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INSPECTION OF QUALITY STANDARD SPECIFICATIONS FOR BUILDING WORKS

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ABSTRACT

Practical training at the Pengurusan Air Pahang Berhad (PAIP) HQ building, and placed in the “Unit Perolehan dan Pengurusan Projek”. The introduction of firm organization and project. Describe or exposure the projects being undertaken by the firm. This company as one of the government building to serve all the people, particularly in water management.

In engineering activities inspection involves the measurements, tests, and gauges applied to certain characteristics in regard to an object or activity. Addition, to monitor method that use by contractor at site project. Quality of material also very important in construction. Superintendent Officer monitoring the quality of work and materials used during construction so that contractors do not mistakenly use materials approved by superintendent officer. The results are usually compared to specified requirements and standards for determining whether the item or activity is in line with these targets, often with a Standard Inspection Procedure in place to ensure consistent checking.

The implementation of government projects involving the cooperation of many parties such as customer agency, Jabatan Kerja Raya Malaysia (JKR), consultants, contractors and suppliers. The approval of management and quality of materials used according to specifications. This project used Jabatan Kerja Raya Malaysia (JKR) Standard Specifications for Building Works. Inspecting the quality of materials used with Superintendent Officer S.O. Task of Superintendent Officer S.O also is making a list of materials and substances approval in accordance with the requirements set.

Problem Statement Since there is no system of effective management of the construction site, various problems arise which cause losses to the contractor but to the owners and the general public in particular. Therefore, to avoid or reduce the risk, effective management systems need to be practiced widely. The objective of the management of the construction site must have clear objectives in the organization.

1.1 INTRODUCTION

First at the all thanks to Allah above because the grace and permission, I completed training this industry training successfully. I feel very happy because this training begins with good and qualified. It was smooth as expected.

This industrial training is a requirement of a compulsory for all student of the Faculty of Building Surveying Universiti Teknologi Mara before being considered for a Diploma. Each student must pass before obtaining industrial training diploma. Students who fail must repeat the training industry. Therefore, I have to comply with all the conditions set by the UITM and my company.

Each explanation and complete information of the company. I may not undergo industrial training well and smoothly. In addition, I can also prepare a report book industry according to a predetermined format. Industry training also gives a lot of experience and new knowledge to me. In addition, I also can practice the knowledge acquired. Industrial training is also able to form my self-confidence to face the new millennium where in the future we will face many challenges and obstacles.

1.2 OBJECTIVE OF STUDY

This report is prepared to provide any procedure related with inspection of quality standards specifications for building works that practically involved during my practical training. There is the objective of the study is:

- To identify the methods of project management.
- To study the definition of inspection works in construction.
- To know about the materials used and methods used in the construction.
- To study the purpose of inspection works during construction stage.

1.3 COMPANY BACKGROUND



Figure 1.3.1 : Pengurusan Air Pahang Berhad (PAIP)

Pengurusan Air Pahang Berhad (PAIP) was officially established on February 1, 2012 through corporatisation of Jabatan Bekalan Air Pahang (JBAP) and is a wholly owned subsidiary of Pahang State. Jabatan Bekalan Air Pahang (JBAP) with the State Government to officially hand over the operation, maintenance, supplies, clean water and collect revenue from the sale of clean water that had been controlled by Jabatan Bekalan Air (JBAP) to Pengurusan Air Pahang Berhad (PAIP).

Pengurusan Air Pahang Berhad (PAIP) has been licensed by Suruhanjaya Perkhidmatan Air Negara (SPAN) as operator of water supply to the Pahang State in accordance with the provisions of Act 655 (Water Services Industry Act 2006). Thus, Pengurusan Air Pahang Berhad (PAIP) serves to give a clean water supply services in satisfactory in terms of quantity and quality to consumers in the most economical way to meet the needs of social and economic development of the Pahang State.

In addition, Pengurusan Air Pahang Berhad (PAIP) is also responsible for the planning, development and management of Water Supply System in addition to

billing and collection of water on behalf of the State Government of Pahang. Pengurusan Air Pahang Berhad (PAIP) also acts as an advisor or consultant to Pahang State Government on matters affecting the water supply industry.

Pengurusan Air Pahang Berhad (PAIP) has conducted the affairs of all time job application online through the website *ejob.paip.com.my*. With this method, Pengurusan Air Pahang Berhad (PAIP) no longer advertise their vacancies before recruitment takes place. Only candidates who apply through the website shortlisted for the job will be called for interviews.

eJob applications through the system will be registered in the data bank PAIP Berhad. The validity period of register is 12 months, if the applicant was not shortlisted for interview within 12 months from the date of the last update, applicants need to register if still interested in updating the data of the applicant.

