder cannot to start welding.

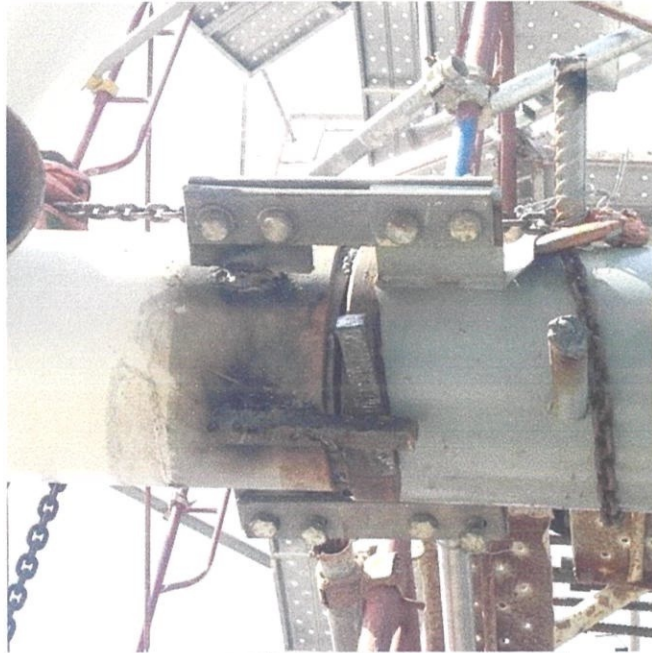


Photo 3.19 High and low repair work

The solution to solve this problem is repair the high and low until the jointing does not have a gap and the jointing can pass from Inspection Fit-up Test. The duration to repair is about 1 hours and need two workers to repair. The equipment for repair this hig and low is hammer to setting the high and low until the joint straight and can pass from inspection fit-up and use welding set machine.

CHAPTER 4

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

From the study, it can be concluded that the construction of installation of main trusses for the certain building is very suitable and provides good support for the building itself. The installation of main trusses is quite difficult as it looks by the writer. It involves more skilled workers and some unskilled workers because roof is part important in building and it's a part a highly in one building and have risk to do the main trusses installation. This work began with constructing the safety statistics to facilitate the employees to do the work that has been given by his bosses. This is to ensure the safety and security of workers can reduce exposure to volume risk dangers.

The construction of installation of main trusses required difficult to install process so need to be done precisely to avoid any misplacing and follow the procedure of installation of main trusses. The writer found that this method is very suitable to build up the roof structure using steel pipe all roof top because this roof steel structure look very nice to do expose for people look its amazing. All the main trusses components must be placed accordingly to their specifications and positions based on the procedures provide.

4.2 Recommendations

Therefore, the writer would suggest improvement of delivery material from factory to site. The material must follow the schedule to send the material on site so work at site smoothly. Second, unchecked material. All material delivered on site send by the truck must be carefully checked and the material ordered shall be the same as the request ordered. Next is roof storage. After the material already checking so the workers must already provide a place to put the material ordered so it can make the procedure material delivered be easy and faster. Lastly is unchecked truss segment from foreman with carefully and refer from drawing before want to install because it for prevent from wrong segment installation.

REFERENCES

Admin. (2004, April 3). Analysis of roof structure. Available from:
<http://www.ce.memphis.edu>

Structural principle. (2014). Structure steel trusses. Available from:
<http://www.tatasteelconstruction.com>


Ambrose, J. (1994). Design Of Building Trusses. Third Avenue, New York, NY.

