DEPARTMENT OF BUILDING
UNIVERSITI TEKNOLOGI MARA
(PERAK)

BUILDING MAINTENANCE WORK

Prepared by:

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It is recommended that the report of this practical training provided

By

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entitled

BUILDING MAINTENANCE WORK

be accepted in partial fulfillment of requirement has for obtaining Diploma in Building.

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STUDENT'S DECLARATION

I hereby declare that this report is my own work, except for extract and summaries for which the original references stated here in, prepared during a practical training session that I underwent at Pejabat Pendidikan Daerah Jempol and Jelebu for duration of 20 weeks starting from 23 August 2021 and ended on 7 January 2022. It is submitted as one of the prerequisite requirements of BGN310 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

…….

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Date : 10 January 2022

ACKNOWLEDGEMENT

Alhamdulillah syukran, praise to Allah, The Most Generous and The Most Merciful.

First thing first, all engaged individuals have my highest regard and gratitude for their advice, teaching, and guidance throughout the practical training time. I also very grateful by the opportunity given by En. Rajalingam a/l Selvarajah as my supervisor to do internship with his at Pejabat Pendidikan Daerah Jempol & Jelebu. En. Raja as my supervisor teach me from A-Z for guidance and manage the project for building maintenance work at school and PPD building. Not to forget, all the staff at PPD Jempol & Jelebu for their cooperation and guidance at the office.

Moreover, many people from the contractor company, Persada Kaiba Enterprise have contributed their help, guidance, and support in the development of the project from the time I was began practical work until the completion of the project at PPD Jempol & Jelebu. I would like to thank En Afiq as contractor of Persada Kaiba, and En. Rizal as site engineer in this project and his team, for their wisdom and valuable knowledge about construction and experience they share at the site since the project started.

Other than that, I would like to thank to my lecturer, Pm Ts Dr Siti Akhtar Mahayuddin person in charge for our Internship for her valuable guidance and advice. Spending her time to answer any questions concerning my internship. I am also thankful and fortunate enough to get constant encouragement, support and guidance from all the lecturers of UiTM Seri Iskandar who helped me to successfully complete my Internship.

Finally, I want to express my gratitude to my family and friends for their support in helping me complete this practical training. Thank you for your unwavering support, encouragement, and constant source of strength from my family. Thank you so much to everyone I listed above for your assistance, I truly appreciate it.

ABSTRACT

To complete this diploma course, practical students are required to undergo for industrial training for 20 weeks as it is included in our course outline and need to be completed in our 5th semester of our diploma. This industrial training started from 23 august until 7 January 2021 and during the industrial training we are monitored and supervised by the nominated supervisor.

For my industrial training, I did at Pejabat Pendidikan Daerah Jempol & Jelebu it is located at Jempol, Negeri Sembilan. It is an infrastructure unit at PPD Jempol & Jelebu where doing a building services maintenance and repair for school at Jempol and Jelebu area. Jempol and Jelebu District Education Office was established on 2 January 1998. Mr Dini bin Jamin was appointed as the first Jempol branch PPD assistant and assisted by 4 seconded officers administratively that is Mr. Hazamudin bin Jaafar, Mr. Ismail bin Sharif, Mr. Mohd Nor bin Deman, Ms. Siti Ezalmezal (Pre -School Officer) and administrative assistant, Ms. Norhawati Mukdan.

The project that I involved to is doing a Menaiktaraf Longkang Serta Lain Kerja Berkaitan di Rumah Guru SK Putra, Jempol's Project. I assisted by my supervisor Encik Rajalingam to checking all the progress and specification of drain every house working and functioning well. I also helped by workers from contractor team to identify which one of drain has been replaced.

The conclusion is doing a testing and checking is a must for all new building to prevent from any accident happened or system doesn't work as required. I hope this report will be useful for me as a reference in future.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Building maintenance is the process as shown in Figure 1.1 of preserving and restoring the functionality of residential and commercial buildings such as government and office building. Cleaning, landscaping, plumbing and electrical system upkeep are all included. Its goal is to keep residents in a safe, functional, and comfortable environment at all times.

Figure 1.1 Building maintenance background.

Next, property owners and managers owe it to building tenants to provide them with pleasant living and working surroundings. Most people, on the other hand, pay little attention to the effort that goes on behind the scenes to achieve these expectations.