1.4 SUMMARY

Interview session with the in-charge person at the Pengurusan Air Pahang Berhad (PAIP) HQ building, and placed in the “Unit Perolehan dan Pengurusan Projek”. The introduction of firm organization and project. Describe or exposure the projects being undertaken by the firm. For example, a project undertaken is build the plant, pumps, piping and build the operations center at Daerah Bera. This company as one of the government building to serve all the people, particularly in water management.

CHAPTER 2 : LITERATURE REVIEW

2.1 OVERVIEW OF JKR STANDARD SPECIFICATIONS FOR BUILDING WORKS

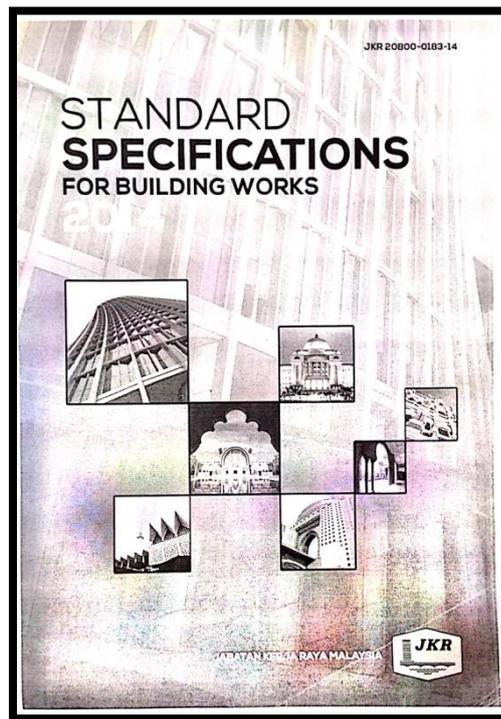


Figure 2.1.1 : JKR Standard Specifications for Building Works

Jabatan Kerja Raya (JKR) Standard Specifications for Building Works is a system project delivery in which one entity which the contractor is responsible entirely on the design, construction, supervision, testing and commissioning, setup and maintain during the period of maintenance as provided in the contract and according to specifications. JKR project implementation is a project delivery system where a contracting entity which is solely responsible for the design, construction, supervision, testing and commissioning, setup and maintain during the period of maintenance as provided in the contract.

Implementation of the conventional method in which responsibility is shared by the project owners, designers and contractors and will require coordination and effective communication. The contractor must appoint or qualified as a design consultant to manage and take responsibility of professionals in the design and construction supervision.

Implementation of the project on the concept offers several advantages in terms of control over the implementation period, the integration between designers and builders, improving relationships, decisions are made more quickly and the project team have an incentive to control overall costs. Liability implementation of the project as a whole is on the contractor. Government contractors to ensure that the design and the completed work is complete and free from any inadequacy, failure or / and disability. Any costs or delays caused by the imperfection of the design will be borne by the contractor. JKR role and responsibilities in the project as a developer and supervisor project to the customer departments only. While professional responsibility is the contractor fully.

2.2 DEFINITION OF QUALITY INSPECTION STANDARD SPECIFICATIONS

Is a quality inspection standard specifications for building works process to ensure that products comply with the contract accepted Jabatan Kerja Raya (JKR). The scope of this investigation includes a thorough examination of the product components, inventory checks; preparation of lists of defects and works delayed; the lists must be confirmed by the architect / engineer / certified professional where appropriate. In each stage of the project construction activities are the responsibility of the contractor and the Jabatan Kerja Raya (JKR), especially Superintendent Officer S.O should emphasize the monitoring of the implementation in accordance with the work program and check the quality of work to ensure the project is completed by the contractor to achieve the objectives set and the satisfaction of the customer.

2.3 PURPOSE OF QUALITY INSPECTION STANDARD SPECIFICATIONS

Quality inspection is most generally, an organized examination or formal evaluation exercise. In engineering activities inspection involves the measurements, tests, and gauges applied to certain characteristics in regard to an object or activity. Addition, to monitor method that use by contractor at site project. Quality of material also very important in construction. Superintendent Officer shall monitor the quality of work and materials used during construction so that contractors do not mistakenly use materials approved by superintendent officer. The results are usually compared to specified requirements and standards for determining whether the item or activity is in line with these targets, often with a Standard Inspection Procedure in place to ensure consistent checking. Inspections are usually non-destructive.

2.4 CONCEPT OF QUALITY MANAGEMENT IN QUALITY STANDARD SPECIFICATIONS

The concept of material and quality management should contain the basis for quality management, namely:

- i. Quality Planning (QP),
- ii. Quality Assurance (QA)
- iii. Quality Control (QC)

Quality Planning (QP) is planning activities, criteria and resources in the care of achievement of the objectives and requirements of material quality is documented as a guide during the execution of a project.

