



اُنِيْوَرْسِيْٓتِيْ تِيْكَنُوْلُوْجِيْ مَآرَا
UNIVERSITI
TEKNOLOGI
MARĀ

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

SEPTEMBER 2014

It is recommended that the report of this practical training provided

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(PERAK)

SEPTEMBER 2014

STUDENT'S DECLARATION

This is a result of practical training report writing works has been produced entirely by me unless start through practical training that I went through a period of 5 months starting from 12 May 2014 and ended 29 September 2014 in TJ Civil Structural And Contactor. It is also as one of the requirement to pass the course DBN 307 and accepted in partial fulfilment of the requirement for obtaining the Diploma in Building.

.....

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Date :

ACKNOWLEDGEMENT

Praise is to Allah who gave me the inspiration and determination to complete my report, during practical training. I want give thanks to my project coordinator of Mr. Kamarul Shahril because he has a lot of guidance and support on all the work I do. I would like to appreciate any guidance and comments given to me during my journey in the practical training.

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Not forget, great appreciation goes to all the staff in the company of TJ Civil& Structural Contractor who helping me during practical training and give their co-operations. I am so lucky to have colleagues who always help and cooperate with all the work I do. Most of my loved ones to which my parents it is my father

and also my mother that give me a lot of motivate and support me, they also helped me during my practical training. Lastly, after done practical training, I found a lot of the difference during the time for jobs and the time for study, and I think without them I might not complete all the paperwork properly and successfully. Thank you very much.

ABSTRACT

The objective of this report is to examine in detail all repairs found in the condominium building. These elements consist of working out how to properly paint the wall outside and inside the construction site. Many place that have problems such as leaks found in the column. This project is very high because it is design with a special design and all the elements found in this are designed to look more interesting. The structure of the pipes also is something that is very important because when the opposite happens then it could cause leakage of damaged structures in the building and can cause critical damage. By identifying the corrective maintenance for all the element, this report provide a contents of understanding and new knowledge on the actual implementation of technical work on site which is normally required a proper management to achieve the date line for this project.

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LIST OF ABBREVIATIONS

TJCSC	TJ Civil & Structure Sdn. Bhd	4
DBKL	Dewan Bandaraya Kuala Lumpur	14
VC	Vacant Possession	14
AC	Air Conditioning	20

CHAPTER 1

1.0 PREFACE

1.1. Introduction

Nowadays there are many ways to do to make a project, but when the building was completed the building must do the maintenance works. Many of the buildings are well maintained as there are many defects, maintenance usually is always given within 2 years to repair all defects found in the building. Main contractor should solve all problems no matter inside or the outside of the building as landscape area.

In a construction between main contractor and sub-contractor their partnership is always required to complete a project properly. Maintenance works related to the defects found are done with that comment list given by the owner of the building. Upon completion of the building defects such defect can be closed and given to the owner for handing over project. Examples of work to be done is such as there is a small hole repair in kitchen furniture because the furniture has already been provided to the owner when the house was sold.

1.1.1 Corrective maintenance

For maintenance works include action necessary for retaining or restoring a piece of equipment, machine or system to the specified operable condition to achieve its maximum useful life. It includes corrective maintenance and preventive maintenance. But, for this report will focus on corrective maintenance.

1.2. Objective

- i. To explore the maintenance works after project was completed.
- ii. To understand the requirement and specification of maintenance.

1.3. Scope of Study

This study was delimited to maintenance work that took place on Cadangan Pembangunan 3 Blok Apartment 10 Tingkat 9100 Unit. This project is under management of TJ Civil & Structural Contractor Sdn. Bhd. (TJCSC). The site location is at PTT106, Seksyen 71, Jalan Syers, Bukit Tunku, Kuala Lumpur. For this project, totally have 3 block apartment 10 floors 9100 unit; Block A, Block B and Block C1 & C2. Facilities Club House 1 floor and 2 floors basement parking.

But, for this report will focus on corrective maintenance works for Block Apartment C2. It is because the block has many defects that should be done the maintenance works. Typical floor plan is attached in Appendix A. For maintenance works the scope of works shall include preparation of equipment to be use for maintenance work such as stopping, silicone, plastering and wood filler. The important works before the contractor want to handling over the project to client. It is to ensuring the work done with successfully and wants to achieve what client desire and the apartment must satisfy the client. For this building, the maintenance works will be done such as scheme work for wall, maintenance for drainage pipe, corrective the tiles which has crack at the swimming pools, and reinstall the manhole ceiling which has damages.

1.4. Method of Study

For overall process of producing this practical report, there is having several methods that has been used to complete this report. For example:

i. Observation

From the site visit to construction site with my supervisor, there is a lot of knowledge that I have learned. For example, I have learned the maintenance work and inspection work and then from the observation, I have implemented the knowledge to do this practical report. Through this method, it helps me more to understanding the maintenance work to the building.

ii. Interview and discussion

Interview the workers and staffs is one of the method for me to gain knowledge about construction industry. While go to the construction site, I take this opportunity to ask the question which is not understand. It will make me become more understand when they explained to me about the method of construction that they have been used. (Appendix B)

iii. Internet

Internet is the one of medium that I use to gain knowledge. Through internet source I can find extra information about piling works. Apart from the internet, I also use references book related to piling works to finish my report. So, based on the information I have found I can use as my references.

iv. Works experiences

Based on the work experiences during practical training for five months, a lot of knowledge that I've get. With the work experience during at site it helps me to understand the situation at the site because the knowledge that I get from class is totally difference when work at construction site.

CHAPTER 2

COMPANY BACKGROUND

2.1 Introduction

TJ Group had its beginning in May 1996 as TJ Civil & Structural Contractor Sdn. Bhd. (TJCSC) when it was established for the principal business of carrying out general contract works for both the private and public sectors. It started out as a contractor of small projects in Kedah, doing rice mills, factories, government buildings and workshops and progressively grew over the years to expand to Selangor and into the housing sector in a big way when it became a Main Contractor for Sime Darby Property Berhad.

Today, it has a creditable client portfolio comprising the Sime Darby Group, I&P Group, Dijaya Group, Lion Group, and Bolton Group. To-date, it has successfully completed more than 840 units of residential houses in the medium to up market category for its clients. TJ Group began diversification to the property development sector in 2008 when it bought a 10-acre piece of land in Sungai Long, Mukim Cheras, Selangor to develop exclusive semi-detached houses. TJ Group is poised for further growth and expansion. It is continually sourcing for viable and parcels for boutique housing development and is open to joint ventures with landowners who are looking to optimise their land values. TJ Group is keen to pursue projects that are distinctive, sustainable, well planned and integrated.

2.2 Company profile



Figure 2.1 Official Logo TJ Group

Source TJ Group Sdn Bhd

Organization names	: TJ CIVIL & STRUCTURAL CONTRACTOR
Register address	: Wisma TJ Group No.7 & 9, Jalan M U8/M, Seksyen U8, Bukit Jelutong, 40150 Shah Alam, Selangor Darul Ehsan.
Telephone no:	03-7845 8958
Fax no:	03-7859 1411
Branches address	: Wisma TJ Group No. 230& 231, Jalan Sahab 2, Shahab Perdana, 05150 Alor Setar, Kedah Darul Aman.
Telephone no	: 04- 732 2614
Fax no	: 04- 732 2562
Type of practice	: Private Company

(**Source:** <http://www.tjgroup.com.my/>)

2.2.1 Vision

Become a world- class service providers and centers of excellence in the field of asset management, project management and engineering scale for the development of human capital based on the country's infrastructure and created an innovate and creative technology.

2.2.2 Mission

We will be a responsible, competent and reliable contractor. We aim to provide total customer satisfaction through high quality workmanship and services by consistently applying quality management and best business practices. We will strive to live up to our integrity and responsibility for quality and safety of projects delivered.

In pursuit of this, we will systematically and strategically develop our human resource to provide them with relevant new skills and technology. We will inculcate among our staff a progressive, honest, trustworthy and positive work attitude and provide them with a pleasant, enjoyable, and safe working environment.

2.3 Organization chart



Chart 2.1 TJ Civil & Structural Contractor Organisation Chart
Source [http: //www.tjgroup.com.my](http://www.tjgroup.com.my)

2.3.1 Roles of workers

i. Manager Director

The managing director is responsible for the performance of the company. He reports to the chairman or board of directors. His responsibilities include:

- Formulating and successfully implementing company policy.
- Directing strategy towards the profitable growth and operation of the company.
- Developing strategic operating plan that reflect the longer term objective.

ii. Sales Executive

Sales executive responsible to:

- Listening to customer requirements and presenting appropriately to make a sale.
- Maintain and developing relationships with existing customers in person and via telephones calls and emails.
- Challenging any objections with a view to getting the customer to buy.

iii. Finance Manager

Finance manager responsible to:

- Establish key financial strategies to enhance business profitability.
- Ensure financial team follows company policies and regulations.
- Develop standards accounting procedures to improve financial operation.

iv. Administrative executive

He job may vary from position to position, but the duties usually involve the following:

- Managing the day-to-day operations of the office.
- Organizing and maintaining files and records.
- Planning and scheduling meetings and appointment.




2.4 List of project

Since TJ Civil & Structural Contractor was established at 1996, many projects were completed by them. This organization is responsible to do the private project and public project such as apartment, houses and gallery. Mostly project are located at area Kuala Lumpur and Kedah.

