DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

THE CONSTRUCTION OF ROADWORKS AT MASJID KARIAH TEMERIS - BAHAU, NEGERI SEMBILAN

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FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

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It is recommended that the report of this practical training provided

By

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entitled

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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 herein, prepared during a practical training session that I underwent at Jabatan Hal Ehwal Agama Islam Negeri Sembilan (JHEAINS) 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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ABSTRACT

Road are one of the crucial contributions to economic development. Road are vital importance in order to make nation grow because it is provide an access to employment, social, health, and education services makes a road network crucial in fighting against poverty. This report will discuss about bitumen mixes that we called premix for the roadworks. This report was conducted for The Constructions of Roadworks at Masjid Temeris, Daerah Bahau, Negeri Sembilan. The objectives of this report is to identify the method of the premix works and measure the thickness of premix. It will focus on the whole process of road constructions. It is also to investigate the machinery and materials used in the road constructions. This report will also look at the problems and the solutions that occur during the roadworks.

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CHAPTER 1.0

INTRODUCTION

1.1 Background of Study

In building constructions, there are a few things that very important just like the building itself, and it called a road. Basically a road means any highway to which the public has access. It also includes any bridges over which a road passes. A road physically should have the character of a definable route, with ascertainable edges, and that leads from one point to another to enable travellers to move conveniently from one point to another along that route. (James Murray, 2019).

To make a road, it have to go through a process that we called roadworks or road constructions. Road construction is the installation of soil stabilisers, concrete, asphalt, and other building materials on a path to create a surface that vehicles can travel on from one destination to another. (Janet Mutegi, 2021). This is a complex venture that involves paving, rehabilitation, and/or reclamation of degraded pavements to create a motorable roadway. It can take months or years of planning before work can begin depending on the size and type of the envisioned road. (Jane Mwangasha, 2021).

Common types of road construction methods differ based on the nature of the envisioned road, every highway project require months or years of planning before work can begin on site. (Janet Mutegi,2020). The five most popular methods of road construction, including gravel road construction methods, asphalt road construction methods, and other temporary road construction methods.For my project, it uses asphalt road construction. Asphalt road construction methods are very popular due to asphalt roadway's flexibility a. This road construction technique starts with the preparation of the subgrade, a process that involves removing any existing vegetation and the topsoil.nd the ability to acquire the shape of the load above it. This helps it to support heavy. (Janet Mutegi,2020). This road construction technique starts with the preparation of the subgrade, a process that involves removing any existing vegetation and the topsoil.(Janet Mutegi, 2020).

There are some advantages using this asphalt method, production of bitumen is economical. Bitumen is a by-product of crude oil distillation process. Crude oil itself is a composition of hydrocarbons.(Neenu S K, 2018). The physical and the chemical properties of Bitumen are found to be a function of load level, temperature and the duration of loading. It is a thermoplastic and viscoelastic material.(Neenu S K,2018). These dependencies make us to truly access the traffic on the road so that a bitumen mix properties can be varied based on the stress levels calculated. It is highly appreciable about the fact that bitumen has a favorable melting point, that helps in both surface dressing and wearing resistance with ease.(Neenu S K,2018).

There are many types of of roadworks in theoretically. There is a need for a smarter approach when it comes to road construction. The aim should be to chalh down the type of road construction that is durable as well as cost effective.(Constro Facilitator, 2020). Several different types of road construction methods and processes have evolved throughout the years and now we have the more number of options for road construction.The type of surface material used in road construction is largely dependent on traffic volume, weight load and weather conditions. (Constro Facilitator,2020). There is a strong desire to optimize the use of materials currently used for road construction and to seek advanced materials that are cheaper, better performing, and less damaging to the environment. (Constro Faciliator, 2020). Whitetopping is the covering of existing asphalt pavement with a layer of Portland cement concrete. The principal purpose of an overlay is either to restore or to increase the load-carrying capacity or both, of the existing pavement. (Constro Facilitator,2020). Polymeric fibers are being used now because of their no risk of corrosion and also being cost-effective. (Constro Facilitator, 2020). Bituminous surface treatment (BST) or chip seal is used mainly on low-traffic roads, but also as a sealing coat to rejuvenate an asphalt concrete pavement. They are most often used in urban areas where the roughness and lose stone associated with chip seals is considered undesirable. (Constro Facilitator, 2020).