APPENDICES

Appendix A: Permit To Work Form

It's Possible DAEWOO E&C		PERMIT TO WORK (COLD WORK ONLY)	
SECTION 1 - REQUESTION (Subcontractor)		PTW NO:	
APPLICANT'S NAME: <u>RIZAINI</u>	ID NO.:	DATE: <u>31/5/15</u>	AREA CLASSIFICATION (Tick appropriate boxes)
SECTION DEPARTMENT: <u>STEEL STRUCTURE</u>	LOCATION: <u>CONCRESE LOWER</u>	<input checked="" type="checkbox"/> OPEN AREA	<input type="checkbox"/> ENCLOSED AREA
SPECIFIC WORKSITE: <u>CONCRESE AREA</u>	PROJ. MATRADE: <u>EXHIBITION CENTRE</u>	<input type="checkbox"/> COVERED AREA	<input checked="" type="checkbox"/> ELEVATED AREA
DESCRIPTIONS OF WORK: (Attach if details of workscope required) <u>CONCRESE AREA CLIPPING</u>			
SECTION 2 - HAZARDOUS ACTIVITIES (Subcontractor) (Tick appropriate boxes)			
<input type="checkbox"/> Pressure testing	<input checked="" type="checkbox"/> Working at height	<input checked="" type="checkbox"/> Lifting (non/lifting routine)	<input type="checkbox"/> Washdown (use of water)
<input type="checkbox"/> Excavation/Trenching	<input type="checkbox"/> Cable pulling/installation	<input type="checkbox"/> Material transporting	<input type="checkbox"/> Earthwork/concrete work
<input type="checkbox"/> Scaffolding	<input type="checkbox"/> Grouting activities	<input type="checkbox"/> Grating activities (removal/trial fit)	<input type="checkbox"/> Others (specify)
SECTION 3 - WORKSITE PREPARATION & PRECAUTION (Subcontractor) (Tick appropriate boxes)			
A. BASIC REQUIREMENT			
<input checked="" type="checkbox"/> Warning signs/Notions	<input checked="" type="checkbox"/> Lighting required	<input checked="" type="checkbox"/> Toolbox Meeting	<input type="checkbox"/> Intrinsically safe tools
<input checked="" type="checkbox"/> Area barricaded/conditioned	<input checked="" type="checkbox"/> JSA briefing	<input checked="" type="checkbox"/> Clear access/egress	<input type="checkbox"/> Falling hazards identified/controlled
<input checked="" type="checkbox"/> Scaffolding required	<input checked="" type="checkbox"/> House-keeping	<input type="checkbox"/> No incompatible work within the vicinity	<input type="checkbox"/> Others
B. CLEARANCE OF PROCESS MATERIALS (Tick appropriate boxes)			
<input type="checkbox"/> Depressurization	<input type="checkbox"/> Draining	<input type="checkbox"/> Purging	<input type="checkbox"/> Nitrogen/Air
C. ISOLATION (Tick Boxes)			
<input type="checkbox"/> Instr. power supply	<input type="checkbox"/> Block and bleed	<input type="checkbox"/> Stoppers	<input type="checkbox"/> Spades and blinds
<input type="checkbox"/> Mechanical isolation	<input type="checkbox"/> Electrical isolation	<input type="checkbox"/> Cathodic protection	<input type="checkbox"/> Radiation sources
<input type="checkbox"/> Physical separation	<input type="checkbox"/> Pneum/hydr. supply		
SECTION 4 - PERSONAL PROTECTIVE EQUIPMENT (Subcontractor) (Tick appropriate boxes)			
<input checked="" type="checkbox"/> Safety Helmet & chin strap	<input checked="" type="checkbox"/> Respiratory Protection	<input type="checkbox"/> Eye & Face Protection	<input type="checkbox"/> Appropriate Hand Protection
<input type="checkbox"/> Jacket/Long sleeves	<input type="checkbox"/> Dust mask	<input type="checkbox"/> Goggles (cup type)	<input type="checkbox"/> Cotton gloves
<input type="checkbox"/> Safety Boots	<input type="checkbox"/> Half-face respirator	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Leather gloves
<input type="checkbox"/> Safety Glasses	<input type="checkbox"/> Full-face respirator	<input type="checkbox"/> Hearing Protection	<input type="checkbox"/> Rubbers/chemical gloves
<input type="checkbox"/> Others	<input type="checkbox"/> SCBA/Airline	<input type="checkbox"/> Ear plugs	<input type="checkbox"/> Fall Protection
	<input type="checkbox"/> Body Protection	<input type="checkbox"/> Ear muffs	<input type="checkbox"/> Full body harness
	<input type="checkbox"/> Chemical suit		<input type="checkbox"/> Fall arrest equipment
	<input type="checkbox"/> Apron		
SECTION 5 - JOINT SITE VISIT BEFORE WORK COMMENCES (Main Contractor and Subcontractor's Representative)			
I understand the precautions specified in Section 3 and accept all responsibilities for the work stated in Section 1		I understand the precautions specified in Section 3 and have personally/fully carried them out.	
Subcontractor's Rep: <u>RIZAINI</u>	Date: <u>31/5/2015</u>	Main Contractor's Rep: <u>TAVIG</u>	Date: <u>31/5/2015</u>
Signature: _____	Time: <u>9:00 am</u>	Signature: _____	Time: <u>10:50 am</u>
SECTION 6 - CLEARANCE APPROVAL			
A. VERIFICATION BY HSES DEPARTMENT			
The above location was checked and found to be:			
<input type="checkbox"/> SAFE for above Type of Work	<input type="checkbox"/> NOT SAFE for above Type of Work		
Name: <u>ALZAT</u>	Signature: _____	Date: <u>31/5/2015</u>	Time: <u>10:00 am</u>
SECTION 7 - WORKING IN CONFINED SPACE (Tick appropriate boxes)			
<input type="checkbox"/> A. A Gas Test is REQUIRED	<input type="checkbox"/> NOT REQUIRED	<input type="checkbox"/> B. Confined space entry checklist to be attached	<input type="checkbox"/> NOT REQUIRED
SECTION 8 - PERMIT SUSPENSION/REVALIDATION			
HSES Department and Subcontractor must endorse this section by signing to confirm that the conditions of work detailed in Sections 1 to 4 and Section 6 of this permit have not changed and still applied and/or confirmed work has stopped and made safe by Subcontractor before revalidate/revoke the suspension			
SUSPENSION/REVALIDATE		REMARKS	
Time			
Date			
Work Leader			
HSE Department			
SECTION 9 - HANDBACK			
No further work may be undertaken when any one of the signatures has been made to this permit.			
A. PERMIT APPLICANT			
Work has stopped. Condition/system has been re-instated and the area has been restored to safe and operational condition.			
Name: _____	Signature: _____	Date: _____	Time: _____
B. MAIN CONTRACTOR'S REPRESENTATIVE		C. HSES DEPARTMENT	
I am satisfied that the work has stopped. Worksite has been restored to a safe condition.		I am satisfied with the worksite restored to safe condition	
Name: <u>ANDY</u>	Date: <u>31/5/2015</u>	Name: <u>JOI YIP JOE</u>	Date: <u>31/5/2015</u>
Signature: _____	Time: <u>11:00 am</u>	Signature: _____	Time: <u>11:05 am</u>
SECTION 10 - PERMIT DISTRIBUTION			
The permit shall be distributed strictly. Other party who requires a copy shall make a photostat copy. All entries shall be made on the original copy.			
Original copy: Subcontractor		Copy 1: Displayed at Worksite	
		Copy 2: HSES Department	
Original copy to be signed and submitted to HSES Dept after work completion.			