Quality Assurance (QA) is a well-planned program that includes policies, procedures, responsibilities, systematic action including inspection, testing and necessary to ensure that audit quality management program and results meet the conditions of the contract.

Quality Control (QC) is an action taken by contractors to inspect, witness, supervise and examine all the construction and installation process to ensure compliance to specifications and management plans quality.

QAS documents will be used by the contractors and consultants to plan, implement, monitor and control the construction work to ensure quality objectives can be achieved.

Quality Inspection Not Meet Specifications:

Material is the result of the services provided, including the level processing such as painting, design, tender documents, contract documents, components of the project during the construction product and the final product of a project.

Materials that do not meet specifications is materials that do not comply with the requirements stated in the specifications, codes, standards, project brief and relevant legislation which stipulated in the contract.

The control material and quality is not to satisfy the specifications of procedures for ensure that the material does not meet the specifications identified, controlled, isolated and taken corrective action so that the material received only delivered to customer.

2.5 THE IMPORTANCE OF THE QUALITY ASSURANCE SYSTEM IN QUALITY INSPECTION STANDARD SPECIFICATIONS

Document Quality Assurance System (QAS) is involved in all processes such as planning, implementation, monitoring and quality control for all scope of work. For example, the consultant will make planning, inspection and testing, and acceptance of a product based on the Plan of Inspection & Testing. Inspection of the construction works will be carried out as they proceed to verify compliance with the requirements of the contract documents.

Site inspectors (or clerks of works) may be provided as an additional service by the existing consultant team, or could be new appointments. They may be based on site permanently or may make regular visits. On large projects it may be appropriate to have separate site inspectors for mechanical and electrical services, structural works and architectural works. Specialist inspections may also be necessary for specific aspects of the project such as; the client's environmental policy, site waste management plan, accessibility and so on.

Site inspectors provide an independent assessment of the works and will generally report to the contract administrator. They are likely to keep a site diary, attend construction progress meetings and to produce regular written reports. Traditionally on the larger projects a clerk of works was appointed to be the eyes and ears of the consultants and be resident on site. They had limited power other than to inspect; they could condemn work but any instructions would be issued by the architect or the contract administrator.

2.6 SUMMARY

In engineering activities inspection involves the measurements, tests, and gauges applied to certain characteristics in regard to an object or activity. Addition, to monitor method that use by contractor at site project. Quality of material also very important in construction. Superintendent Officer monitoring the quality of work and materials used during construction so that contractors do not mistakenly use materials approved by superintendent officer. The results are usually compared to specified requirements and standards for determining whether the item or activity is in line with these targets, often with a Standard Inspection Procedure in place to ensure consistent checking.

CHAPTER 3 : CASE STUDY

3.1 PROJECT BACKGROUND

3.1.1 INTRODUCTION OF PROJECT



Figure 3.1.1.1 : Pengurusan Air Pahang Berhad (PAIP) Daerah Bera

The project aims to build a new operations center, the project title is **“PAKEJ 5: Merekabentuk, Membina dan Menyiapkan Pusat Operasi Pengurusan Air Pahang Berhad (PAIP) Daerah Bera Di Atas Lot 3471 Mukim Triang Daerah Bera”**. The owner of this building is the Pengurusan Air Pahang Berhad (PAIP). Date of site ownership is 27 July 2015 and the expected date of completion of the buildings is 11 December 2016. The overall price contract for this building is RM 4,032,435.04. Function to this building as one of the government building to serve all the people in this area, particularly in water management.

3.1.2 CONTRACT INFORMATION OF PROJECT

NO.	ARTICLE	DESCRIPTION
1.	Project	Pakej 5: Merekabentuk, Membina dan Menyiap Pusat Operasi Pengurusan Air Pahang Berhad (PAIP) Daerah Bera Di atas Lot 3471 Mukim Triang Daerah Bera.
2.	Contract No.	S/PAIP/DK/003/2015
3.	Contract Price	RM 4,032,435.04
4.	Contract Period	72 Weeks
5.	Date of Site Ownership	27 July 2015
6.	Dateline	11 Dicember 2016
7.	Performance Bond	RM 201,621.75
8.	LAD Penalty	RM 729 /day
9.	Insurance	Contractor's All Risk Policy No. : C/15/EC00/002713/KTN-70 Period : Allianz General Insurance (Workmen Compensation) Policy No. : C/15WC000003527KTN22 Period :
10.	Superintendent Officer	Ketua Pegawai Eksekutif
11.	P.P Agent	Pengurus Daerah PAIP Bera
12.	Owner	Pengurusan Air Pahang Berhad
13.	Contractor	Pembinaan Din Z Sdn Bhd
14.	Registered Address	A 59, Tingkat Bawah Jalan IM 3/11 Bandar Indera Mahkota 25150 Kuantan, Pahang
15.	Status	Bumiputra
16.	Certified Manager	Mohamad Shahir B. Mansor@Yahaya
17.	Site Agent	Ahmad Kamil Bin Ahmad Mahir