These are the types and method used in road constructions. However the aim of this report is to discover the roadworks process before, during and after the constructions.

1.2 Objectives

There are few objectives have been developed from this construction as follow ;

i. To identify the method of premix works

ii. To measure the thickness of premix used in the construction (Coring Test)

iii. To determine the problems occurred and solutions taken to solve the problems

1.3 Scope of study

The scope of study has been carried out at Masjid Kariah Temeris, Daerah Bahau , Negeri Sembilan. The project had started on 9 December 2021 and will be completed on 9 December 2021. The construction is a road construction of parking lot and cost RM 63,970.00. The project currently is on going. Therefore, the focus of the study is to determine on how the roadworks process done step by step to make the parking lot. Hence, the study will be explained not only about method used for premix but including how to measure the thickness of premix used in the construction, as well as machinery and material used for premix. Furthermore, the problems and solution also included in this study. Even so, the study do not only concentrate on the quantity of manpower or labors, costs and and duration matters. In order to fulfill the data required, there were three methods need to be carried out which is observation, interviews and document reviews. In conclusion, all further explanation relating the method above were explained as below.

1.4 Method of Study

1. Observation

The observation is one of the method to collect data through observing. The observation is about how the roadworks process done starting from the original base until they complete the premix work. The average time for this observation approximately around 3-4 hours until they compact the last layer and it depends on the size of the area. The bigger size of the area premix, the longer it takes to complete the premix works. Overall, it took only 1 day for the premix works done. Meanwhile, for the measuring of the thickness it took about 1-2 hours on the second day to observe after the premix works done because it have to wait 24-48 hours until the premix surface can be measured accurately. This make it took around 2-3 days to complete all the premix works from compacting until the last process i.e measuring the thickness. The observation of the road constructions had been recorded by smartphone and some notes that lasted for 20 weeks.

2. Interview

Interview is also one of the way to collect the construction data by doing the structured or semi structured interview with the trusted person for the project. It have been done while doing the observation and while doing the work at the site. The interview was conducted with our unit supervisor and the contractor who is responsible for handling the project while at the construction site. The interview was also done to the workers who were at the construction site while doing the roadwork. Semi-structured interviews were also conducted with the contractor responsible for conducting the project each day at the site and usually carried out around 10-15 minutes. The semi-structured interview recorded through short notes and video.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

Jabatan Hal Ehwal Agama Islam is a government department previously known as Jabatan Ugama Negeri Sembilan or Pejabat Ugama Islam. Jabatan Hal Ehwal Agama Islam (JHEAINS) is the main implementing agency for policies related to Hal Ehwal Pentadbiran Agama Islam enacted at Majlis Agama Islam Negeri Sembilan (MAINS). To fulfill the set objectives, government has amended the Majlis Ugama 1950 law to Undang-Undang Majlis Agama Islam 1957. Then it amended again to the Undang-Undang Pentadbiran Hukum Syarak 1960 which was later repealed with Enakmen Pentadbiran Hukum Syarak Negeri Sembilan 1991. On 1st March 2004, Enakmen Pentadbiran Agama Islam Negeri Sembilan 2003 came into force and previous enactmen came into force and the previous enactmen was repealed. This department also enforces other enactment including Undang-Undang Keluarga Islam Negeri Sembilan 2003, Enakmen Jenayah Syariah Negeri Sembilan 1992, Enakmen Prosedur Jenayah Syariah Negeri Sembilan 2003, Enakmen Keterangan Mahkamah Syariah Negeri Sembilan 2003, Enakmen Tatacara Jenayah Syariah Negeri Sembilan 2003 and Enakmen Tatacara Mal Mahkamah Syariah Negeri Sembilan 2003.

2.2 Company Profile

Jabatan Hal Ehwal Agama Islam was established officially on 1st January 1950 and start operating on August 1950 with the appointment of Shahibul Fadhilah Tuan Sheikh Haji Ahmad Bin Sheikh Haji Mohd Said. This department currently active in the area of government offices. This department based in Seremban located at Jalan Yam Tuan, Bandar Seremban,70400 Seremban, Negeri Sembilan.