Appendix B: Request For Inspection Form



MINISTRY OF WORKS AND TRANSPORT
GOVERNMENT OF KENYA

REQUEST FOR INSPECTION FORM

Submission Title: Structural Steelworks		Scheme/Project Name: []	
Level: []	Zone: []	Attachment: []	
Structure: []	Gridline: []	Prepare By: []	POST: []

Inspection Items	Checked Conformance				Remarks
	Inspection		Corrective		
	Accept (A)	Reject (R)	Accept (A)	Reject (R)	
General					
Drawing No					
Location					
Approved Shop Drawing No					
Shop Fabrication Inspection					
Date					
Steel Sizes					
Storage					
Welding					
Cutting					
Camber Provided					
Rust Cleaning					
Shop Painting 1st Coat (thickness/color)					
Shop Painting 2nd Coat (thickness/color)					
Site Erection					
Level					
Alignment					
Bolts, Nuts & Washer					
Site Member welding					
Stud Welding					
Site Painting					
Fire Protection					
Type					
Specified Thickness					
Cable Installation					
Surface of Cable					
Joint Cable Set and Lug Plate					
Bolt and Pin and Pin Cover					
Bolt of lock Cover					

1st Requested Date: []	Requested Time: []
2nd Requested Date: []	Requested Time: []