3.1.3 THE PROJECT SCOPE OF WORK

General works:

- Appoint a licensed surveyor to carry out survey work to identify the boundaries of the project site and situation purposes of preparation of the design.
- Checking, control and plan the work before, during and after the project is implemented.
- Appoint specialist contractors and carry out site investigation work, mechanical work, electrical work and so on.
- Appoint and nominate a qualified consultant to design and oversee the entire scope of work: -
 - i. Architect
 - ii. Civil Engineer
 - iii. Mechanical and Electrical Engineers
 - iv. Quantity Surveying
 - v. Land Surveyor
 - vi. Ground Investigation Work

Public Works:

- a. Build A Two-Storey Building Operations Center
- b. Office Furnishings
- c. Build A Guardhouse
- d. Build Parking
- e. Roads And Squares Lean
- f. Drainage System
- g. Gates And Fences
- h. Slope Protection Work
- i. Sewage System
- j. Signage
- k. Landscape

Mechanical and Electrical Works:

- a. Mechanical and Electrical Works

3.1.4 SITE ORGANIZATION CHART

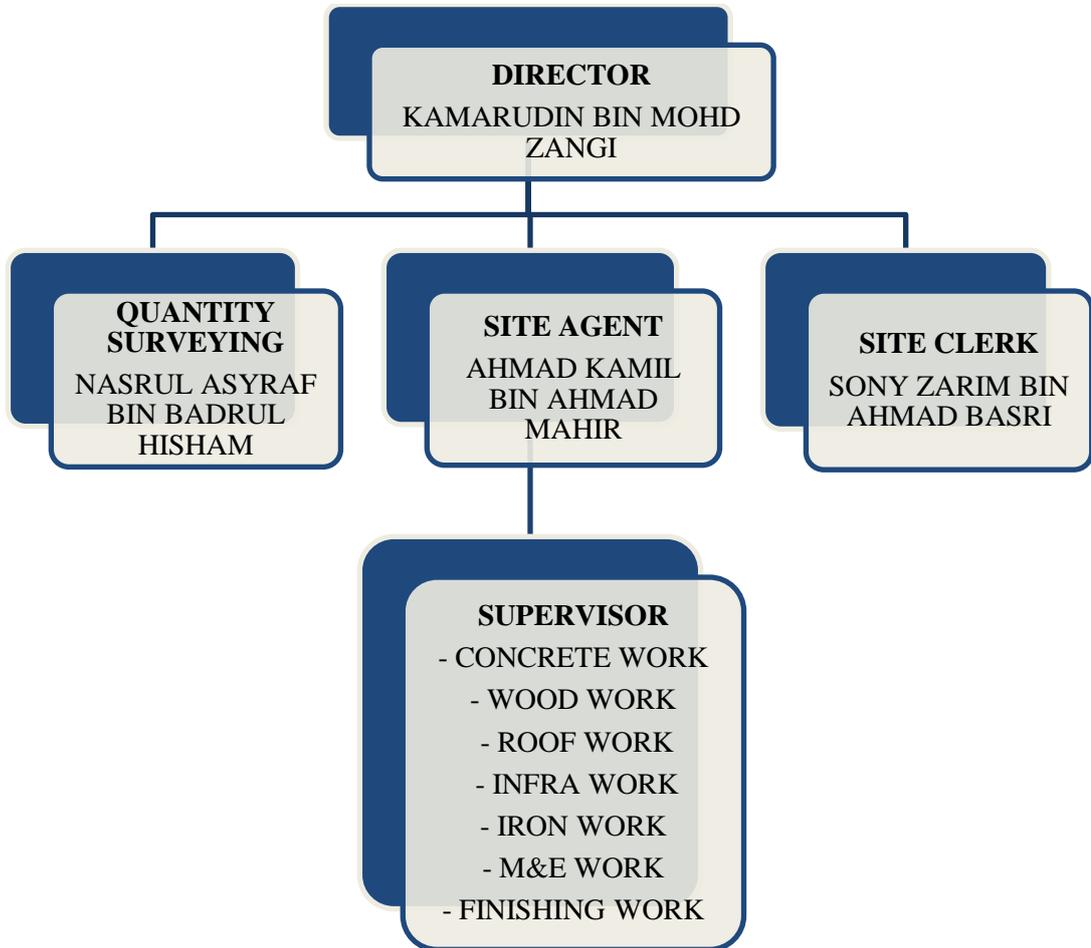


Figure 3.1.4.1 : Site Organization Chart

3.1.5 TEAM ORGANIZATION CHART CONSULTANT

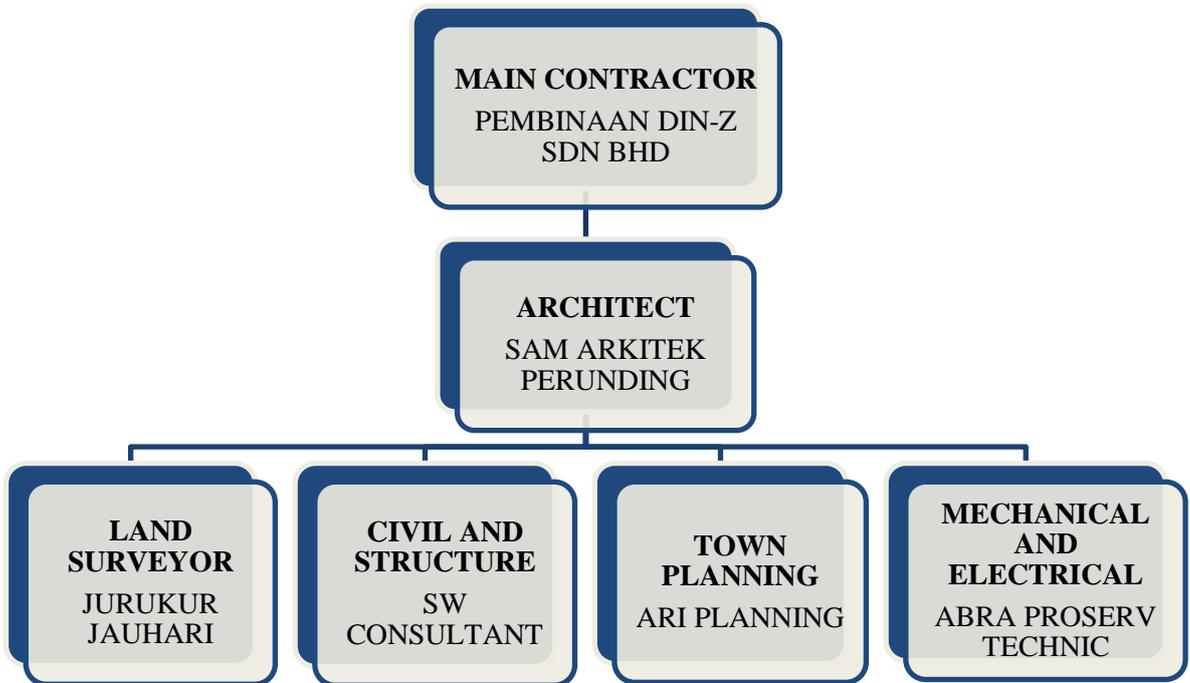


Figure 3.1.5.1 : Team Organization Chart Consultant

3.1.6 LOCATION OF THE PROJECT

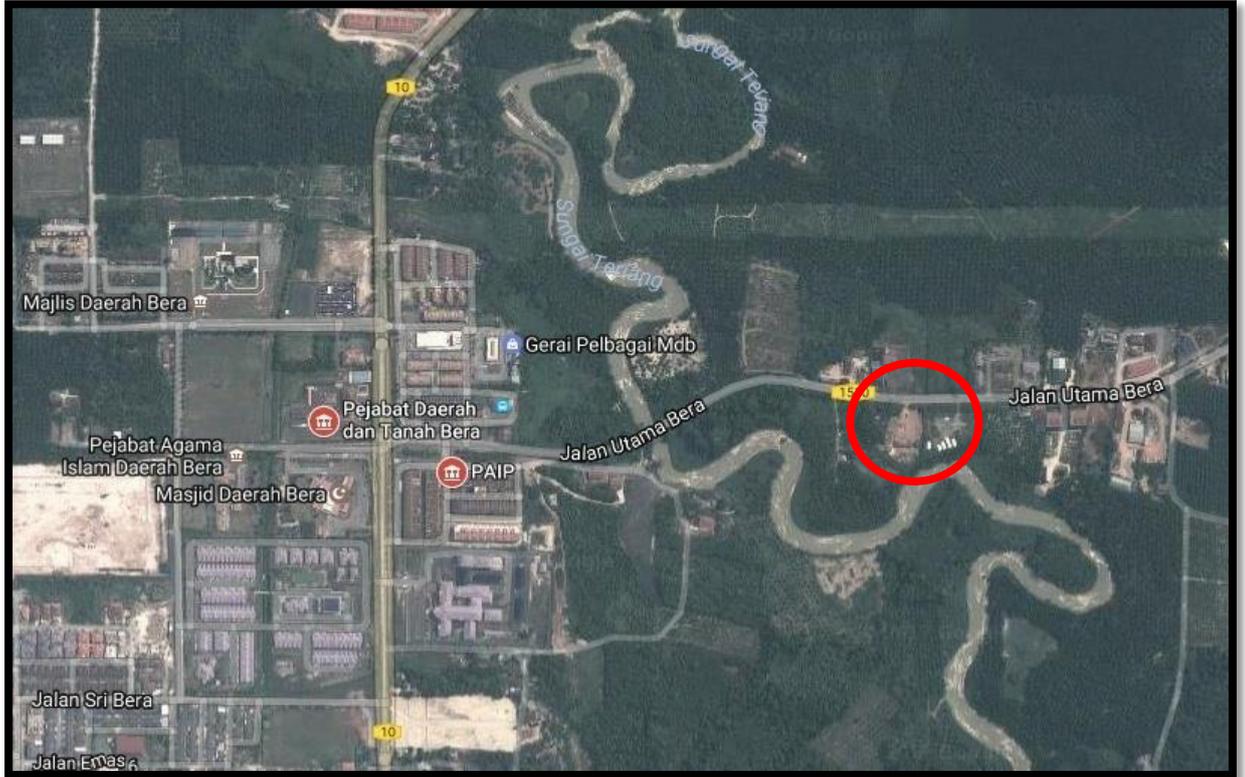


Figure 3.1.6.1 : Location Plan of Case Study (Daerah Bera)

3.2 PROCEDURE QUALITY INSPECTION WORK STANDARD SPECIFICATIONS

Contractors will discuss with consultants, architects and Mechanical and Electric (M&E) in the selection and materials to be used.