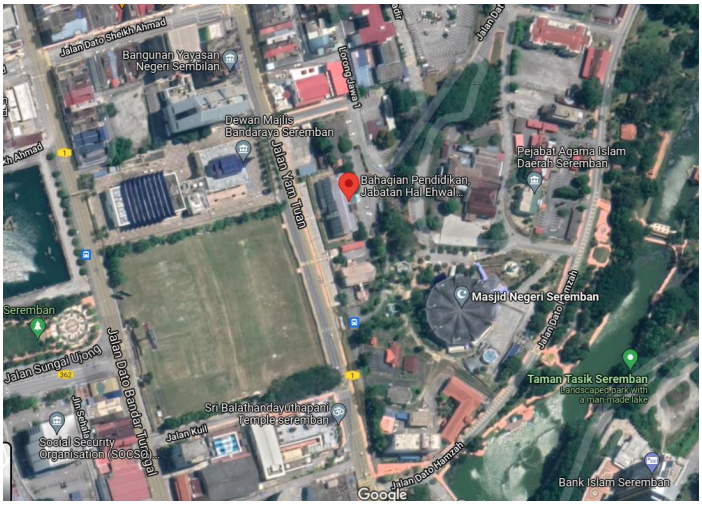
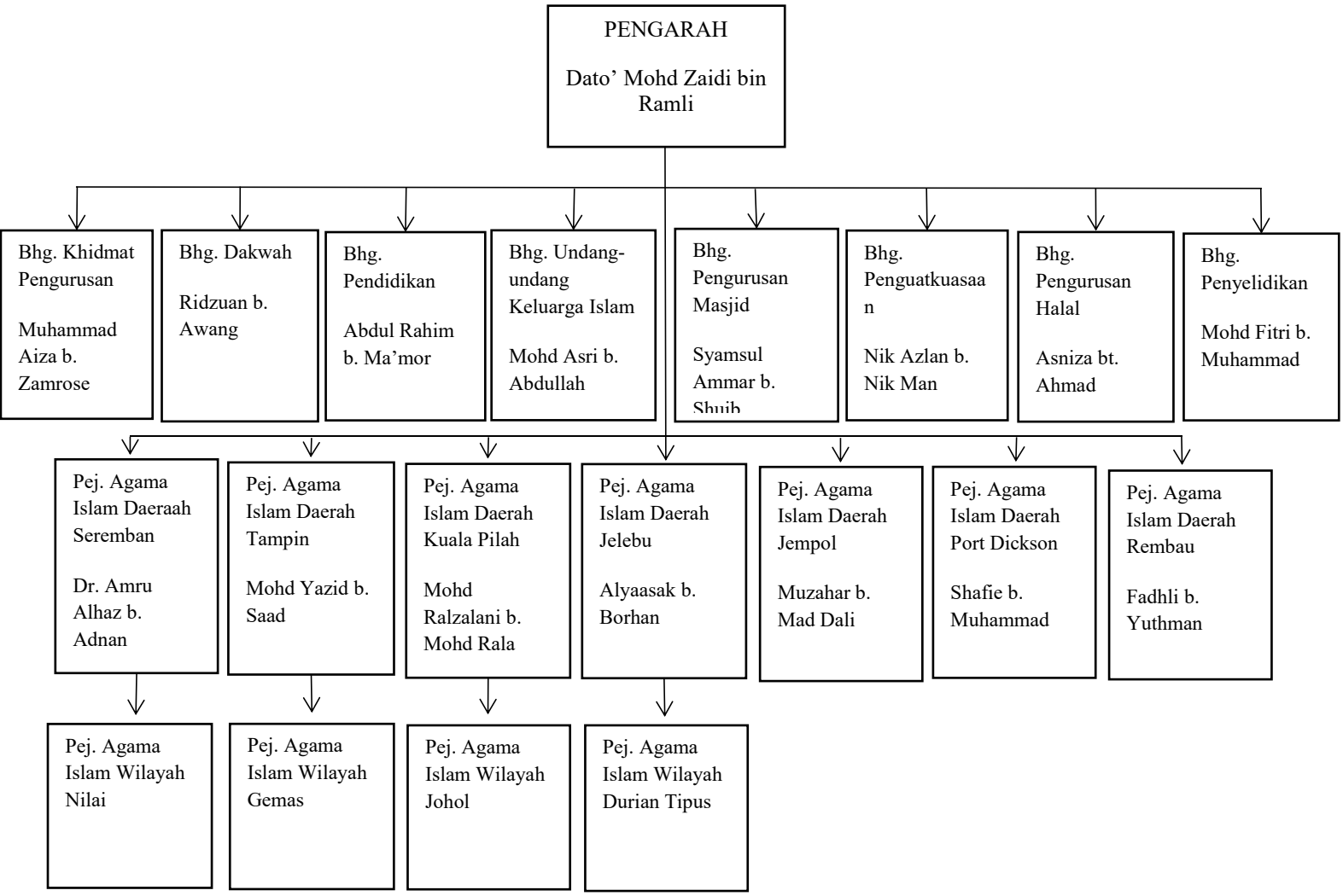