Furthermore, maintenance crews inspect, fix, and replace equipment parts on a regular basis to keep assets working. To ensure sustained operations, personnel may sweep snow from walkways, change HVAC filters, and perform preventive maintenance activities on any given day.

Besides, when occupants discover a plumbing problem, though, maintenance takes precedence. Maintenance is "out of sight, out of mind" until anything goes wrong, in other words. As a result, the best maintenance teams go mostly unseen since proactive maintenance prevents severe malfunctions, inconveniences, and safety issues that renters may not notice.

Residential facilities, commercial facilities, and government facilities all rely on building maintenance. Indoor and outdoor aspects of residential facilities require maintenance. Inspections, maintenance, and repairs are performed on a regular basis to guarantee that everything is in working order.

Every business facility necessitates the use of maintenance services. The majority of smaller organisations outsource maintenance services, whereas larger businesses have an in-house maintenance department. Moreover, maintenance is required for government facilities such as post offices, city buildings, and libraries to remain in good working order for public usage and safety.

1.2 Objectives

Based on the practical training session, following are the objectives of this study:

i. To study the method for building maintenance work.

ii. To identify the construction process and the type of maintenance work for school building.

iii. To determine the problem and solution due to the maintenance work.

1.3 Scope of Study

This study focus on building (school) maintenance at SK PALONG 1 works which is drain installation and pavement work was conducted to understand the structure and method of installation according to Pejabat Pendidikan Daerah specification. This study mainly focuses on the building maintenance which include the drain replacement works and method of pavement work at road of school SK PALONG 1.

A building maintenance checklist includes a list of tasks to be completed by assistant engineering PPD. The list is usually prepared by a clerk at school familiar with the care needed for the building's specific assets.

Property owners an example at school, head master rely on building maintenance to ensure functionality, comfort, and safety for occupants. It includes tasks such as cleaning, painting, and building systems repairs. Selected contractor will perform maintenance tasks following the specification that has been made by assistant engineer from Pejabat Pendidikan Daerah.

1.4 Methods of Study

The case study on the building's maintenance was researched using a variety of methods to gather more information.

i) Observation

The observation method is the most popular because it has been employed continuously during the practical training phase, with daily site visits. The information gathered is based on all of the events that occurred at the construction site when site supervisors were present. All data is gathered utilising a mobile device to photograph and video record site activities such as job progress, equipment, and machines used in any procedure.

ii) Interview

The interview method also plays a significant role, as it was carried out by holding interview sessions with the Site Supervisor from the Main Contractor. The interview provided a wealth of information and new construction knowledge.

iii) Internet

There are numerous internet websites that have been recommended as a secondary source for learning more about concrete and domestic service installation methods. The internet has been a huge help in gaining more knowledge about building maintenance in construction through articles and visuals.

iv) Research

There is much information obtained by conducting studies on structural plans and drawings of related construction processes based on all drawings provided.

Architectural drawings also aid in predicting the outcome of all construction processes related to the case study.

CHAPTER 2

COMPANY BACKGROUND

2.1 Introduction of Company

Jempol and Jelebu District Education Office as shown in Figure 2.1 was established on 2 January 1998. At an early stage this education office which better known as the District Education Office Jempol Branch is a branch of the Kuala Pilah District Education Office, Jempol and Jelebu. Mr Dini bin Jamin was appointed as the first Jempol branch PPD assistant and assisted by 4 seconded officers administratively that is Mr. Hazamudin bin Jaafar, Mr. Ismail bin Sharif, Mr. Mohd Nor bin Deman, Ms. Siti Ezalmezal (Pre -School Officer) and administrative assistant, Ms. Norhawati Mukdan.

Figure 2.1 Building of Pejabat Pendidikan Daerah Jempol & Jelebu

The restructuring of Jempol and Jelebu District Education Office in 2003 has changed the scenario off their management system throughout Malaysia. In this regard, Kuala Pilah, Jempol and Jelebu District Education Office has split in two. Kuala Pilah District Education Office has become one district education office and operates independently, meanwhile Jempol and Jelebu District Education Office are combined become one district education office. Mr. Hj. Baherin bin Sihat, the principal of Tuaku Jaafar Science Secondary School Kuala Pilah, has been appointed as the Officer.