<input type="checkbox"/> Inspection passed. Work allowed to proceed <input type="checkbox"/> Inspection failed. Remedial work and re-inspection required. New request for inspection to be submitted. <input type="checkbox"/> Inspection postponed. New request for inspection to be submitted.	Checked and inspected by: (COW/RE) Name: [] Date: [] Signature: [] Remarks: []
--	---

Supervision by:	Submitted by:	Received by:	Approved by:
Name: []	Name: []	Name: []	Name: []
Date: []	Date: []	Date: []	Date: []
Sign: []	Sign: []	Sign: []	Sign: []
DEC SUPERVISOR/ENGINEER	DEC ENGINEER	COW/RESIDENT ENGINEER	RESIDENT ENGINEER

Form No. COW/RE/2011/001/R

Appendix C: Management System Certificate

	
DET NORSKE VERITAS	
MANAGEMENT SYSTEM CERTIFICATE	
Certificate No. 26998-2008-AQ-SNG-UKAS	
<i>This is to certify that the Management System of</i>	
PRESERVER BINA SDN. BHD.	
(610805-M)	
at	
Lot 116, Batu 3 1/2, Jalan Kapar, 07100, Klang, Selangor Darul Usson, Malaysia	
<i>has been found to conform to</i>	
ISO 9001:2000	
<i>This Certificate is valid for the following product or service ranges:</i>	
CONSTRUCTION OF STEEL STRUCTURE	
<i>Issue / Certification date</i> 20 November 2008	<i>Place and date</i> Singapore, 20 November 2008
<i>The Certificate is valid until</i> 20 November 2011	<i>For the Issuing Unit</i> DNV CERTIFICATION B.V., THE NETHERLANDS
<i>The audit has been performed under the supervision of</i> Syed Arizan Syed Hashim Lead Auditor	 053 Tan Gok Eng Management Representative
<small>Lack of fulfillment of conditions as set out in the Certification Agreement may result in the Certificate being suspended or the Certificate being withdrawn. For further information, contact DNV Certification, 2008-2011</small>	

THIS DRAWING IS COPYRIGHT © 2012 BY PERSEKUTUAN TETUAN TTDI KL METROPOLIS SDN. BHD. ALL RIGHTS RESERVED. NO PART OF THIS DRAWING MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF PERSEKUTUAN TETUAN TTDI KL METROPOLIS SDN. BHD.

REVISION		
NO.	REVISION	DATE

DRAWING INFORMATION	
NO.	DESCRIPTION

SHOP DWG

TAKSIR CADANGAN:
 CADANGAN MEREKABENTUK DAN MEMBINA 1 BLOK PUSAT PAMERAN MATRAJE 3 TINGKAT (DOUBLE VOLUME) DENGAN 1% TINGKAT BASEMEN TEMPAT LETAK KERETA DI ATAS SEBAHAGIAN LOT 50978, JALAN DUITAMAS 2, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR.

UNTUK:
 TETUAN TTDI KL METROPOLIS SDN. BHD.

FEMILIK:
 MINISTRY OF INTERNATIONAL TRADE AND INDUSTRY (MITI)
 BLOK 16, COMPLEKS PERANGKUTAN BANGUNAN JALAN DUTA, 50488, KUALA LUMPUR. FONE 65-6213 2327 Faks. 65-6213 2327

PEMAJL:
 TTDI KL METROPOLIS SDN. BHD. (6889-1-9)
 No. 1, JALAN WISMA 13/71, SEKTOR 11, MUKIM BATU, MUKIM BATU, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR. FONE 65-3101 8333 Faks. 65-3101 8333

PEANGKURUS PROJEK:
 NRY Architects Sdn. Bhd. (6879-4)
 NRY ARCHITECTS P/M Link Pte. Ltd.
 No. 1, JALAN WISMA 13/71, SEKTOR 11, MUKIM BATU, MUKIM BATU, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR. FONE 65-3101 8333 Faks. 65-3101 8333

ARKITEK:
 RSP Architects Sdn. Bhd. (6879-9)
 RSP ARCHITECTS P/M Link Pte. Ltd.
 No. 1, JALAN WISMA 13/71, SEKTOR 11, MUKIM BATU, MUKIM BATU, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR. FONE 65-3101 8333 Faks. 65-3101 8333