2.4.1 Completed project

Table 2.1 Completed project

No	Project title	Construction cost	Construction site	Status
1.	 <p>Cadangan mendirikan 9 unit kedai / pejabat 3 Tingkat</p>	RM 1,580,000.00	Lot 564, Kota Sarang Semut, Daerah Kota Setar, Kedah Darul Aman Untuk Kota Semut Sdn Bhd	Completed
2.	 <p>Cadangan Membina 16 Unit Rumah Teres 3 Tingkat</p>	RM 8,908,300.00	Seksyen 1, Kota Damansara Pekan Baru Sungai Buloh Daerah Petaling, Selangor Darul Ehsan	Completed




3.	 <p>Dua Blok Pangsapuri(18 dan 13 Tingkat) 178 Unit</p>	RM 63,856,000	Fasa DM3, Desa Melawati, Mukim Setapak, Wilayah Persekutuan Kuala Lumpur.	Completed
4.	 <p>Cadangan Membina 72 Unit Rumah Berkembar 2 1/2 Tingkat</p>	RM 22,500,000.00	Lot 1431, Bandar Mahkota Sheras, Daerah Hulu Langat, Selangor Darul Ehsan	Completed
5.	 <p>Pembangunan 46 Unit Rumah berkembar Dua Tingkat Dan Tiga tingkat Fasa H4</p>	RM 30,780,000.00	Lot 77299 Seksyen U8, Bukit Jelutong, 40150 Shah Alam Selangor Darul Ehsan	Completed

6.	 <p>Cadangan Mendirikan Rumah Banglo Sebuah</p>	RM 872,000.00	<p>Lot 108, No.2, Jalan Begonia (PT13222) Di Planters' Haven– Desa Impian Menghijau, Mukim Labu, Seremban, Negeri Seremban.</p>	Completed
7.	 <p>Cadangan Galeri Diraja Di Telaga Harbour Park</p>	RM 10,000,000.00	<p>Pantai Kok, Langkawi Permata Kedah, Kedah Darul Aman.</p>	Completed

Sources: TJ Group Sdn Bhd

2.4.2 Project in progress

Table 2.2 On- going project

No	Project Title	Construction cost	Construction site	Status
1.	 Cadangan Pembinaan Blok Apartment 10 Tingkat	RM 64, 658, 000	Syeksyen 71, Jalan Syers, Bukit Tunku, Kuala Lumpur	In progress
2.	 Cadangan Untuk Membina Skim Perumahan 68 Unit Rumah Berkembar	RM 23, 335, 596	Mukim 14, Seberang Perai Tengah, Pulau Pinang	In progress
3.	 Cadangan Pembinaan Banglo 7 Unit	RM 22, 800, 000	Seri Beringin, (area S4) Bukit Damansara, Kuala Lumpur	In progress

Source: TJ Group Sdn. Bhd.

CHAPTER 3

CORRECTIVE MAINTENANCE

3.1 Introduction

Maintenance can be classified into four categories which is corrective maintenance, schedule maintenance, preventive maintenance and predictive maintenance. For this report, it will focus on corrective maintenance works to the building. Corrective maintenance is a form of system maintenance that is performed after a fault or problem emerges in a system, with the goal of restoring operability to the system. Corrective maintenance can be defined as a maintenance task performed to identify, isolate and rectify a fault so that the failed equipment, machine or asset can be restored to an operational condition within the tolerances or limit established for in-service operations. It is also will carried out after failure detection and is aimed at restoring an asset to a condition in which it can perform its intended function.

In some cases, it can be impossible to predict or prevent a failure, making this type of maintenance the only option. The process of corrective maintenance begins with the failure of the structure and failures have occurred simultaneously. Good maintenance is essential to keep machines and work environment safe and reliable. Then, maintenance itself is a high-risk activity and it has to be performed in a safe way, with appropriate protection of maintenance workers and other people present in the workplace. Lack of maintenance or inadequate maintenance can cause serious and deadly accidents or health problems. Appendix C shows example of defect form use in construction site.

(Source: <http://gjax.com/maintenance>)

3.2 Project Background

The purpose Project Cadangan Pembangunan 3 Blok Apartment 10 Tingkat 9100 Units is to gives convenient to the client and to improve the infrastructure and the facilities at there. The project was started on 15 September 2011 and it is located at PTT106, Seksyen 71, Jalan Syers, Bukit Tunku, Kuala Lumpur. Due to the project was located at elite area, so there are a few prerequisites that we have to be complying. Then, the client for this project is Symphony Life Berhad and the Contractor belongs to TJ Group Sdn. Bhd. TJCS responsible to handle C & S work, finishing, infrastructure and landscaping works. For mechanical & electrical, the client was engaged others sub-contractor to fulfil including lift works, fire fighting, telecommunication, security and CCTV, water reticulation and other related works.

The total cost for this project is RM 64, 658, 000.00 and the project is expected to be complete in 21 March 2014. For now, the maintenance progress for this project is almost 90% completed. The certificate of practical completion (CPC) was obtained on 1/1/2014 and CF obtained local authority from Dewan Bandaraya Kuala Lumpur (DBKL) on end of January 2014. The key handing over or Vacant Possession (VP) date started since March 2014. For defect works under Defect Liability Period, the company was responsible to maintain the building up to 24 months.

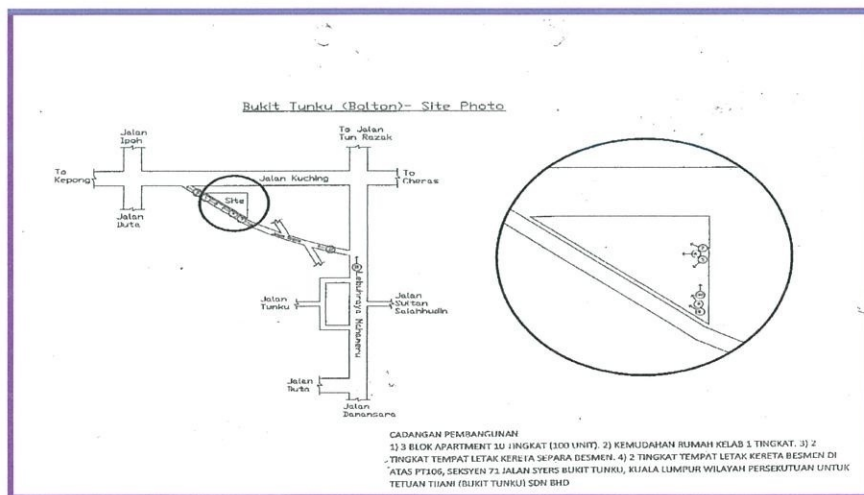


Figure 3.1: Location Of The Project
Source: TJ Group Sdn. Bhd.

3.2.1 Organization project

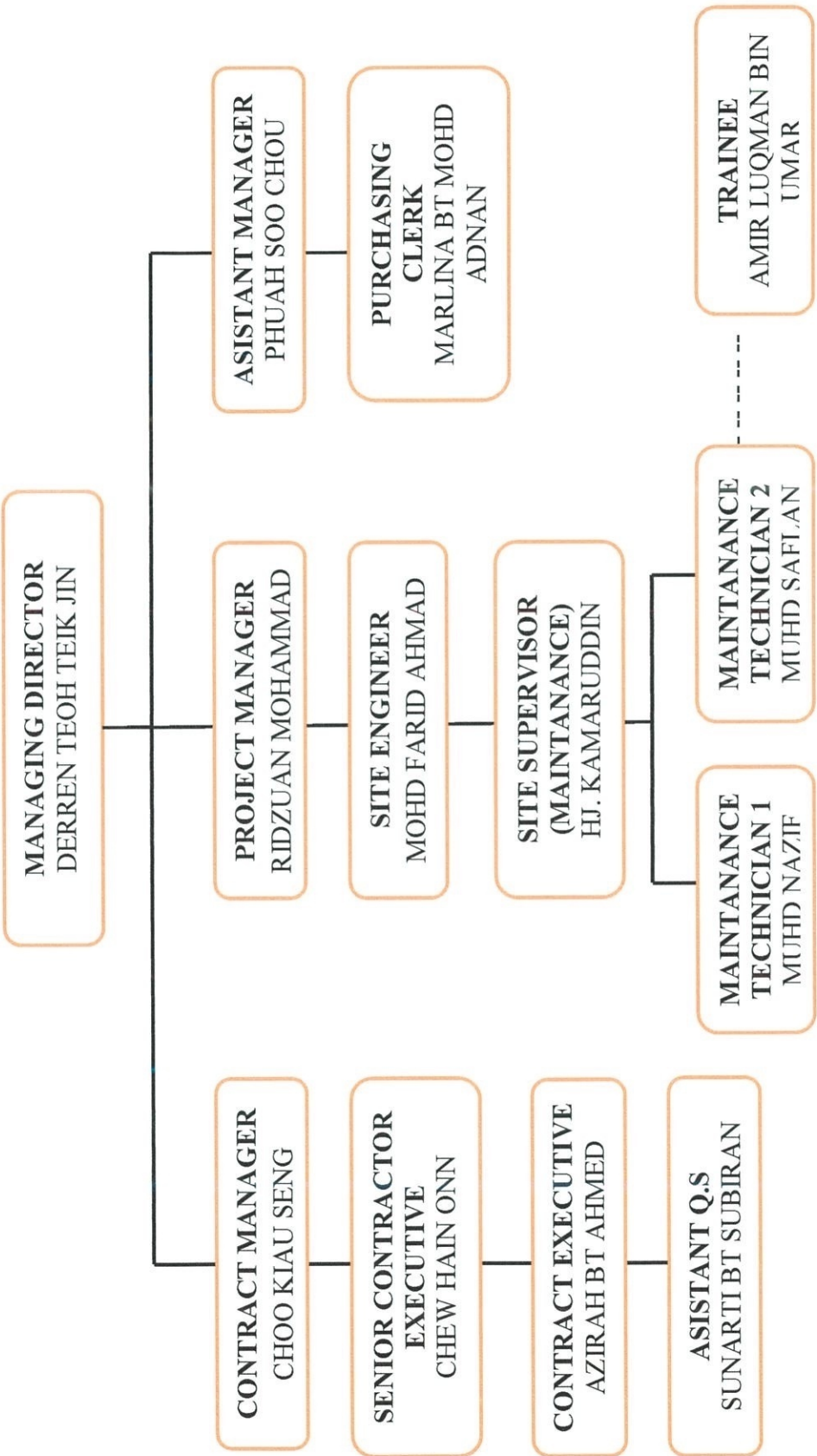


Chart 3.2: Organization charts at construction site
Source: TJ Group sdn bhd

3.2.2 Personnel involves in construction

i. Project Manager

Project manager prepares preview, inspect, evaluate and report quality and progress of the work and workmanship and adjust schedule if necessary.