Figure 2.1: Location of the department based on satellite map

Source : https://www.google.com

With the department's mission to be the one of department that are able to provide the best, high quality and transparent services to people and can be balance in terms of religion as well as social. This department want to help as many people as possible by taking care of maters related to religion and social. This department has a chief director who take care of the management of this department and assisted by 8 director who assist him in each of their respective divisions. Jabatan Hal Ehwal Agama Islam can be contactd via email jheains.official@gmail.com , facebook (Jabatan Hal Ehwal Agama Islam Negeri Sembilan Official) or directly contact through department number (06-7664100).

2.3 Company Organizational Chart



2.4 List of Project

2.4.1 Completed Projects

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1.	Kerja-kerja Menaiktaraf Pejabat Serta Kerja Berkaitan di Masjid Putra Nilai Daerah Seremban, Negeri Sembilan	Forty Eight Thousand Eight Hundred Eighty Five Malsysian Ringgit (RM48,885)	25 AUGUST 2021	29 SEPTEMBER 2021	1 MONTH	Ahamad Rashid bin Mohd Yasin
2.	Membaikpulih Tandas, Tempat Wudhuk dan Stor Surau Al-Islah KG. Sentosa, Paroi Daerah Seremban, Negeri Sembilan	Thirty Thousand Malaysian Ringgit (RM30,000)	27 SEPTEMBER 2021	22 NOVEMBER 2021	2 MONTHS	Mohd Hafiz bin Abdul Said
3.	Kerja-Kerja Membaik Pulih Bangunan Serta Kerja Berkaitan Di Surau Desa Permai, Titi Daerah Jelebu, Negeri Sembilan	Fifty Thousand Malaysian Ringgit (RM50,000)	27 SEPTEMBER 2021	29 NOVEMBER 2021	2 MONTHS	Abu Bakar bin Haji Samah
4.	Cadangan Menaiktarah Ruang Solat Luar Dengan Pemasangan Tile Lantai Seluas 305 Square Meter Di Surau Al-Ikhlas, Nilai Perdana, Daerah Nilai, Negeri Sembilan	Twenty Five Thousand Malaysian Ringgit (RM25,000)	27 SEPTEMBER 2021	08 NOVEMBER 2021	2 MONTHS	Rahimah bt Abdul Jalil

Table 1.1 Completed Projects

2.4.2 Project in Progress

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1.	Kerja-Kerja Penyelenggaraan Infrastruktur Di Tanah Perkuburan Islam Masjid Tuanku Muhriz Daerah Jempol, Negeri Sembilan	One Hundred Thousand Malaysian Ringgit (RM100,000)	27 SEPTEMBER 2021	29 NOVEMBER 2021	2 MONTHS	Wan Rozita binti Azman
2.	Kerja-Kerja Mengganti Karpet Serta Kerja Berkaitan Di Masjid Kariah Sg. Talan, Daerah Kuala Pilah, Negeri Sembilan	Forty Nine Thousand Two Hundred and Ten Malaysian Ringgit (RM49,210)	2 AUGUST 2021	13 SEPTEMBER 2021	1 MONTH	Muhd Naim bin Razali
3.	Kerja-Kerja Membina Baharu Pagar Serta Kerja Berkaitan Di Masjid Jamek Dato' Haji Abdullah Sijang Daerah Port Dickson, Negeri Sembilan	One Hundred Eighty Thousand and Thirty Five Malaysian Ringgit (RM180,035)	15 OCTOBER 2021	09 DECEMBER 2021	2 MONTHS	Hasnol bin Zaid

Table 1.2 Project in Progress

CHAPTER 3.0

ROADWORKS

3.1 Introduction to Roadworks

The case study is about road construction (premix work). The project where has started the construction in 9 December 2021 and the prediction to complete this work will be on the same day. The cost of construction approximately sixty three thousand nine hundred and seventy Ringgit Malaysia (RM63,970.000). Currently, the project has done. Thus, the study will be explained not only regarding installation but including the method of premix works, thickness of premix and the problems and solutions of the road constructions. Nevertheless, the study do not conentrate on cost matters and manpower. The site location took place at the Masjid Kariah Temeris, Bahau Negeri Sembilan.