JURUTERA STRUKTUR & AWAM:
 TYLIN INTERNATIONAL SDN. BHD. (6881-9)
 Tylin International Sdn. Bhd.
 No. 1, JALAN WISMA 13/71, SEKTOR 11, MUKIM BATU, MUKIM BATU, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR. FONE 65-3101 8333 Faks. 65-3101 8333

JURUTERA PERUNDING MEKANIKAL & ELEKTRIKAL:
 COITRE INTERNATIONAL (6879-8)
 PERUNDING KOTREK SDN. BHD.
 No. 1, JALAN WISMA 13/71, SEKTOR 11, MUKIM BATU, MUKIM BATU, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR. FONE 65-3101 8333 Faks. 65-3101 8333

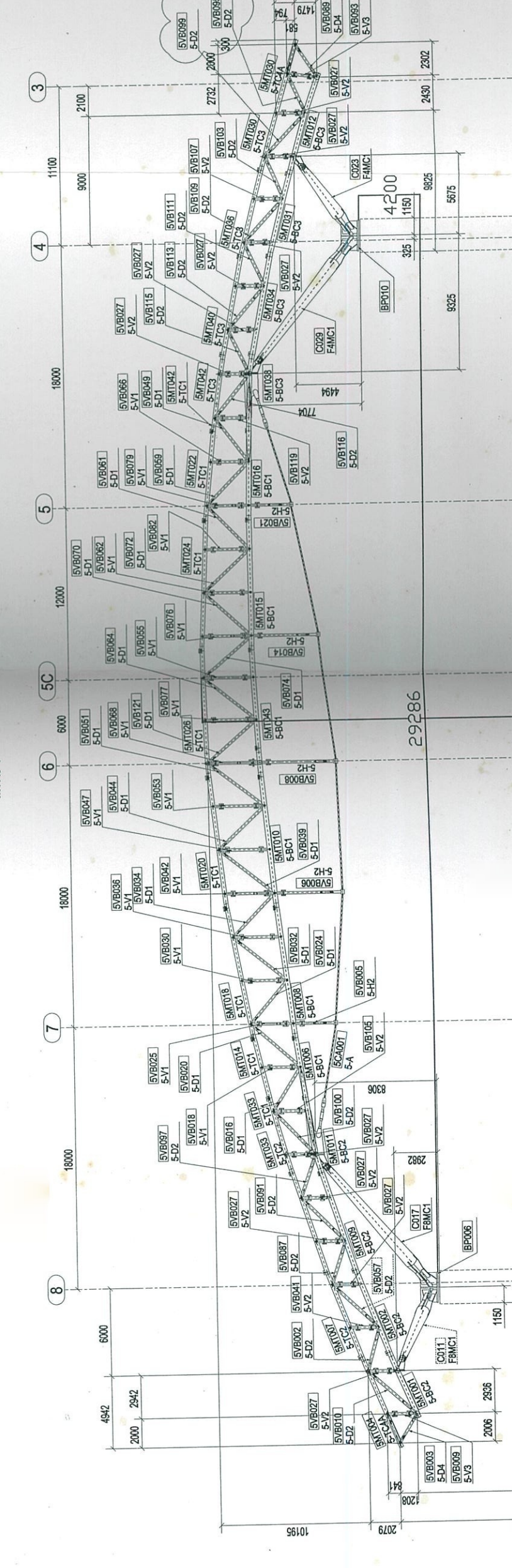
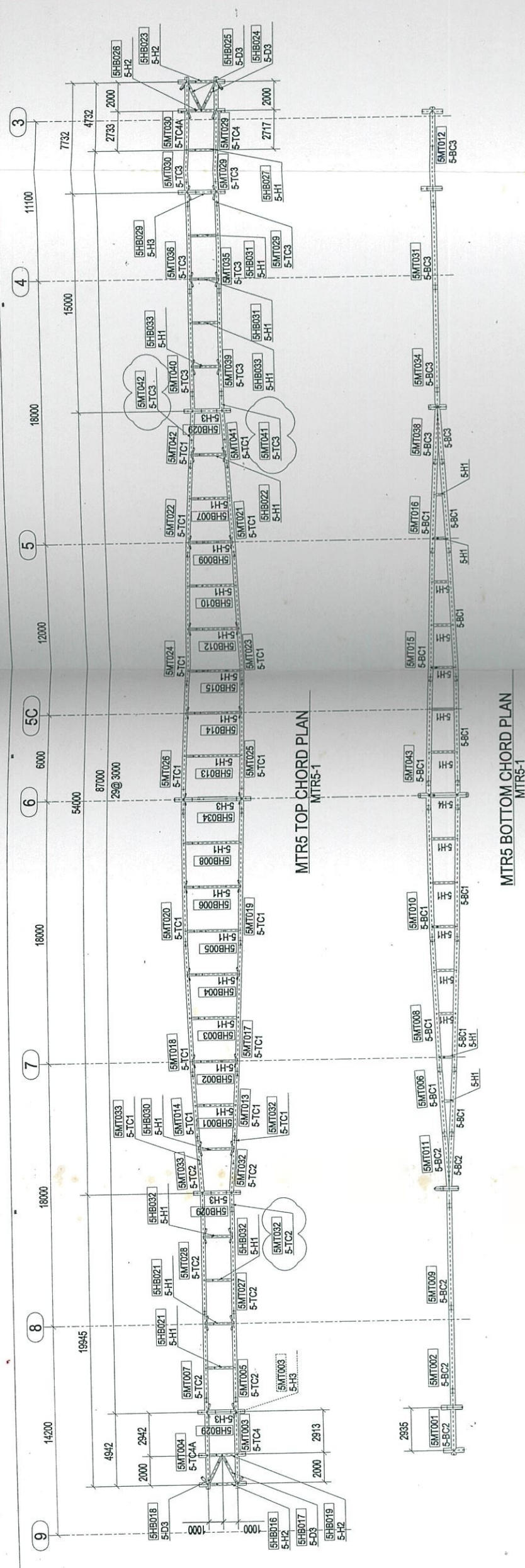
ARKITEK LANDSKAP:
 THE BLO GROUP ASIA SDN. BHD. (6879-0)
 THE BLO GROUP Asia Sdn. Bhd.
 No. 1, JALAN WISMA 13/71, SEKTOR 11, MUKIM BATU, MUKIM BATU, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR. FONE 65-3101 8333 Faks. 65-3101 8333