After discussions, the contractor will send letters and consent forms and materials have a complete statement of such a plan, sample, catalog and specification to Superintendent Officer for confirmation. If the statement is not enough then Superintendent Officer will not be confirmed and sent back to the contractor. If passed Superintendent Officer will stamp the letter and the form the contractor can order the materials.

After contractor buy the materials and materials have arrived at the construction site. Superintendent Officer will make quality inspection and verification of the material. After do the inspection, Superintendent Officer will test the strength and resilience of the material.

During installation of the material, Superintendent Officer will looks the method of installation of material. After done install the material, Superintendent Officer will looks the packaging and quality of the final work. If the packaging, the quality is good, follow the specifications then Superintendent Officers will receive.

3.3 QUALITY CONTROL MATERIAL

Superintendent Officer S.O conducted an audit to determine the quality control contractors and consultants to comply with the criteria set forth in the QAS. Methods for random checks auditing is to record the following:

1. Acceptance of materials,
2. The construction process (in-process)
3. The product acceptance by the consultant.

If there are doubts on the record quality / quality of the product, separate tests must be carried out by Superintendent Officer.

Inspections process:

Acceptance Materials:

1. Check the quality records / materials at random to determine compliance with the contract and QAS.
2. Check the qualifications of personnel assigned to carry out the above process.

Construction process:

3. Check the record random checks to ensure that the work carried out in accordance with Method Statement and specifications.
4. Check your work at the site at random to make sure that what is recorded in the inspection records are accurate and true.
5. Check the qualifications of personnel assigned to carry out the above process.

Acceptance of Materials:

6. Check the records of random testing to determine the resulting product meets the criteria set out in the specification.
7. Check the qualifications of personnel assigned to carry out the above process.

Progress of Works:

Quality inspection conducted by representatives of the official authorities to ensure that the quality management system exists, apply and effectively achieve the project objectives. Inspection carried out in accordance with the checklist through the examination of documents, physical or / and interviews to obtain objective evidence of activities and the implementation of related projects. Objective evidence such as Project Report, Progress Report on Work and Quality Control Reports (such as calibration certificates, certificate issuance, compliance reporting, image, data analysis-related data, and so on). Non-compliance report (NCR) issued to the contractor in the event of non-compliance for corrective action and improvement.