The first Jempol and Jelebu District Education commenced work on 28 July 2003. In 2010, a total of 16 interim officers (administratively seconded) were placed in the Jempol. By 2011, the Jempol and Jelebu Education Office had moved to new locations when the new building was completed built to operate. Jempol and Jelebu District Education main office is located in Bandar Seri Jempol and the branch office is in Kuala Klawang, Jelebu. Now the Jempol and Jelebu District Education Office is led by Tn. Hj Nor Hashim Bin Othman, P.M.C. Jempol and Jelebu Education Office is strength by a total of 50 officers and 28 support staff. There are 99 schools under the administration of Jempol and Jelebu District Education Office, which is 25 secondary school and 74 primary schools.

Jempol and Jelebu District Education Office (PPDJJ) practices corporate values designed to influence success or excellence in implementing established policies or policies. It is achieved by instilling pure values and deep commitment among Jempol and Jelebu District Education Office (PPDJJ) staff towards the achievement of the vision, mission and objectives that have been set in order to gain high quality education among students in Malaysia.

2.2 Company Profile

Company's Name	:	Pejabat Pendidikan Daerah Jempol dan Jelebu.
Establishment	:	2 January 1998
Sector	:	Government
Address	:	Pejabat Pendidikan Daerah Jempol dan Jelebu, Jalan Bahagia, 72120 Bandar Seri Jempol, Negeri Sembilan.
Email	:	ppdjempoljelebu@moe.gov.my
Phone Number	:	06-458 3589
Operation Hour	:	7:30 am – 5:30 pm (Monday-Friday) Offday (Saturday, Sunday and Public Holiday)

2.3 Company Organisation Chart

Figure 2.2: Organisation Chart of PPD Jempol And Jelebu

The diagram above shown highest management at Pejabat Pendidikan Daerah Jempol dan Jelebu for each sector. Tn Hj. Nor Hashim bin Othman as chief education district officer. Meanwhile, Encik Anuar bin Nordin as deputy district education officer of planning sector. Next, Encik Abdullah Anastas Zorin bin Yaacob as deputy district education officer of school management sector. Other than that, Miss Norshahida binti Shaarim as deputy district education officer of learning sector. Following, Tn Hj Aminuddin bin Mohd. Rashid as deputy district education officer of student development sector. Ultimately, Puan Siti Salmah binti Jamaluddin as assistant administrative officer of management sector.

Figure 2.3: Organization structure of management sectors

The diagram above show organization structure of management sectors including Units of Finance, Infrastructure, Procurement and Units of Human Resources, Information and Communications Technology (ICT), and Public Administration headed by Puan Siti Salmah binti Jamalludin as assistant administrative officer. During six months of my internship, I was placed in Units of Finance, Infrastructure and Procurement.

2.4 List of Projects

2.4.1 Completed Project

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1.	KERJA-KERJA MENGECAT BANGUNAN SEKOLAH, SELENGGARA DAN BAIKPULIH LONGKANG BANGUNAN SEKOLAH DAN MELEBARKAN KAWASAN HADAPAN SEKOLAH SERTA KERJA-KERJA BERKAITAN DI SK PALONG 1	RM 200,000.00	7/10/2021	9/12/2021	9 MINGGU	PPDJJ
2.	KERJA-KERJA MENGECAT BANGUNAN SEKOLAH, PREMIX KAWASAN SEKOLAH SERTA KERJA-KERJA BERKAITAN DI SK LUI TIMOR.	RM 180,420.00	4/10/2021	6/12/2021	9 MINGGU	PPDJJ
3.	KERJA-KERJA PREMIX KAWASAN SEKITAR SEKOLAH LENGKAP DENGAN PERALATAN SERTA KERJA-KERJA BERKAITAN DI SK PENGHULU LUAK JEMPOL.	RM 64,598.00	28/10/2021	23/12/2021	8 MINGGU	PPDJJ
4.	KERJA-KERJA SELENGGARA DAN BAIKPULIH PAGAR KAWASAN SEKOLAH SERTA KERJA-KERJA BERKAITAN DI SK PALONG 12.	RM 138,060.00	4/10/2021	29/11/2021	8 MINGGU	PPDJJ
5.	KERJA-KERJA MENGECAT BANGUNAN DAN MENUKAR GANTI ATAP BLOK SEKOLAH SERTA KERJA-KERJA BERKAITAN DI SMK PALONG 7 SERTA KERJA-KERJA BERKAITAN	RM 158,100.00	4/10/2021	6/12/2021	9 MINGGU	PPDJJ
6.	KERJA-KERJA SELENGGARA DAN BAIKPULIH PAGAR KAWASAN SEKOLAH SERTA KERJA-KERJA BERKAITAN DI SK SERTING HILIR KOMPLEKS	RM167,050.00	4/10/2021	6/12/2021	9 MINGGU	PPDJJ

2.4.2 Projects in Progress

Project building maintenance for school under Pejabat Pendidikan Daerah Jempol and Jelebu was one hundred percent completed for phase 4 of year 2021.