Manage the production team to ensure timely and successful completion of the works and ensure corrective actions are implemented as requested.

ii. Quantity surveyor

Quantity surveyor prepares cost estimation before any construction project begins. The quantity surveyor is responsible to prepare overall cost of a project during the management stage. Among the roles of quantity surveyors are to:

- a) Prepare and check project cost estimation and control total expenditure.
- b) Prepare and check tender document, manage tender award, issue tender form and tender opening and receiving tender.

iii. Site supervisor

Besides working as the consultant's assistant, a site supervisor also plays his specific roles. Among the roles of site supervisor are to:

- a) Supervise and coordinate construction work at the construction site.
- b) Supervise work carried out by the workers under his supervision such as technician and draughtsman.

iv. Skilled worker

Working on site is the responsibility of skilled workers who have the expertise and experience in their work. Their job is set based on their skills as follows:

- a) Earthwork
- b) Reinforced concrete work
- c) Painting and finishing work
- d) Carpentry work and roofing works

(Source: Civil Engineering Studies, 2007)

3.3 Purpose Of Corrective Maintenance

The main objectives of corrective maintenance are the maximisation of the effectiveness of all critical plant systems, the elimination of breakdowns, the elimination of unnecessary repair, and the reduction of the deviations from optimum operating conditions.

Corrective maintenance is different from run to failure maintenance in that its activities are planned and regularly taken out to keep plant's machines and equipment in optimum operating condition. The difference between corrective maintenance and preventive maintenance is that for the corrective maintenance, the failure should occur before any corrective action is taken.

3.3.1 Before starts the corrective maintenance works

Measures and care should be taken by the contractor before do the works at construction site to avoid from injuries to the workers and damages to the building. Before starting the corrective maintenance works, there are a few prerequisite that has to comply with the workers.

- i. The specialist contractor should decide whether the work should be done or not and never take on work for which if the workers not prepared or competent.
- ii. The workers should be plan the work carefully before start working, ideally using the manufacturer's maintenance instructions and produce a safe system of work. It will help to avoid unforeseen delays and reduce the risks.
- iii. The maintenance staffs that are competent have to ensure that the workers wear an appropriate clothing and equipment to avoid an accident during do the maintenance works.

3.3.2 Maintenance works process

Maintenance works process in important things that we should consider before construction works start. It is because we can use it as a guideline for maintenance works after completes the project. Chart below shows the schedule of maintenance work process implemented by this construction project.

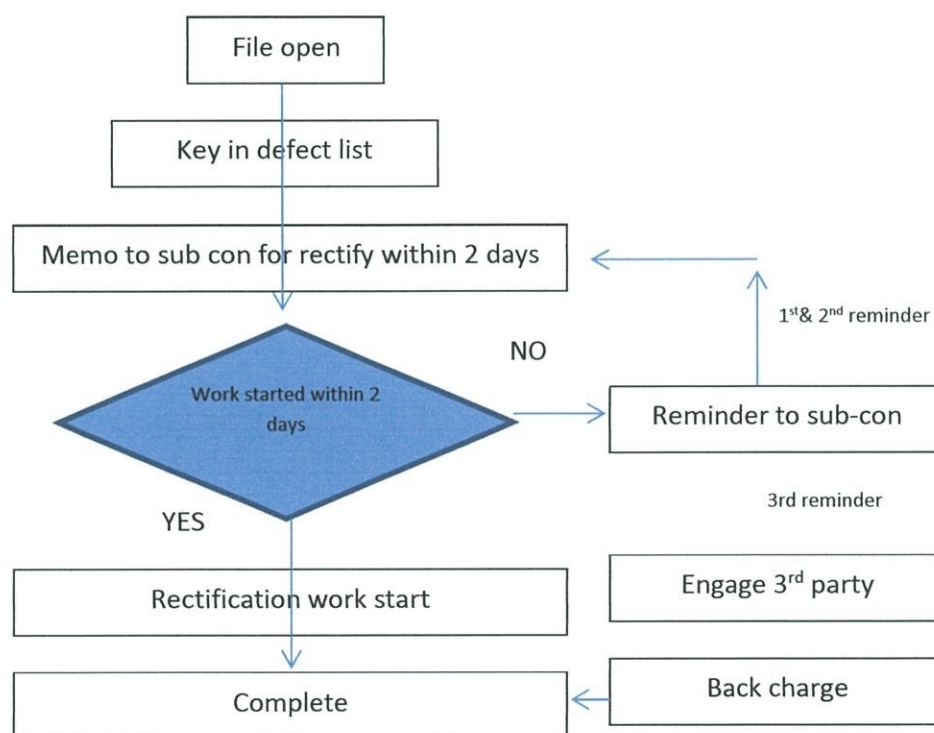



Figure 3.2: The maintenance work process

Source: TJ Group Sdn Bhd

The process start from above which is when the file defect is open and then give to the client to list all defect in their house such as problem with timber floor, window frame, doors and air conditioning system. Then, the form will pass to the sub contractor to rectify the defects and does maintenance work within 2 weeks. If the maintenance work start within two days means the work will become complete and if the rectify work do not start within two days, the contractor have to reminder to the

sub contractor until the work is done. Furthermore, the back charge will be give if the sub contractor does not complete the maintenance work in time given the sub contractor.

For each defects list, the client was set to duration for corrective maintenance works completed in two weeks. Therefore, each unit must start the physical work at least 2 days after defect form list received and to complete the defect at least 10 days from date start. For example, the below defect list which received from unit no.1 level 1 at block C (unit type C1):



SITE MEMO

Project No. 0809

ARATA - BUKIT TUNKU

To: cc			
<input checked="" type="checkbox"/> TLJANI (BUKIT TUNKU) SDN. BHD.		<input checked="" type="checkbox"/> Fax: 03-7849428	<input type="checkbox"/> Hand <input type="checkbox"/> Email
<input checked="" type="checkbox"/> CARCH ARCHITECTURE & DESIGN SDN BHD	Mr. CHEW CHU WAI Mr. CHUM Ms. WAN JUANIA	<input checked="" type="checkbox"/> Fax: 03-75496869	<input type="checkbox"/> Hand <input type="checkbox"/> Email
<input type="checkbox"/> SIDA ENGINEERING SDN. BHD.	Mr. CHURU THIN SOOI Mr. YAP KAU HIN	<input type="checkbox"/> Fax: 03-67066079	<input type="checkbox"/> Hand <input type="checkbox"/> Email
<input type="checkbox"/> BAHARUDIN ALI & LOW SDN BHD	Mr. WONG CHEE TENG	<input type="checkbox"/> Fax: 03-9285482	<input type="checkbox"/> Hand <input type="checkbox"/> Email
<input type="checkbox"/> MFP ENGINEERING SDN BHD	Mr. STEVEN WONG Ms. CHENG S.	<input type="checkbox"/> Fax: 03-78663830	<input type="checkbox"/> Hand <input type="checkbox"/> Email
<input type="checkbox"/> PENTAGO LANDSCAPE SDN BHD	Mr. EFFENDI Mr. MURUGUS	<input type="checkbox"/> Fax: 03-2282016	<input type="checkbox"/> Hand <input type="checkbox"/> Email
<input type="checkbox"/> DISKINSTREAM SDN BHD	Mr. NG VIN FAE	<input type="checkbox"/> Fax: 03-42042077	<input type="checkbox"/> Hand <input type="checkbox"/> Email
<input checked="" type="checkbox"/> T.J. CIVIL CONTRACTOR SDN BHD	Mr. EUGENE TION Mr. ANNE SITI AL GHAZ Mr. NO KIM HAN	<input type="checkbox"/> Fax: 03-78304411	<input checked="" type="checkbox"/> Hand

Subject: **VP - Defect List on Unit C-3A-3A.** Date: 3/3/2014

From: W W. LAI Ref: 0809TBT-ARATA-VPAR-03-055

Attached herewith, defect complaint for unit C-3A-3A dated 3/3/2014 for your action.
You are required to complete the entire defect in 14 working days.
Your cooperation is much needed.