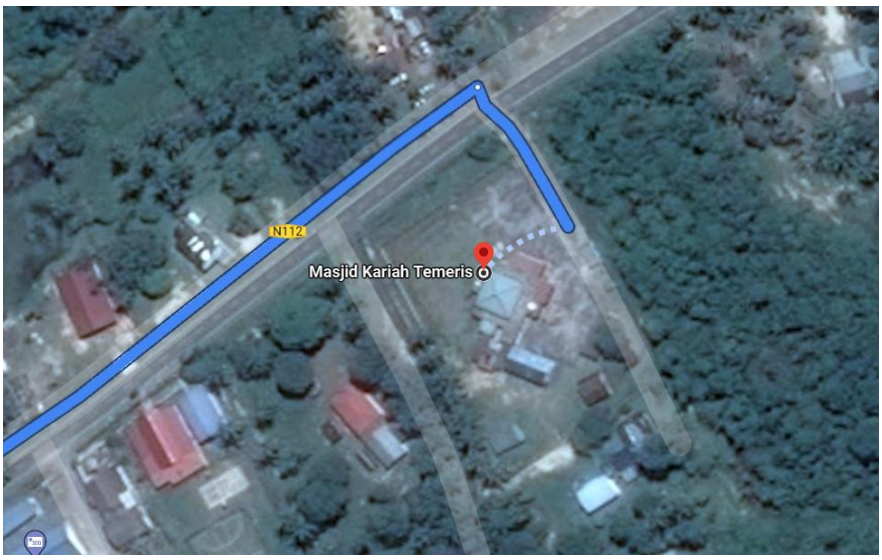


Figure 3.1: Location of site based on the satellite map

Source : https://www.google.com/maps

The project construction located at Masjid Kariah Temeris, Daerah Bahau Negeri Sembilan. This construction area is facing the main road of Jalan Kampung Temeris. The area is quite secluded as it is still surrounded by forest because it is in a village area. The main building close to this construction area is only Pejabat Felcra Kampung Temeris. There are few existing house buildings close the construction area. There are not many buildings there, so to get to the shop or supermarket, residents there have to go to the nearby town that called Pekan Bahau.

The activities that have been carried out on the site is premix work. This uneasy work need to be handle by experienced workers to get a perfect premix work. There are also several unskilled workers that help to take the premix from the quarry using a lorry. The machineries and tools that involve in this construction are backpusher, grader, bitumen sprayer, paver ,roller compactor, electric core drill, core retrieval, presssurized water tank, water recirculator and measuring tape.

3.2 To Identify the Method of Premix Works

Site Clearance

Figure 3.2.1 Checking the original sites to make premix works

Provide workers and other equipment for the work clean, grade and level the existing road shoulders from all unwanted materials from the construction site according to as directed by the supervisor.

Crusher-run

Figure 3.2.2 Seeing the workers put the crusher-run

Supply, transport, unload, level, and compact 300mm thick crusher-run after compaction as directed by the supervisor.

Tack Coat

Figure 3.2.3 Worker is watering tack coat on crusher-run

Supply and water tack coat of cationic bituminuos RS 1K emulsion with a rate of 0.55 liters square meter and above mixed stone foundation surface or existing road surface as directed by the supervisor.

i. Irrigation 1 - after CIPR

ii. Irrigation 2 - before Premix

Resurfacing

Figure 3.2.4 Workers are pouring premix into the paver from the quarry

The premix that workers take from quarry should maintain the temperature that are between 140 degree celcius to 160 degree celcius, If the temperature drop below than that, the premix cannot be use.

Figure 3.2.5 Workers is pouring premix using paver

The skilled workers have to do the pouring works because it takes more experience to make sure the premix work goes well.

Figure 3.2.6 Measure the thickness of premix before compact

The workers measure the thickness of premix before compact to make sure the thickness of premix according to the correct specifications.

Figure 3.2.7 The worker is compacting the premix

Supply, spread and compact premix concrete including watering tack coat according to specifications and as directed by supervisor. Compaction work should have done not long after the paver pour the premix on the original base to prevent problems occurred when the work done.