CHAPTER 3

BUILDING MAINTENANCE WORK AT SK PALONG 1

3.1 Introduction to Case Study

`There is 1 project with multiple tasks for building maintenance work at Sekolah Kebangsaan Palong 1 namely the work of Kerja-Kerja Mengecat Bangunan Sekolah, Selenggara Dan Baikpulih Longkang Bangunan Sekolah dan Melebarkan Kawasan Hadapan Sekolah Serta Kerja-Kerja Berkaitan Di SK Palong 1. These school are located at No 1, Felda Palong 1, Jempol Negeri Sembilan. The primary school as shown in figure 3.1 has been selected to maintenance work to restore the functionality and comfort of a building such as drain, paint and pavement work. Assistant engineer plays the role need to have a corrective maintenance strategy in place as it's impossible to completely prevent damage or decay. Corrective maintenance ensures that everything is back in operation as soon as possible.

The duration of the building maintenance work at SK Palong 1 is from October 4, 2021 to November 16, 2021 and the value for this work is RM 200,000.00. The installation of drain began on 6 October 2021 with an 4 - week period of 29 October 2021. The client for this project is Pejabat Pendidikan Daerah Jempol & Jelebu. The project is monitored by project manager FHAYYAD TEGUH ENTERPRISE, Muhammad Arif. Drain is a important for school because school drainage systems will be forced to deal with a high volume of waste over the years. This can include actual grey water from sinks, showers and toilets as well as rainwater. It is common for school drain pipes to struggle with such a high volume of water. In many cases, they will start to suffer all kinds of damage, many of which can cause serious structural problems. From that, replacement work for drain at school is a serious problem most the time. During this work there were several events that took place near the site area causing slight disruption in terms of space and student safety.

Figure 3.1 Construction site for building maintenance work
source : Sekolah Kebangsaan Palong 1

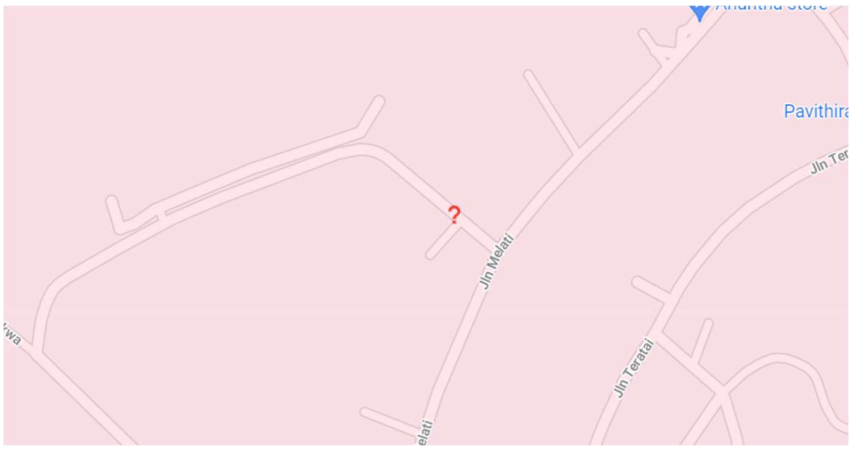


Figure 3.2 Location of site (SK Palong 1)

3.2 Drain Installation (SK Palong 1)

Drain Installation

(Kerja-Kerja Mengecat Bangunan Sekolah, Selenggara Dan Baikpulih Longkang Bangunan Sekolah dan Melebarkan Kawasan Hadapan Sekolah Serta Kerja-Kerja Berkaitan Di SK Palong 1)

Drain installation is necessary to drain wastewater and from sanitary ware, kitchens, rainwater mains (R.W.D.P) as well as paved surface water to public sewers and subsequently to special disposal and treatment sites. Next, the drains should be having the following features such as should not leak easily, wastewater and sewage cannot affect the drain, it can withstand soil pressure and building settlement and able to withstand the flow of heat and liquids. For this case study, the focus will only be on, installation of drain at SK Palong 1 uses 2 types of drain such as V-drain and Half round drain. There are few types of drains as below:

Figure 3.3 U-shape drain

Figure 3.4 V-shape drain

Figure 3.5 Half round drain

For this case study, the focus will only be on the replacement and installation of drain according to the Fhayyad Teguh Enterprise and Pejabat Pendidikan Daerah Jempol and Jelebu specification.