Thank You,

Sincerely,
For TLJANI (Bukit Tunku) Sdn. Bhd
W.W. LAI (Clerk of Works)

T.J. CIVIL & STRUCTURAL CONTRACTOR SDN BHD (786756-01)	
Proposed 3 (Work) 10 (Share Agreement as PT) 10	
Received by Date Time	
Signature	9/3/14 11:46 am
Stamp	

Action required by	Immediate	Reply Ref
Reply / Action taken	Yes	Reply Date
Resident Engineer Sign-off		

The information contained in this form is CONFIDENTIAL INFORMATION and may also be LEGALLY PRIVILEGED. It is intended only for the use of the addressee. If you are not the addressee, you are hereby notified that any use, review, dissemination, distribution or copying of this document is strictly prohibited. If you have received this document in error, please notify us by telephone and destroy the original document.

Figure 3.3 Example of defect form

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ARATA - Service Request Form

Ref No.: _____

Name: A.R. Sinnathuray & Claire Quinn (Owner or Authorized Representative only)

Email Address: quinn302@gmail.com Tel / Unit No: C-3A-3A

Tel - Mobile: _____ Fax: _____

Received by: _____ Received Date & Time: _____

No	Area / Location	Description	Remarks
	LIVING ROOM - WINDOWS	All windows chipped / marked - Paint marks on most windows SEALANT AROUND PT window bumpy - not filled properly Paint on windows (long windows on the door) For KHS window - frame chipped & opening Sealant not fixed to the bottom hot air blowing in @ join in the middle of the windows - Seal needs to be at bottom of window For hook - rusted looking - Paint Outside ledges - need smoothed / cleaned & painted Rm doors need repaired	Reflex B B

Name: _____ Date: _____

INSPECTION & COMPLETION

Investigated by: _____ Dept: _____ Date & Time: _____

Remarks: _____

Investigation acknowledged by: _____ Sign: _____ Date & Time: _____

Action taken by (if any): _____ Dept: _____ Date & Time: _____

Remarks: _____

Completion of work certified by: _____ Dept: _____ Date & Time: _____

Remarks: _____

* To Inform CRM in writing within 24 hours of completion

ACCEPTANCE OF WORKS BY OWNER / AUTHORIZED REPRESENTATIVE

I hereby acknowledge that my request(s) / feedback(s) have been attended to satisfactorily.

Sign: _____ Date: _____

Name: _____ Remarks: _____

At Symphony Life we take customer satisfaction very seriously, these inputs are important for us to improve our services to you. Please let us know if anything does not meet your expectation by contacting us at +603-7844 6866 or at crm@symphonylife.my. We appreciate all your suggestions and comments. Thank you.

Figure 3.4 Example of defect list 1

ARATA - Service Request Form

Ref No.: _____

Name: A.R. Sinnathuray & Claire Quinn (Owner or Authorized Representative only)

Email Address: quinn302@gmail.com Tel / Unit No: C-3A-3A

Tel - Mobile: _____ Fax: _____

Received by: _____ Received Date & Time: _____

No	Area / Location	Description	Remarks
	Bath 2	Tiles chipped round hole / drain in Shower All walls need touched up Condo needs cleaned, paint on air cons, tiles throughout condo. Appliances need cleaned Tiles need cleaned, floors polished All outside areas not finished, cement needs smoothed, cleaned & painted. Windows outside need cleaned Outside Entrance to Condo, tiles not cleaned, lift not cleaned. All common areas not cleaned or work completed Access to stairs parking not working	Replace tiles (5) (4) (6) (7) (8) (9) (10) (11) (12) (13) (14)

Name: _____ Date: _____

INSPECTION & COMPLETION

Investigated by: _____ Dept: _____ Date & Time: _____

Remarks: _____

Investigation acknowledged by: _____ Sign: _____ Date & Time: _____

Action taken by (if any): _____ Dept: _____ Date & Time: _____

Remarks: _____

Completion of work certified by: _____ Dept: _____ Date & Time: _____

Remarks: _____

* To Inform CRM in writing within 24 hours of completion

ACCEPTANCE OF WORKS BY OWNER / AUTHORIZED REPRESENTATIVE

I hereby acknowledge that my request(s) / feedback(s) have been attended to satisfactorily.

Sign: _____ Date: _____

Name: _____ Remarks: _____

At Symphony Life we take customer satisfaction very seriously, these inputs are important for us to improve our services to you. Please let us know if anything does not meet your expectation by contacting us at +603-7844 6866 or at crm@symphonylife.my. We appreciate all your suggestions and comments. Thank you.

Figure 3.5 Example of defect list 2

Defect form and defect list above was used for defect liability period. The content of the form includes the problem such as air conditioning problem, window frame problem, aluminium problem, plastering problem, grouting problem and water features problem. Most of the problem encountered from the material used is do not have quality and misused equipment. Besides that, the weather also affects the existence of the problems. The special defect that will highlights for this report is problem according to water features. It is because the water features is difficult to repair and it also take time because it involves the solid concrete and water drainage. The detail of the problem with water features and others will be described in detail below.

3.4 Air conditioning works

Air conditioning systems are very straight forward in their purpose. That purpose is to cool the air that moving through the room. This result is achieved by blowing the air entering the room over a cooled surface which transfers the heat from the air to the coolant liquid that is flowing through the unit.

There are many types of air conditioning systems that can be used in the home including window, portable, ductless and central air conditioning systems. Air conditioning works as a machine that takes heat from the house and dumps it outside by using five interrelated parts:

- Refrigerant
- Compressor
- Condenser
- Expansion valve
- Evaporator coil

The components are illustrated by photograph in Appendix D.

i. Refrigerant

The refrigerant is the blood pumping through the air conditioners system. It changes state from gas vapour to liquid as it collects heat from house and rejects that heat to the outside. Refrigerant is special in that it has a very low boiling point meaning that it changes from a liquid to a vapour at low temperatures.

ii. Compressor

Compressor is the sort of heart of the system pumping the refrigerant through all the refrigerant components in a big loop. Refrigerant enters the compressor as a low pressure warm vapour and leaves it as a high pressure hot vapour.

iii. Condenser

From the compressor, hot refrigerant vapour moves to the condenser. Here the high pressure hot refrigerant vapour is cooled by air blowing over finned condensing coils by the condenser fan as it moves through the finned coils. As the refrigerant cools it changes state from a hot vapour to a hot liquid at high pressures and moves onto the expansion valve. The compressor, condenser coil and condenser fan are all located in the big noisy box thing in back yard often called a condensing unit.

iv. Expansion valve

The expansion valve is really what does the work. As the hot liquid refrigerant passes through a tiny opening at high pressure in the valve on one side, it emerges as a cool low pressure mist on the other side because as a gas expands, it cools. So now a low pressure cold liquid mist that moves onto the evaporator coil.

v. Evaporator coil

The low pressure cold liquid leaving the expansion valve now runs through the evaporator coil located in the plenum of your furnace. Here the hot air of home blows across the evaporator coil and heats it up while the cold coil cools off the air blowing across it and back into the room. As the refrigerant heats up, it boils and changes from a cold liquid and evaporates into a warm vapour. From there it moves back onto the compressor and exterior condensing unit and the cooling cycles continues.

These components that has stated above are used in the air conditioning system. The components are important in the air conditioning system. If one of the components is not available, then the air conditioner will not operating with properly well.

(Source: <http://meyerscompaniesinc.com/blog/air-conditioning-some-common-problems>)

3.4.1 Defects on air conditioning system (AC)

Air conditioning may be required in buildings which have a high heat gain and as a result a high internal temperature. Since air conditioning is expensive to install and maintain, it is best avoided if possible. There are many things that can go wrong in air conditioning system. It is often to create problems when the building was completed. Lack of maintenance can lead to minor problems, which will eventually snowball into major issues that can cost quite a bit of money to repair. The following shows defects in the AC system.

i. Problem with the drainpipe

A drainpipe is extremely important, in regards to any AC unit. Its main purpose is to remove any condensation, caused by warm airflow coming into contact with air conditioner. Photo 3.1 shows the problems occur during construction in air conditioning system are drainage system. When air conditioners condensation pumps breaks, pooling water happens. This can cause problems depending on where air conditioning unit is located. Then, if the air conditioner pipe is clogged, the water flow out from the pipelines and can cause damages to the wooden floor. It also makes the air conditioner less effective and can cause electricity bill to rise as it takes more energy to cool the home.



Photo 3.1The drainpipe of air conditioning

ii. Clogged Condensation Line

A second cause can be due to the next problem is improper cleaning of air conditioning system. Workers usually do not care too much towards cleanliness. When they act like this it will cause many problems after all the works has been complete. If they do not keep the unit clean it cannot run effectively. Think of it as trying to breathe when you have something over your face; it is just same like air conditioner system. If a concrete is often clogged in the condensation line, it cannot pull in enough air to cool and it also will bother the system to running well. The inside component of an AC system sits inside of a drip pan, which is designed to collect water if the unit's condensation drain line becomes clogged. This problem can occur when insects build their nest inside the drain line. To clearing the clogged the workers must prepare a solution that consists of a bleach and water then pour it into the drainpipe to eliminate mould and mildew.

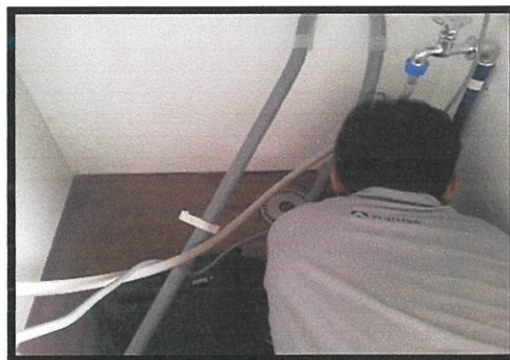


Photo 3.2The workers clearing the clogged

iii. Problem with remote control and socket

Then, the next problem is related to remote control and socket of AC. Photo 3.3 shows the socket and photo 3.4 shows the remote control of control AC is not working properly and smoothly. The problems happen because of improper installation and the worker do not use quality equipment. So, the site supervisor have to monitor their workers during installing the remote control to avoid from the problems happen because everything with houses is about maintenance, it is much less expensive to keep up with repairs than to replace broken items. A malfunctioning LED light on the tip of the remote control might be the cause of a remote control malfunction. If the card fails to respond to the remote control commands, then the LED is broken and worker should replace the remote control or fixed it. For sockets, the installation method is not according to proper way and it cause non-functioning.