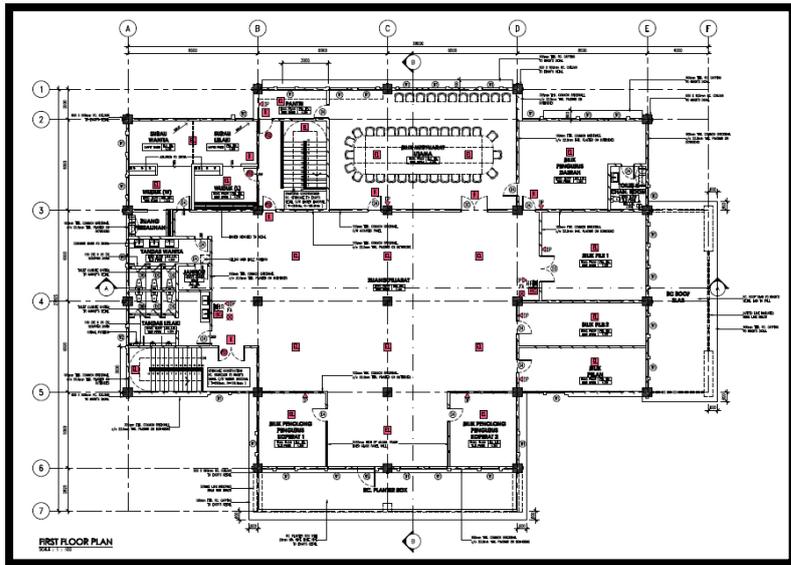


Figure 3.3.1 : First Floor Plan

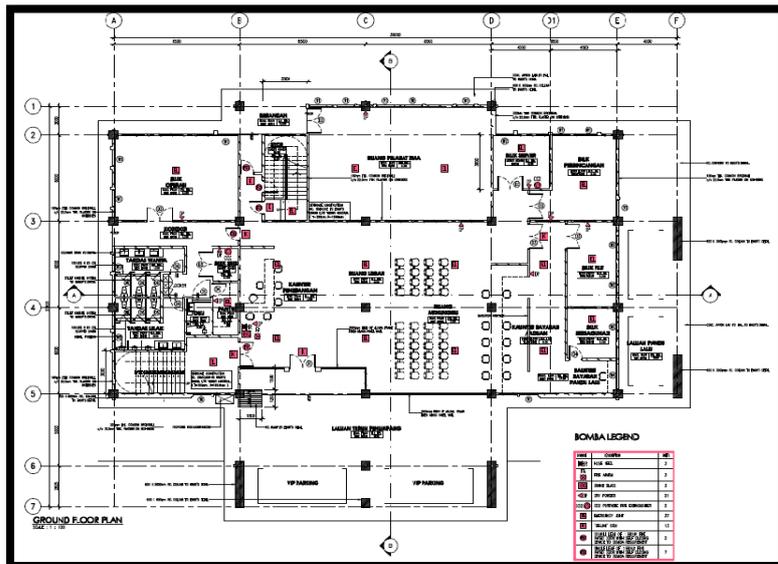


Figure 3.3.2 : Ground Floor Plan



Figure 3.3.3 : Front Elevation of Building



Figure 3.3.4 : Rear Elevation of Building

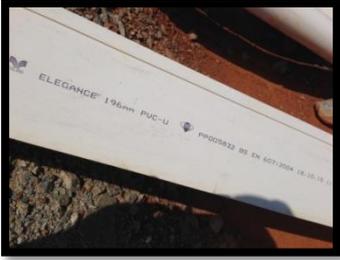
3.4 INSPECTION OF QUALITY STANDARD SPECIFICATIONS

Superintendent Officer S.O shall monitor and control the project so that contractors comply with the Conditions of Contract, Need Statement, Specification, Material used, Drawings Construction / Painting Work. In addition, the construction work shall be in accordance with quality standards, guidelines and best engineering practices. Monitoring and control is made up of three key elements in project management, namely: Work Progress, Quality, Material Approval. In this project used Jabatan Kerja Raya (JKR) Standard Specifications for Building Works. For example:

3.4.1 CEILING

No.	Element Description	JKR Standard Specifications for Building Works	Remarks
1.		<p>General:</p> <p>Unless otherwise specified or shown on the Drawings, all ceilings shall be Mineral Fiber Boards or as comply with the classification of fire spread as stipulated in the 8th Schedule Uniform Building By-Law 1984</p> <p>All ceilings shall be provided with service access to the ceiling void for maintenance of services above the ceiling space in accordance to the Drawing and approval of the S.O.</p> <p>The contractor shall not commence the ceiling installation works until the building is effectively weather-tight and the work area of wet trades has been completed and dried.</p>	Comply

3.4.2 GUTTERS

No.	Element Description	JKR Standard Specifications for Building Works	Remarks
1.	 	<p>Unplasticised Polyvinyl Chloride (uPVC) gutters</p> <p>Unplasticised Polyvinyl Chloride gutters shall be lead free conforming to BS EN 607: 2004 for gutter profiles and fittings and BS EN 1462: 2004 (Lead Free) for the gutter brackets. All gutters and fittings shall be installed as recommended by the manufacturer with a product warranty as approved by the S.O.</p>	Comply