There are key-persons in-charge for all activities occurred at site to ensure all works run smoothly, which are the Project Manager, En. Muhammad Arif, Sir Iqbal as Safety and Health Officer, En. Amirul as Assistant Manager. School area is a most dangerous place for construction site because children with average 7-12 years old always play around and didn't care about the warning and dangerous area in construction site. To conclude to ensure all works run smoothly, Safety and Health officer plays their important role taking care of safety children at school.

3.2.1 Procedure of Drain Installation

Firstly, Assistant engineers, En. Rajalingam a/l Selvarajah visit the site as well as make preliminary measurements for the drains to be upgraded. Checking defect or damage to restore the drain is the first thing to do before specification maintenance work will be create by Pejabat Pendidikan Daerah Jempol and Jelebu.

Second, the appointed contractor will start the project following the project duration for 9 weeks given by client and provided the following as required in the terms of the quotation. During installation drain is running by workers, assistant engineer will make the inspection and checking progress to make sure contractor following the specification (6" x 9" lengkap dengan beam dibibir longkang selebar 3" dan lepaan licin di bahagian permukaan).

Next, the work of removing drains from construction site as well as other related work in accordance with the instructions from supervising officer. Then, supply and install the malaria prevention drains, half round drain and V-shape drain approved by SIRIM. Certificate and high quality of drain is an important thing to make sure drain of school more durability and longetivity.

While project is ongoing, contractor build and complete the sump from brick bonding including smooth plastering of both sides of the face. The installation of drain will be made for 600 feet all area at school and the worse, defect part of drain at SK Palong 1. Half round drainage can be achieved by building ditches, improving natural channels, or shaping the land. Open ditches have a low initial cost and are easy to inspect. Disadvantages to these systems include that they reduce the cropping area, require a right-of-way, and have high maintenance costs.

Lastly, site clearing work after completion and all unnecessary materials are taken out of construction site.

Figure 3.6: Site visitation with Engineer and Assistant Engineer at SK Palong 1

Figure 3.7: Preliminaries measurement for the drains using roller.

Figure 3.8: Before and after for drains installation

Figure 3.9: Checking and inspection size of drain following the specification.

3.3 Pavement work (SK Palong 1)

(Kerja Penyelenggaraan Jalan Memperluaskan Kawasan Sekolah Serta Kerja Berkaitan di SK Palong 1, Jempol Negeri Sembilan)

A durable surfacing for a road, area of school, or other comparable area is premix. A pavement's principal role is to transfer loads to the sub-base and underlying soil. Sand and gravel or crushed stone are compacted with a bituminous binder, such as asphalt, tar, or asphaltic oil, in modern flexible pavements. This type of pavement is flexible enough to absorb impact. Rigid pavements are formed of concrete with coarse and fine aggregates, as well as portland cement, and are typically reinforced by steel rod or mesh.

Figure 3.10: Site visit with contractor for pavement work.

For this work, SK Palong 1 need to do pavement work which are area of parking lot and assembly point along 1450 $m2$ because the road was cracking and depressed damage. The type of premix that used for the both area is asphalt concrete

which is a premix of bitumen and sand (with or without filler) not less than 30% by weight of mineral aggregate of size larger than sand, missed and laid at high temperature 35 degree and required heavy binder generally are 50-60, 60-70, 70-80 and 85-100. In specification, after compacting the road, thickness of road must be 40mm and above.

3.3.1 Method for Pavement Work

Figure 3.11: Clearance site for pavement work (premix)

The work of cleaning the road surface as shown figure 3.11 at SK PALONG 1 from any dirt and debris before the premix work of overlay the road. Cleaning the road surface from debris or plant takes 3 working day using backhoe and lorry.