Photo 3.3The worker is repair the socket

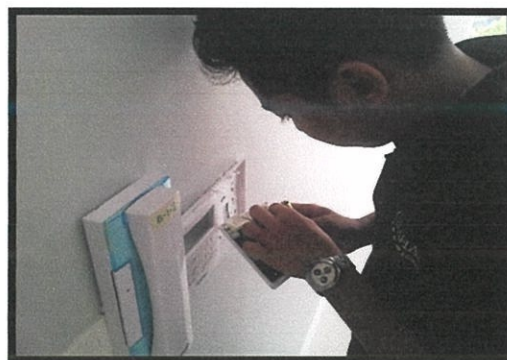


Photo 3.4 The worker repair the remote control

3.4.2 Corrective maintenance for socket and remote control works

- i. Flush-mounted socket and two-way plug adaptor. Box for flush-mounted sockets are 25mm-35mm deep.
- ii. Surface-mounted socket and 13 amp plug. The live and neutral pins are sleeve for protection. Wiring up a single socket. Strip about 20mm insulation from the cores and connect to the terminals.
- iii. Connecting a twin socket. Cover bare earth wires with lengths of PVC slaving before connecting.
- iv. Unscrew the cover of an existing socket to check that it is suitable for connecting to a spur.
- v. Mark the position for the new spur socket, then cut the recess for the box and the cable chase. Push a cable through the conduit from the original box. Remove the outer sheathing.
- vi. With the sheathing removed back to the edge of the box, bare the ends of the wires with wire strippers.
- vii. In the box of the original socket, twist the end of each group of wires together. Wire up the cover plate and screw it back into place on its mounting box. Then test the new socket.

That is the way to install the socket for maintenance works. It is important to do the right way because it involves the electric circuit. If the workers install the socket in improper way it can cause die to the people.

(Source: Home Repair and Maintenance, 2014)

3.5 Windows frame works

Silicone is used to seal joints between two surfaces. It can be used indoors or outdoors, between almost any surfaces. It's pretty useful stuff to have around the home. But there is more than one kind and a few things we need to know to help you get the best out of it. In building and construction, silicone sealants make construction materials work better and last longer. Silicones adhesives bond diverse materials such as concrete, glass, granite and plastics. Sealants and coatings also protect joints and materials from moisture, heat, corrosion and other chemicals.

To choose the right sealant for the job, first take a close look at the problem that trying to fix. Make sure that the surface you are going to silicone is clean, dry and well prepared. This is essential to achieving good adhesion and a smooth bead. Using a utility knife, remove any remnants of old silicone as new silicone will not adhere to it. After remove the most of the old silicone with a blade, clean any remaining residue with fine sandpaper.

3.5.1 Defects on window frame

For the next defects in maintenance work are problems encountered at window frame. There are many factors that can contribute to the problems such as the workers are not installing the silicone in correct way. Silicone is normally used in window frames like in the kitchen, living room and yard. The maintenance work was doing after the contractor instructed the workers to do so. Window frame is extremely important to the feature of window because it will show the aesthetic value to the home or building. The example of problem with window frame works is improper installation a silicone.

i. Problem with silicone sealant

Normally, client was complaint about window frame because they are not satisfied with the silicone neatness that was made on it. It causes the silicone sealant that has been used by worker on the frame change colour to yellowish. The things happen may cause by the workers not install silicone sealant is not properly made. Besides that, the silicone sealant also do not withstand the affect of constant immersion in water, so the result is the window frame will looks old and yellow. Photo below show the worker install the silicone sealant to the window frame.



Photo 3.5 The worker replaces a new silicone at living area

3.5.2 Corrective maintenance for the silicone replace works

Following is the procedure to replace the silicone:

- i. Make sure that the area that wants to silicone is clean and dry. If filling between glass and aluminium, or whenever a smooth straight edge is required, use masking tape and mask off. Take the tube of silicone and using a knife to cut the end from the tapered nozzle. The further away from the end of the nozzle. The bigger the bead of silicone that will be available.
- ii. Pull the handle of the caulking gun all the way back and put the tube of silicone in the gun. Turn the handle down and push the handle until it stops against the end of the tube

- iii. The recommended way to silicone is to push the bead of silicone ahead of the nozzle. This prevents air bubbles forming under the sealant. Use constant pressure on the trigger to ensure an even flow of the silicone. Seal the entire length. When the work had done, make sure that the workers turn the handle up so that the pressure on the tube is released.
- iv. Ensure that the silicone bead is unbroken. If it isn't, smooth with the filling knife dipped in a water and detergent solution. Then remove the masking tape before the silicone starts to cure. Photo 3.4 and 3.5 shows the workers replace a new silicone for window frame.



Photo 3.6 The worker replace a new silicone at the kitchen

3.6 Aluminium works

Aluminium materials are characterised by their lightness, high durability and formability leading to a wide range of product forms and extensive use in engineering applications. However, despite its high durability and corrosion resistance, some simple steps should be employed when handling and cleaning aluminium to avoid staining and damage as some alloys tend to be quite soft.

To preserve the powder coated finish on aluminium windows and doors, regular cleaning is required. The cleaning should be performed using hand-cleaning and rising techniques. Aluminium is a lightweight alternative, weighing approximately one-third that of steel. While aluminium does not have the same tensile properties as steel, it will not oxidise as vigorously as steel, making aluminium the material of choice for salt water environments. The following is the characteristic of aluminium:

- Strong and lightweight
- Excellent corrosion resistance
- Good heat and electrical conductor
- Versatile surface finishing options
- Easy to work and easy to recycle

Handling of Aluminium

To avoid damages to the surface of aluminium components, some care is needed in handling. This includes:

- Avoid allowing aluminium to scrape against hard or sharp surfaces
- Use two people when stacking or moving sheets to avoid dragging them over one another.
- In order to avoid distortion or damage, use soft slings when lifting heavy components.

3.6.1 Defects of window glass

Window is the one of components in building. Care should be taken by workers during construction in order to avoid any problems or damages occur after completion of construction. When there is defects occur on the surface of window, the contractor has to spend money to do the maintenance works. The big problems to the work of the windows are made of aluminium glass. The disadvantages of aluminium glass are it is easily scratched if it is exposed to rough object. So, to get rid of scratches, the workers have to polish the glass carefully to prevent glass from cracked or broken. If it is not work, the glass have to be replaced with a new one and when the things happened the cost of project will increase.

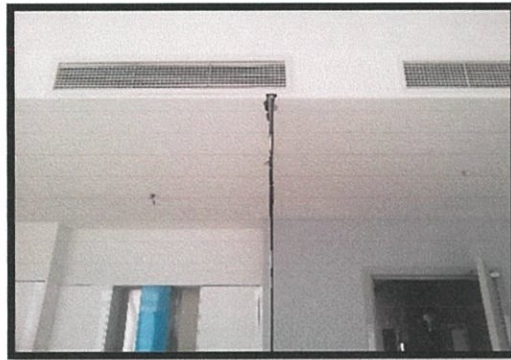


Photo 3.7 Defects of window glass

3.6.2 Corrective maintenance for aluminium window works

- i. Inspect the window and ensure that it is the right size and shape by using measuring tape. Check for damage such as cracks, gaps or twisted framing.
- ii. Remove packaging material from the window until and clean the frame with a cotton cloth. Check the lock to make sure it functions properly. Leave the unit in the locked position for installation.

- iii. Use a weather seal silicone caulk on any gaps in the formwork, making sure not sealing the working portion of the window. Apply a thin coating of spray adhesive to the rough opening of the window frame. Make sure not to spray the glass window.
- iv. Prepare the sill pan. The sill pan diverts water away from the window to the outside and helps avoid water damage. The window should sit in the sill pan on the rough opening. Then, install the sill pan.
- v. Check the window and position with its right side up and right side out. Test the window to make sure it will open and close and its lock works before completely securing the frame. If there are no loose ends, the installation is finished.



Photo 3.8 Worker replace the silicone sealant

3.7 Plastering works

Sand- cement plaster is used extensively in building work as a decorative or protective coating for concrete, masonry walls and concrete ceilings. The aim of this publication is to provide the information needed for successful plastering. Aspects dealt with include the selection of materials, surface preparation and correct plaster application. For this project, they have chosen the Davco (M) Sdn. Bhd as their suppliers for the skim coat. So, the flier according to skim coat is attached in Appendix E.

Plaster has important requirements in the fresh and hardened states. In the fresh state, plaster must be workable and cohesive. In the hardened state, plaster must be:

- a) Strong enough to hold paint and withstand local impact and abrasion.
- b) Free of unsightly cracking and well bonded to the substrate.
- c) Have an acceptable surface accuracy and have an acceptable surface texture.

The properties of hardened plaster depend on the properties of the fresh plaster and the substrate and on workmanship.