3.4.3 PLASTERING

No.	Element Description	JKR Standard Specifications for Building Works	Remarks
1.	  	<p>Cement:</p> <p>The cement, unless otherwise described shall be Ordinary Portland Cement, complying with MS 522 as specified in SECTION D: CONCRETE WORK or Masonry Cement complying with MS 794.</p> <p>White and coloured cement shall be of approved manufacture.</p> <p>Curing and Protection:</p> <p>Unless otherwise specified hereinafter, the screeds shall be cured for 3 to 7 days after laying, and protected from rapid drying by covering with polyethylene sheets or tarpaulins and shall also be protected from any damage.</p>	Comply

		<p>Making Good:</p> <p>Defective screeds shall be cut out and made good with fresh screed and sufficient time shall be allowed for the screed to dry prior to the laying of the floor finish.</p> <p>Defective plastering and rendering shall be made good by cutting out the defective part to a rectangular shape, and the edges shall be undercut to form dovetail-key and finished flush with the surrounding work.</p> <p>Samples:</p> <p>The Contractor shall supply the S.O. with samples of materials and/or sample offinished work for approval. Approved samples shall be kept at site for reference.</p>	<p>Comply</p>
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3.4.4 ROOFING WORK

No.	Element Description	JKR Standard Specifications for Building Works	Remarks
1.		<p>Interlocking Concrete Tiles:</p> <p>Interlocking concrete tiles shall be of approved type and colour and shall conform to MS 797. The tiles shall be free from all defects.</p> <p>Interlocking concrete tiles shall be laid on timber or steel battens approved for roofing at spacings and tightly screwed as recommended by the manufacturer.</p> <p>Tiling fillers consisting of 1:3 cement mortar as specified under SECTION E:</p> <p>BRICKWORKS, shall be provided at the feet of the rafters.</p> <p>Verges, ridges, hips and valley tiles shall be provided and laid to bond with the general tiling in accordance with the manufacturer's instructions.</p>	Comply

3.5 SUMMARY

As for the summary, the introduction of firm and organization and project. The implementation of government projects involving the cooperation of many parties such as customer agency, Jabatan Kerja Raya Malaysia (JKR), consultants, contractors and suppliers. Project management methods used in this project. The approval of management and quality of materials used according to specifications. This project used Jabatan Kerja Raya Malaysia (JKR) Standard Specifications for Building Works. Inspecting the quality of materials used with Superintendent Officer S.O. Task of Superintendent Officer S.O also is making a list of materials and substances approval in accordance with the requirements set.

CHAPTER 4 : PROBLEM AND RECOMMENDATION

Problem:

Problem Statement Since there is no system of effective management of the construction site, then various problems arise which cause losses to the contractor but to the owners and the general public in particular. Among the problems frequently encountered are:

- Work at the project site is not running properly and systematically.
- No system of effective management of the construction site, then various problems arise which cause losses to the contractor but to the owners and the general public in particular.
- Causing delay in the completion of a construction project.
- Waste of raw materials, labor and time during work or activities at the construction site, it must be implemented in accordance with the planning schedule (time schedule) has been established, where the purpose is to avoid delays.
- Construction materials that slow replies to cause problems and lead to cost increases and project delays on the project.

Recommendation:

Therefore, to avoid or reduce the risk, effective management systems need to be practiced widely. The objective of the management of the construction site must have clear objectives in the organization. This will help members determine the direction of each task and the relationship between the members of the organization. There are times when companies need to focus on the objectives of personnel in determining the company's objectives. The division of tasks in a systematic use of labor must be properly managed and distributed according to activity. Compatibility of work and skills must be balanced with the nature of the activity submitted.

CHAPTER 5 : CONCLUSION

In conclusion, Industry Training is one way to expose students to real work and to strengthen the study of theory that has been studied in the University. Because of that, the University requires that all students in the University training period because it has its own objectives and the most important is that it can give students a real working environment before they graduate at the University. Can learn something new such as project management in the construction. Can learn how the construction by using rules that are realistic and in accordance with established specifications. in cooperation with other parties and the various problems encountered in this construction project. Could see capabilities in the areas in which we live. In addition, the Industrial Training is also an advance to students when they are in a real working environment more challenging reality and future. Finally, the involvement of students in this kind of exercise can prove and strengthen the identity of the students in training in various fields, thus making the University as an education platform that practical. Report format after the training period can train each student in producing technical reports complete, compact and well-organized to serve as important indicators when they are in the actual situation. This is in line with the objectives of the University itself, which want to produce a quality workforce and semi-professionals in the country.

REFERENCE

1. Jabatan Kerja Raya Malaysia (JKR) Standard Specifications for Building Works, 2014
2. Construction Inspection: Quality Assurance/ Quality Control, James J.O'Brien, P.E.
3. Construction Management Project Design And Build, 2007

APPENDIXES