JURUKUR BAHAN:
 LUB M SDN. BHD. (6879-0)
 LUB M SDN. Bhd.
 No. 1, JALAN WISMA 13/71, SEKTOR 11, MUKIM BATU, MUKIM BATU, MUKIM BATU, WILAYAH PERSEKUTUAN KUALA LUMPUR. FONE 65-3101 8333 Faks. 65-3101 8333

SUB KONTRAKTOR UTAMA:
 HUISING Engineering Co. Ltd.
 F101 TAMBAH T WALKY 197-A, 0250-2084,
 6300-81, SINGAPORE, SINGAPORE. FONE 65-3-735-0088 Faks. 65-3-735-0088

TALK LUNSAN:
 HAISUNG Engineering Co. Ltd.

DRAWING INFORMATION	
NO.	DESCRIPTION



MTR5 MAIN TRUSS ELECTION-1 - A-EMTR5-1

DATE: 2012.12.13
 SCALE: 1:100
 DRAWN BY: C.S.K
 CHECKED BY:
 FILE NAME:
 NO. OF SHEETS: 1
 OF TOTAL SHEETS: 2

REVISION

MEC CCAS/DEC2012/SP/D A-EMTR5-1 2

NO EXCEPTION TAKEN

MAKE CORRECTIONS NOTED

REVISED AND RESUBMIT.

FOR RECORD PURPOSE

SUBMIT SPECIFIED ITEM

Ref.

Checking is only for general compliance with the design concept of the project and the contract documents. It does not constitute a guarantee, warranty or assumption of liability by the Engineer. Any errors or omissions shall be the responsibility of the Contractor. The Contractor shall be responsible for the adequacy of the design and construction details. The Contractor shall be responsible for the safety of the work and the performance of the work.

T.Y. LIN INTERNATIONAL SDN BHD
 By
 Date

NOTE: MATERIAL LIST TO REFER DRAWING NO.: A-EMTR5-2