3.7.1 Defects of plastering works

Defects of plastering works often occur on the walls, door, coping and ceiling. This scheme works are usually done on the walls and ceiling that have an uneven surface or a wall that has a cracks. The defects occur because of the workers do the plastering work with improperly way. When the workers do not work in a proper manner, the problem related to plastering works will occur on the surfaces of walls and ceilings. Besides that, the weather also affecting the defect of plastering on wall such as rain and sunlight ray. When the defects happened the corrective maintenance should be taken by workers. They have to re-plastering the walls that has a problem.

i. Problem with scheme work on walls

Firstly, the workers must dig out of cracks by using a nail to make a deep hole to facilitate scheme works by using stopping because it is suitable to be used on the walls. It will help workers do the scheme works easily by using stopping. The scheme work will take a few hours to drying. After the wall surfaces have fully dried it should be rubbed with sandpaper to get a flat wall surfaces. When the scheme work done, the wall surfaces should be repainted to give a beautiful surfaces. Photo below shows the workers do the scheme works on the wall and ceiling by using a stopping.



Photo 3.9 The scheme work on the wall



Photo 3.10 The scheme works on the ceiling

ii. Problem with scheme work at coping

Apart from the defects on wall and ceiling surfaces, there is also has a defects on the door. To make maintenance works on the door, the worker cannot use stopping to do the scheme works but they have to use the wood filler. Wood filler suitable to be use on the timber surfaces because it is strong and durable. Scheme work on the door was due to the defect on the uneven and rough surfaces. The attitudes of workers during do the work cause the following problems to the door surfaces.



Photo 3.8 The scheme work at coping

3.7.2 Corrective maintenance for scheme works

- i. Before begin to re-plaster a patch, use a hammer and bolster to cut straight lines round the area. This makes plastering much easier.
- ii. Scrape some of the mixed plaster from the spot board onto the hawk with the laying-on trowel. Then trim off an excess plaster. Hold the laying-on trowel at an angel over the hawk and tilt the hawk slightly in order to snatch up a manageable amount of plaster.
- iii. Hold the trowel against the wall surface, keeping its upper edge tilted backward at an angle about 30. Draw it's upwards over the patch. Apply

further undercoat plaster until the patch is filled in and the new plaster is level with the old surrounding plasterwork.

- iv. Take a straight-edge length of wood that is a little longer than the patch and draw it upwards to make the plaster flush with the edges. Use the laying-on trowel to trim away any excess undercoat plaster around the edges of the patch and on the surrounding wall area.
- v. To make room for the final coat of plaster, run over the surface of the undercoat using the skimming float to flatten and cut it back.
- vi. As the finishing plaster begins to set, dampen it slightly with the distemper brush. Take care not to use too much water at this point. Wet the laying-on trowel and smooth it over the surface in circular movements. Finish off with light, upward strokes laying-on trowel.

3.8 Grouting tiles

Grouting is the process of filling the spaces between the tiles. The filler grout comes in powder form in premixed colors. It also is available in pre-mixed containers as well. For a strong and color fast grout, get the right consistency using the least amount of water possible. The grout should mix thoroughly to minimize color variation. Before grouting tiles, let the tile adhesive cure for at least 24 hours. Then, removes the spacers with a spacer puller and clean any adhesive out of the grout lines with a bristle brush before applying the grout. Grouting tile is not difficult to do well, but unfortunately it is even easier to do poorly. The tools involved in grouting tile are few and not very specialized. The only real special tool is rubber grout float. The flier related to grouting tiles from Davco (M) Sdn. Bhd. is attached in Appendix F.

3.8.1 Defects on grouting tiles work

i. Grouting problems

Grouting work is done after the installation of tiles on the floor: they use white cement and placed in each of the tiles cracks. Cement eventually becomes black and unattractive surface and looks bad. Therefore, the client includes a grouting defect as one of the defects found in the house in the defect form. Then, when the contractor received the complaint towards the problem, they will do the maintenance work immediately by refer the defect lists.



Photo 3.12 Ceramic tiles damages

3.8.2 Corrective maintenance for grouting work

Grouting tiles work should be done as the following:

i. Mixing the grout

When mixing grout, pour about $\frac{3}{4}$ of the recommended amount of water in the bucket and then add the grout. Once mixed, add the remaining water to achieve the desired consistency.

ii. Using a float

Press the grout into the spaces between tiles by first moving the float across the spaces at a diagonal to make sure the grout line is filled. Then do a second swipe over the top to clean off the excess.

iii. Removing the excess

After the grout sets for 15- 30 minutes, wipe up the excess grout with water and sponge. Wait three hours and do it again, this time making sure there isn't excess grout on the tile or outside of the grout line.

iv. Wiping the floor clean

Once everything is dry there will be a grout haze on the floor. Use a wet cloth to wipe it off and use a dry towel to rub off any haze.



Photo 3.13 The workers do the grouting works

3.9 Waterproofing works

In modern home developments, it is often required by state or local regulations to have a waterproofing system installed before the completion of the home. It is extremely important to ensure that valuable assets such as home and buildings are waterproof correctly. Without the proper installation of a waterproofing system, the home is at risk for water damage.

A good waterproofing system can help minimize water damage and the growth of black mould in prone areas. The example of water proofing used by them is attached in Appendix G. Other factors to consider when implementing a waterproofing system are the climate, landscape, weather and terrain of the area. Water can build up because of cracks in walls or the floor, improperly installed or no footer tiles, pressure build up from the floor or walls, leaks from sweating basement pipes and for many other reasons as well.

(Source: https://osha.europa.eu/en/topics/maintenance/index_html

)

3.9.1 Defects on water features

The problem of water features start when it's running after handing over project. The water flow out through floor tiles and goes to electrical room that nearest to water features 2. When the problem occurs, the engineer and the architect are trying to find the cause of the problems and want to solve it. After the problem has been identified, they were found that the problem was due to the water flow out from water features through the cement mortar below the tile granite. Then, the architect gives an instruction to the contractor to do the maintenance work for the water features by providing a concrete kerb along the water features to separate between the pool area and the route. Photo below shows the defects on water proofing occur.



Photo 3.14 Defect on water features

The figure below shows the illustrated problem with water features. The arrow shows the ways of water seeping. After doing the observation they found that the water flow out from water features through underneath granite. So it cause the over flow and cause damages to the granite tiles. If they let the water overflow it also can cause waste to water and the bill of water become expensive. Then, they cooperate together to overcome the problem occur.

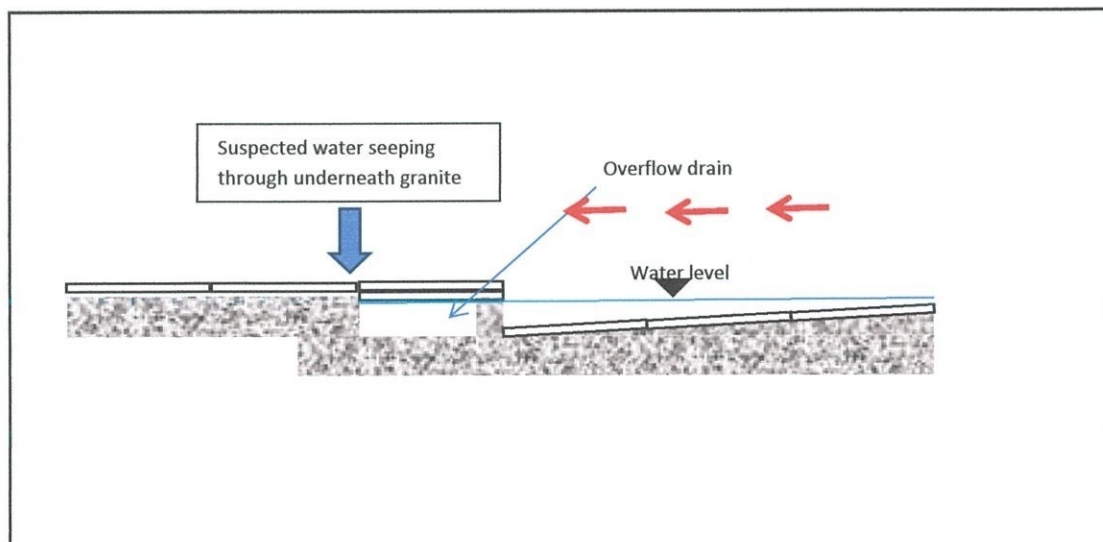


Figure 3.4 Cross-section of water features before maintenance

Source: TJ Group Sdn. Bhd

3.9.2 Corrective maintenance for waterproofing

Following are procedures to do the maintenance for water proofing:

- i. Hack and rid out of granite tiles and set up base for the curb. After that prepare reinforcement and formwork
- ii. Then, do concrete works at the kerb with non-shrink cement grout.
- iii. Remove formworks after a week in the concrete. Then, workers can start applying water proofing layer on the surface of solid concrete.
- iv. Do the flow test work. Remove the flow test after identified that the area is no longer leaks.
- v. Proceeds tiling around the kerb and cover the area has been hacked before.
- vi. Next, do the final test after finishing ready to make sure there are no leaks in the water proofing.
- vii. Upon until completion of all maintenance work, the employee must do a site clearing and cleaning work.