Figure 3.12: The workers spray the tack coat follow the specification.

Figure 3.13: The paver hopper used to lay asphalt on roads

Figure 3.14: The compaction roller is compress raw metal into a thinner and more uniform shape

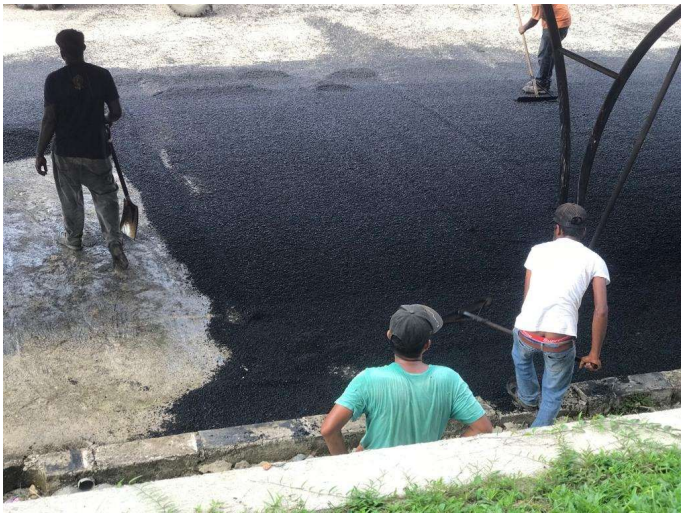
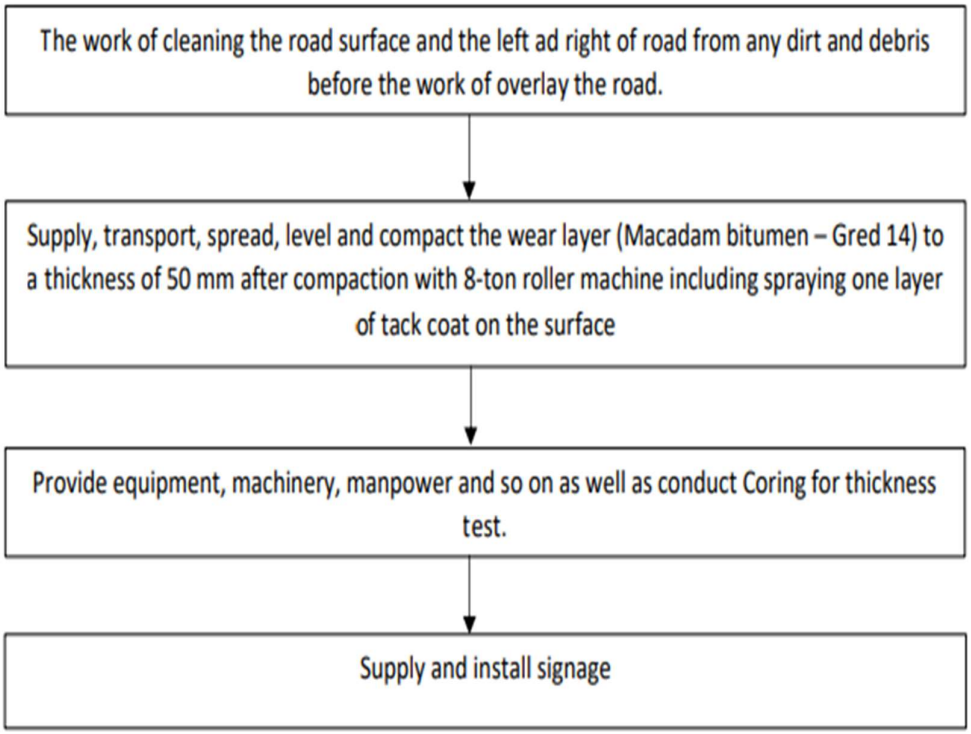


Figure 3.15: The workers spread the premix

Figure 3.16: SK Palong 1 after premix


The work of cleaning the road surface and the left ad right of road from any dirt and debris before the work of overlay the road.
Supply, transport, spread, level and compact the wear layer (Macadam bitumen – Gred 14) to a thickness of 50 mm after compaction with 8-ton roller machine including spraying one layer of tack coat on the surface
Provide equipment, machinery, manpower and so on as well as conduct Coring for thickness test.
Supply and install signage

3.4 Slump Test for The Concrete Ready Mix at SK PALONG 1

The aim of the slump test concrete ready mix for maintenance work at SK Palong 1 is to measures the consistency of fresh concrete before it sets. It is performed to check the workability of freshly made concrete and therefore the ease with which concrete flows. It can also be used as an indicator of an improperly mixed batch. The slump test is used to ensure uniformity for different loads of concrete field condition.