3.3 To measure the thickness of premix used in the construction (Coring test)

Coring Test

Core tests are commonly used in the concrete industry to evaluate concrete strength, and they can also serve as a one-of-a-kind tool for assessing the safety of existing concrete structures. A large-scale experimental study was conducted to investigate the factors influencing the interpretation of core test results. The programme includes four concrete mixes, three concrete grades (18, 30 and 48 MPa), five core diameters 1.5, 2, 3, 4, and 6 in five core aspect ratios (between 1 and 2), two coarse aggregate types (pink lime stone and gravel), two coring directions, three moisture conditions, and 18 steel arrangements. The results show that as the aspect ratio increases, so does the core diameter, the presence of reinforcing steel, the incorporation of gravel in concrete, the increase in core moisture content, the drilling perpendicular to the casting direction, and the reduction in concrete strength.

Concrete compressive strength is a direct requirement of all concrete structures that must withstand applied forces of any kind. Actually, the compressive strength of concrete is a good predictor of most other properties of practical importance. During construction, standard test specimens are examined to ensure the quality of the concrete. These specimens, which represent the potential strength of concrete, are prepared, cured, and tested in accordance with applicable standards and codes. However, determining the actual strength of concrete in a structure is difficult because it is dependent on the history of curing and the adequacy of concrete compaction. As a result, one question that designers frequently ask is whether standard test specimens can accurately represent in-situ concrete strength. When the strengths of standard test specimens are found to be less than the specified value, the answer to this question becomes even more important. In this case, either the concrete strength in the actual structure is low, or the specimens do not accurately represent the concrete in the structure. Drilling and testing core specimens from the suspected structural member is typically used to solve the problem. Furthermore, it may be impossible to locate and test standard specimens at a later age, and it may be necessary to assess the current strength of a structure to determine whether the strength and durability are adequate for its future use when the concrete is questioned

or the structure is intended to be used under higher stress conditions. The core test is the most useful and reliable way to assess the properties of the concrete in the structure in these special situations. For these reasons, the most common method of determining in-situ concrete strength is to drill and test cores. Although the method consists of expensive and time consuming operations, cores give reliable and useful results since they are mechanically tested to destruction. However, the test results should be carefully interpreted because core strengths are affected by a number of factors such as diameter, l/d ratio and moisture condition of the core specimen, the direction of drilling, the presence of reinforcement steel bars in the specimen and even the strength level of the concrete.

Figure 3.3.1 The workers are doing coring test

1) Impact of Coring Test

The determination of cube strength is the most common and simple method for evaluating concrete strength during the construction of new buildings; however, the absence of cube results or doubt about the results can lead to a critical situation. Furthermore, another approach for evaluating concrete strength is critical during the rehabilitation of existing structures. The testing of concrete elements in existing structures enters the picture at this point. From that point forward, core testing is commonly required in the concrete industry and is thus included in the provisions of most international codes. In fact, in many critical situations, the core test becomes a must and, in some cases, the only tool for concrete quality assessment. From general prospective, core test is ultimately needed to assess one or a combination of the following :

1. The quality of the concrete used in a building (potential strength).
2. The actual strength refers to the quality of the concrete used in construction (in-situ strength).
3. The structure's ultimate capacity to carry the imposed loads; actual loads, design loads, and new additional loads.

Figure 3.3.2 The worker is measure the part of compacted premix that have been taken from coring test

3.4 To determine the problems occurred and solutions taken to solve the problems

Problems that Occurred

i. Alligator Cracking

Figure 3.4.1 Road with Alligator cracking

Alligator cracking is a structural failure caused by a load. The failure can be caused by a weakness in the surface, base, or subgrade a too-thin surface or base; poor drainage; or a combination of all three. It frequently begins as longitudinal cracking in the wheel path and progresses to alligator cracking after severe distress.

ii. Block Cracking

Figure 3.4.2 Road with Block Cracking

Block cracks resemble large interconnected rectangles. Block cracking is not caused by load, but rather by shrinkage of the asphalt pavement as a result of the asphalt binder's inability to expand and contract with temperature cycles. This could be due to the mix being too dry when it was mixed and placed; fine aggregate mix with low penetration asphalt and absorptive aggregates; a poor choice of asphalt binder in the mix design; or ageing dried out asphalt.