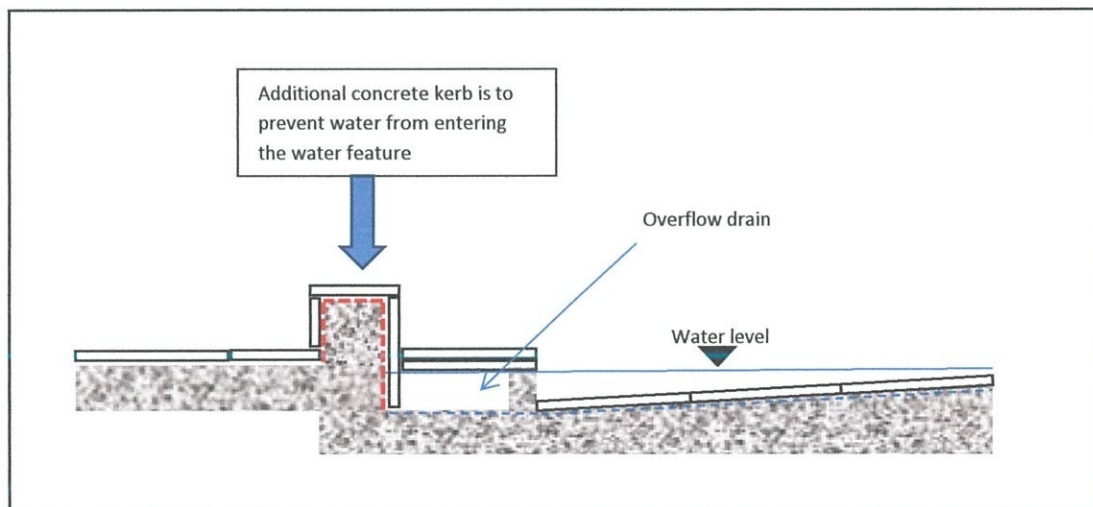


Figure 3.5 Cross-section of water feature after done maintenance works

Source: TJ Group Sdn. Bhd

The figure above shows the cross section of water features after done maintenance works. The architect has taken measures to overcome the problem related to water features. They have place an additional concrete kerb at the behind water features to prevent the water from entering the water features. The example of drawing water features is here in Appendix H.

As a conclusion, in construction field have many type of maintenance works such as corrective maintenance, prevent maintenance, schedule maintenance and others. The important things is the understanding with the definition of maintenance because if do not know the meaning so we cannot do it with properly. So, when the work is done not properly, there will occurs a problem during defect liability period as stated on the above such as plastering work problem, window frame problem and others after we done the works. To prevent the problem from occur, the contractor have to make sure the equipment used is have high quality and the worker installing the equipment with the right way. Besides that, the requirement and specification of maintenance is extremely important. It is because every works in the construction field have their own requirement and specification as stated in Uniform Building By-Law. All the countries have been used the law to construct a building and the purpose of the using this law is want to uniform all the building in the world. When we have follow with the specification as stated in there so the building will do not have a problem. Lastly, maintenance works has to be care and the contractor must follow the correct method to do the maintenance works during defect liability period and follow the requirement of the material and specification of the works.

CHAPTER 4

CONCLUSION AND RECOMMENDATION

4.1 Conclusion

After 5 months of training, I have exposed myself on construction activities whether on site or office. I gain a lot of information and experience with actual site working condition throughout from my industrial training.

Site activities are new for me. It is an exciting and new for me to learn and get information for our working experience. It is my pleasure and great opportunity to joint and gain experience from TJ Civil & Structural Sdn. Bhd. i also learn something new and quite challenging. For example, when critical time on site happen such as how to solves problem when the client angry to the contractor because of the defect found in their house.

Apart from the experiences that I have gained, I am able to interpret various type of works and it is important to me to know how to work will progress and the important it is. From the experience, IO learned new method and technology in construction field. Moreover, it is a practice to me with what I learn previously from lectures and textbooks. I think involving this project are great opportunities to gain experience and contribute before developing my future career. It is very useful for me. Thank you.

4.2 Recommendation

After 5 months I have been here to complete my industrial training, personally I can say that there are a little bit a differences between theoretical and practical. I said that because I see many actual progresses on site such as maintenance works.

I think that the duration of practical training is not sufficient to me to learn more than this. However, I think that this practical training should go on and should be a compulsory program for each student in every faculty especially FSPU. This is because it gave the student a lot of benefit and helps them to build their future career.

The experiences I had in the construction site suggest me the following to be implemented for the improvement of the place. At construction site, the employer usually didn't care towards safety workers and people in the construction site. for example, the workers did not wear the safety boots, safety helmet and there are also do not have a safety sign board.

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APPENDIX A:
TYPICAL FLOOR PLAN

[illegible]

APPENDIX B:
INTERVIEW FORM

INTERVIEW FORM

Date: 27/7/2014.

What is your name?

What is your email?

What is your job?

SITE SUPERVISOR.

Why did you choose your job?

BECAUSE IM INTERESTED IN CONSTRUCTION FIELD.

What are the things that challenge you about your job?

AS A SUPERVISOR, THE MOST CHALLENGING IS I HAVE TO DISCIPLINE AND HAVE TO BE AN EXAMPLE TO THE WORKERS.

What does your day at work look like?

FACED WITH MANY PEOPLE TO COMMUNICATE, SO I HAVE TO CONSIDERATE BE APPROACHABLE AND HAVE A GREAT COMMUNICATION SKILLS.

What kind of training or schooling did you need for your position?

DIPLOMA IN CIVIL ENGINEERING.

APPENDIX C:
EXAMPLE OF DEFECT FORM

Project No: 0809

ARATA – BUKIT TUNKU

To: cc:

<input type="checkbox"/> <input type="checkbox"/> TIJANI (BUKIT TUNKU) SDN. BHD.		<input type="checkbox"/> Fax	<input type="checkbox"/> Hand	<input type="checkbox"/> Email
<input type="checkbox"/> <input type="checkbox"/> C'ARCH ARCHITECTURE + DESIGN SDN BHD	Mr. CHEW TICK WAH Mr. OSCAR Ms. WAN JIHANA	<input type="checkbox"/> Fax	<input type="checkbox"/> Hand	<input type="checkbox"/> Email
<input type="checkbox"/> <input type="checkbox"/> SKM ENGINEERING SDN. BHD.	Mr. CHONG THIN HOOI Mr. YAP KAH HIN	<input type="checkbox"/> Fax	<input type="checkbox"/> Hand	<input type="checkbox"/> Email
<input type="checkbox"/> <input type="checkbox"/> BAHARUDDIN ALI & LOW SDN BHD	Mr. WONG CHEE LEONG	<input type="checkbox"/> Fax	<input type="checkbox"/> Hand	<input type="checkbox"/> Email
<input type="checkbox"/> <input type="checkbox"/> MEP ENGINEERING SDN BHD	Mr. STEVEN WONG Ms. CHEW S.L	<input type="checkbox"/> Fax	<input type="checkbox"/> Hand	<input type="checkbox"/> Email
<input type="checkbox"/> <input type="checkbox"/> PENTAGO LANDSCAPE SDN BHD	Mr. EFREN Mr. MURZUKI	<input type="checkbox"/> Fax	<input type="checkbox"/> Hand	<input type="checkbox"/> Email
<input type="checkbox"/> <input type="checkbox"/> DESIGNSTREAM SDN BHD	Ms. NG VIN NEE	<input type="checkbox"/> Fax	<input type="checkbox"/> Hand	<input type="checkbox"/> Email
<input type="checkbox"/> <input type="checkbox"/> T.J. C&S CONTRACTOR SDN BHD	Mr. DERREN TEOH Ms. ANNE SEE AI GAIK Mr. NG KIM BAN	<input type="checkbox"/> Fax	<input type="checkbox"/> Hand	

Subject: **VP – Defect List on Unit C-3A-3A.**

Date : 19/9/2014

From : Zamri

Ref. : 0809/TBT/ARATA/VPdefect/139

Attached herewith, defect complaint for unit C-3A-3A dated 19/9/2014 for your action.
You are required to complete the entire defect in 14 working days.

Your cooperation is much needed.

Thank You,

Received by:

Sincerely,

For **TIJANI (Bukit Tunku) Sdn. Bhd**
Zamri (Clerk of Works)

Action required by	: Immediate	Reply Ref	:
Reply / Action taken	: YES	Reply Date	:
Resident Engineer Sign-off	:		

ARATA – Service Request Form

Name :

Claire Quinn & Arasa Raj Senthil (*Owner or Authorized Representative only)

Email Address :

equincemom@gmail.com

Lot / Unit No :

C3A-3A

el. - Mobile :

Fax :

Received by :

Received Date & Time :

No

Area / Location	Description	Remarks
Maids Room (beside yard)	Sealant around window discoloured	
Bathroom (off hall)	grout discoloured & wall grout	
Hall - Skirting boards	- need & Hall - grouting	
Bedroom RHS (Right) Hall	- Marks on wooden floor - needs replaced	
ensuite bathroom	- mirror needs cut for shower door.	
"	" - grout discoloured at sink (floor tiles)	
Master bedroom	- outside window frame discoloured & latches	
	↳ marks on the wooden floor	
	↳ paint marks on skirting board at door	
Master ensuite	- grout on wall tiling around bath discoloured	
	- grout on wall tiles around shower discoloured	
	- uneven not tiled properly.	
	- Sink plug not working	

Name :

Date :

INSPECTION & COMPLETION

Investigated by:

Dept. :

Date & Time :

Remarks:

Investigation acknowledged by:

Owner / Authorized Rep)

Sign:

Date & Time :

Action Taken by (if any):

Dept. :

Date & Time :

Remarks:

Completion of work certified by: *

Dept. :

Date & Time :

Remarks:

To inform CRM in writing within 24 hours of completion

ACCEPTANCE OF WORKS BY OWNER / AUTHORIZED REPRESENTATIVE

hereby acknowledge that my request(s) /

feedback(s) have been attended to

satisfactorily.