At site, slump test for the concrete ready mix has been made from Mersing Concrete Sdn Bhd for checking workability of concrete. Contractor company from Fhayyad Teguh Enterprise was order ready mix concrete used to drain installation work at SK Palong 1. Order ready mix concrete will make the drain installation work faster to finish. Besides, ready mix concrete manufacture has less dependency on human labours hence the chances of human errors is reduced. This will also reduce the dependency on intensive labours.

The purpose of a concrete slump test, also known as a slump cone test, is to measure the workability or consistency of a concrete mix made in the laboratory or on the job site as the work progresses. A concrete slump test is performed from batch to batch to ensure that the quality of the concrete is consistent throughout the construction process for building maintenance work at SK Palong 1. The slump test is the simplest basic concrete workability test, with cheap costs and rapid results. It has been commonly utilised for workability tests since 1922 as a result of this.

Generally, the concrete droop value is used to determine workability, which reflects the water-cement ratio, however the concrete slump value is affected by a variety of elements such as material qualities, mixing methods, dosage, and admixtures, among others. Lastly, result for slump test at site SK Palong 1 was true slump made by Mersing Concrete Sdn Bhd.

3.4.1 Procedure Slump test for the concrete ready mix from Mersing Concrete Sdn Bhd

1. Secure slump cone to base plate by standing on the foot holds.

2. Using the scoop, fill 1/3 of the cone with the sample

3. Rod the material 25 times with the steel tamping rod.

Figure 3.17: The technician rod the material

4. Fill the cone to 2/3 full and rod the second layer 25 times.

5. For the final layer also need to be rod 25 times and clean excess concrete overflow from the base of the cone.

6. Holding the cone firmly and slowly lift the cone vertically in a steady motion.

7. Invert the cone mold without touching the concrete sample.

Figure 3.18: The cone was invert adjacent to the sample

8. Using a tape, measure the distance from the bottom of the straight edge to the displaced center of the slumped concrete.

Figure 3.19: The Assistant Engineer measured the slump test

9. The results of the slump test:

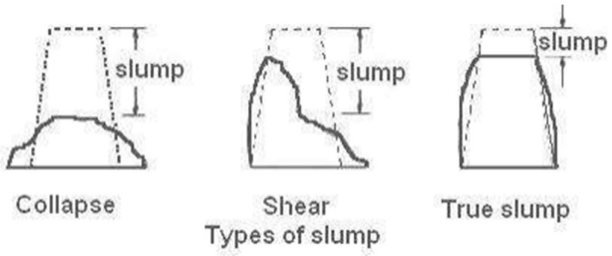


Figure 3.20: Types of slump

Collapse	Shear	True
In a collapse slump the concrete collapses completely	In a shear slump the top portion of the concrete shears off and slips sideways	In a true slump the concrete simply subsides, keeping more or less to shape

Figure 3.21: Types of result slump test

CHAPTER 4

CONCLUSION

As a conclusion, throughout my industrial training at Pejabat Pendidikan Daerah Jempol and Jelebu. I have gained a lot of experience and knowledge in building maintenance work field. During internship, I cooperate with the assistance engineer do site visitation and supervise the project. Indirectly, this training helps me to learn independently, discipline myself, be considerate, self-trust, take initiative and the ability to solve problems. Besides that, my communication skills are strengthening as well when communicating with others.

Communication is very important set for and in the individual as it represents the level of confidence of the individual. Without effective communication skills, one may find it difficult to perform the tasks assigned by supervisor. This can affect a person's confidence while performing a task because others may feel insecure when it is difficult to explain something or any related questions. Through effective communication, many things can be achieved and can benefit both individuals and companies.

Lastly, industrial training is the good exercise to student for encourage them towards excellence and developing countries. Via this training I managed to explore and learn new things such as supervise the site, involved in engineering drawing and all this would be credit and plus point to becoming a good employer. I am so thankful to Pejabat Pendidikan Daerah Jempol and Jelebu because accepted me to complete my industrial training.

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