iii. Linear Cracking

Figure 3.4.3 Road with Linear Cracking

Linear cracking refers to cracks that run parallel to the centerline or laydown direction of the pavement. Pavement fatigue, reflective cracking, and/or poor joint construction can all cause these. Joints are typically the least densely packed areas of a pavement.

iv. Transverse Cracking

Figure 3.4.4 Road with Transverse Crack

Transverse cracks are single cracks that run perpendicular to the centerline or laydown direction of the pavement. Reflective cracks from an underlying layer, daily temperature cycles, and poor construction due to improper paver operation can all cause transverse cracks.

v. Edge Crack

Figure 3.4.5 Road with Edge Cracks

Within one or two feet, edge cracks travel along the inside edge of a pavement surface. Poor drainage and a lack of support at the pavement edge are the most common causes of this type of crack. As a result, the underlying base materials settle and weaken. Edge cracking can also be caused by dense vegetation along the pavement's edge and heavy traffic.

vi. Slippage Crack

Figure 3.4.6 Road with Slippage Cracks

Slippage cracks are crescent-shaped cracks or tears in the asphalt's surface layer(s) where new material has slipped over the underlying course. This issue is caused by a lack of layer bonding. This is frequently due to the lack of a tack coat to develop a bond between the asphalt layers or the lack of a prime coat to bond the asphalt to the underlying stone base course. A lack of bond can also be caused by dirt, oil, or other contaminants that prevent the layers from adhering together.

vii. Pot Holes Crack

Figure 3.4.7 Road with Pot Holes Cracks

Small, bowl-shaped depressions in the pavement surface that extend all the way down to the base course. They typically have sharp edges and vertical sides near the hole's apex. Potholes are caused by water infiltration and are usually the result of untreated alligator cracking. As alligator cracking worsens, the interconnected cracks form small chunks of pavement that can become dislodged as vehicles drive over them. A pothole is the hole that remains after the pavement chunk has been dislodged.

viii. Rutting Crack

Figure 3.4.8 Road with Rutting Cracks

Ruts in asphalt pavements are depressions in the wheel tracks that have been channelized. Rutting is caused by the lateral movement or consolidation of any of the pavement layers or the subgrade under traffic. It is caused by insufficient pavement thickness, insufficient compaction of the asphalt, stone base, or soil, insufficient asphalt mixes, or moisture infiltration.

Solutions to the Problem Occurred

I. Alligator Crack

Because there is a structural failure, the only solution to alligatoring is to perform a full-depth patch.

II. Block Crack

Less severe cracks, measuring 1/2 inch or less, can be sealed to keep moisture out of the subgrade. For more severe cracks, the cracked pavement layer should be removed and replaced with an overlay.

III. Linear Crack

Less severe cracks, measuring 1/2 inch or less, can be sealed to keep moisture out of the subgrade. For more severe cracks, the cracked pavement layer should be removed and replaced with an overlay.

IV. Transverse Crack

Less severe cracks, measuring 1/2 inch or less, can be sealed to keep moisture out of the subgrade. For more severe cracks, the cracked pavement layer should be removed and replaced with an overlay.

V. Edge Crack

The first step in resolving the issue is to remove any existing vegetation near the pavement's edge and to address any drainage issues. Crack seal/fill the cracks to prevent further deterioration, or remove and rebuild to full depth to address any support issues.

VI. Slippage Crack

All of the "stretch marks" will need to be removed, and a partial or full depth patch will be required.

VII. Pot Holes Crack

Full depth replacement patch

VIII. Rutting Crack

The depressions can be filled and overlaid if the rutting is minor or has stabilised. If the deformations are severe enough, the rutted area should be removed and replaced with appropriate material.

CHAPTER 4.0

CONCLUSION

As for the conclusion, the road construction is important nowadays because most of people are using transportation to go anywhere. From the method of premix works above, to start a roadworks we definitely need a plan from the start until the roadworks done. If the plan does not work out, we need to know what should we do to prevent problems occurred. The machineries and material used in making a premix works also important, so that the road works will work out smoothly.

For the measurement of premix or coring test, we can conclude that to do the roadworks, we have to know about several things such as type of surface to do the roadworks, appropriate thickness of the premix and also the appropriate capacity of the premix area used.

Lastly, as for problems occurred and the solutions, we can conclude that roadworks also need a proper maintenance to make sure the road used do not have a problem after the road construction done. We now know the problems occurred because of some reasons and it can be repair after do some repairing work that have been written above.

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