Sign:

Date :

Name:

Remarks:

Symphony Life we take customer satisfaction very seriously, these inputs are important for us to improve our services to you. Please let us know anything does not meet your expectation by contacting us at or at crm@symphonylife.my. We appreciate all your suggestions and comments. Thank you.

f No.:

ARATA – Service Request Form

Name :	Clare Quinn & Anna Pij (Owner or Authorized Representative only)
Email Address :	cquinn302009@hotmail.com
Lot / Unit No :	CSA-3A
Mobile :	
Fax :	
Received by :	
Received Date & Time :	

No	Area / Location	Description	Remarks
	FRONT DOOR & FRAME	MARKS - NEEDS REPAINTED - INSIDE & OUTSIDE	
	WALL OUTSIDE AT DOOR	MARKS - NEEDS REPAINTED	
	LIVING ROOMS	MARKS ON SKIRTING BOARD - AT DOOR & LIVING ROOM.	
	WINDOWS	NOT CLEANED. LIVING ROOM - grouting floor lining discoloured	
	OUTSIDE LEDGE	NEEDS PAINTED	
	TOUCH UP MARKS ON WINDOWS	LIVING ROOM	
	Kitchen	chip at left hand side cooker (top cupboard & shelves)	
	Kitchen	Touch up skirting board if grey mark on workshop	
	Kitchen	Touch up wall - left hand side of sink	
	Toilet	bside yard - grout on wall & floors discoloured	
	Kitchen	grout discoloured on tiles	
	Yard	Washing machine fitting in front of maids room.	

Name :

Date :

INSPECTION & COMPLETION

Investigated by:	Dept. :	Date & Time :
Remarks:		
Investigation acknowledged by:	Sign:	Date & Time :
Owner / Authorized Rep)		
Action Taken by (if any):	Dept. :	Date & Time :
Remarks:		
Completion of work certified by: *	Dept. :	Date & Time :
Remarks:		

To inform CRM in writing within 24 hours of completion

ACCEPTANCE OF WORKS BY OWNER / AUTHORIZED REPRESENTATIVE

I hereby acknowledge that my request(s) / feedback(s) have been attended to satisfactorily.	Sign:		Date :	
	Name:		Remarks:	

Symphony Life we take customer satisfaction very seriously, these inputs are important for us to improve our services to you. Please let us know anything does not meet your expectation by contacting us at crm@symphonylife.my. We appreciate all your suggestions and comments. Thank you.

No.:

ARATA – Service Request Form

Name:	A.R. Sinnathuray & Claire Quinn		(*Owner or Authorized Representative only)
Email Address:	cquinn302009@hotmail.com	Lot / Unit No:	C-3A-3A
Mobile:		Fax:	
Received by:		Received Date & Time:	

Sl. No.	Area / Location	Description	Remarks
	Bath 2	Tiles chipped round hole/drain in Shower.	Replace tiles.
		All walls need touched up.	
		Condo needs cleaned, paint on air cons, tiles, throughout condo.	
		Appliances need cleaned,	
		Tiles need cleaned, floors polished	
		All outside areas not finished, cement needs smoothed, cleaned & painted. Windows outside, outside	
	Outside	Entrance to condo, tiles not cleaned, lift not cleaned. All common areas not cleaned or work completed.	
		* Access card for parking not working.	

Name:
Date:

INSPECTION & COMPLETION

Investigated by:	Dept.:	Date & Time:
Remarks:		
Investigation acknowledged by: (Owner / Authorized Rep)	Sign:	Date & Time:
Action Taken by (if any):	Dept.:	Date & Time:
Remarks:		
Completion of work certified by: *	Dept.:	Date & Time:
Remarks:		

To inform CRM in writing within 24 hours of completion

ACCEPTANCE OF WORKS BY OWNER / AUTHORIZED REPRESENTATIVE

I hereby acknowledge that my request(s) / feedback(s) have been attended to satisfactorily.	Sign:	Date:
	Name:	Remarks:

Symphony Life we take customer satisfaction very seriously, these inputs are important for us to improve our services to you. Please let us know anything does not meet your expectation by contacting us at crm@symphonylife.my. We appreciate all your suggestions and comments. Thank you.

Internal Memo



Urgent



Private & Confidential

To : CRM Dept.

Date : 26-8-2014

From : Zamri

No. of Pages (including this page):16

C.c : TC.Long

Ref : IM 041

Subject : C-3A-3A

With reference to the above subject, you are hereby notified that the SRF items for unit C-3A-3A have been rectified.

1	0809/TBT/ARATA/VPdefect/055	Dated: 3/3/2014
2	0809/TBT/ARATA/VPdefect/066	Dated: 11/3/2014
3	0809/TBT/ARATA/VPdefect/125	Dated: 21/7/2014

Attach herewith C-3A-3A SRF for your perusal.

Thank you.

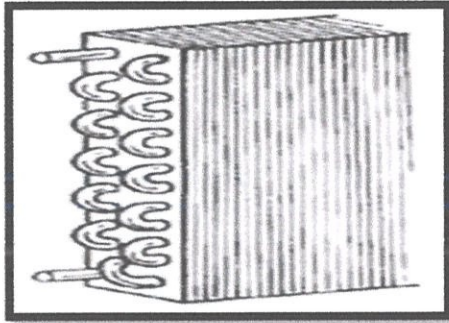
Sincerely

Zamri

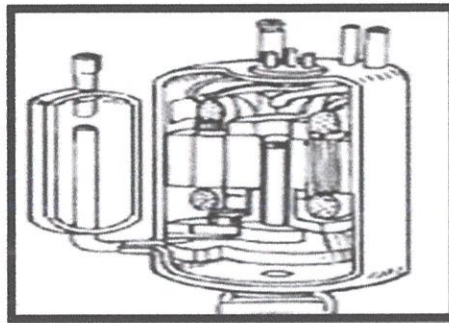
C.O.W

APPENDIX D:
COMPONENT OF AIR
CONDITIONING

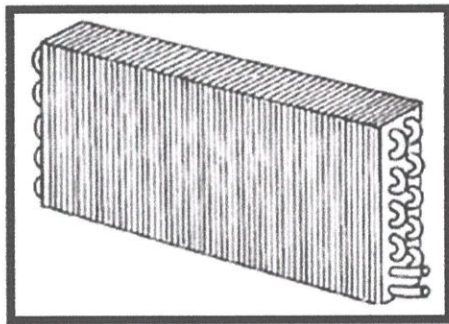
Appendix A



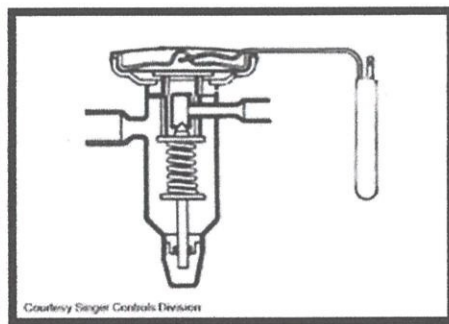
Condenser



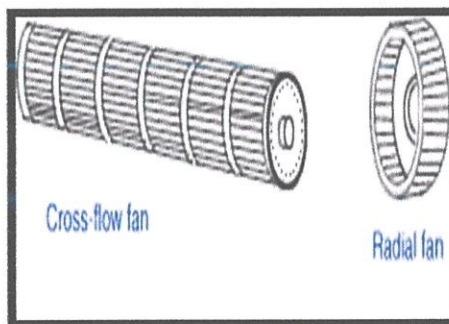
Compressor



Evaporator



Expansion valve



Evapora

APPENDIX E:

SKIM COAT

Plaster Finish Skim Coat (Internal) White / Grey

Mortar Skim Coat White / Grey

Lanko 103

PLASTER FINISH SKIM COAT (INTERNAL) WHITE & GREY

CERAMIC TILE/STONE TILE ADHESIVE FLOOR AND WALL
THIN SET MORTAR



DAVCO PLASTER FINISH
Skim Coat (Internal)



DAVCO PLASTER FINISH
Skim Coat (Internal) White



ADVANTAGES

- Premixed to ensure good consistent quality.
- Prepacked for convenience in handling.
- Mixing and application made easy.
- Eliminates surface crack lines.
- High bonding strength.
- Good weather resistance and high durability.

DESCRIPTION

Davco Plaster Finish Skim Coat (Internal) White / Grey is a specially formulated cementitious skim coat plaster suitable for plastered on concrete surfaces for internal skimming only.

Davco Plaster Finish Skim Coat (Internal) White / Grey is designed to provide a smooth durable finish with excellent adhesion strength. The surface can be either brushed or trowelled finished to meet stringent architectural requirements.

By simply adding water and mixed with a mechanical mixer, Davco Plaster Finish Skim Coat (Internal) White / Grey yields a homogeneous paste that gives good workability on both vertical and overhead surfaces.

USES

Application of Davco Plaster Finish Skim Coat (Internal) White / Grey is suitable for all types of concrete substrates such as lightweight concrete slabs, ceilings, walls, columns and beams. Davco Plaster Finish Skim Coat (Internal) White / Grey is also excellent for application on lightweight autoclaved aerated blocks, blockwall and plastered surfaces.

METHOD OF USE

A) Surface Preparation

Remove all dust, oil or traces of foreign materials. Dampen the dry concrete or plastered surface before application of Davco Plaster Finish Skim Coat (Internal) White / Grey.

B) Mixing

Add approximately 9.0 - 9.5 litres of water to 25 kg of Davco Plaster Finish Skim Coat (Internal) White / Grey. Mix thoroughly using an electrical mixer until a smooth and creamy consistency is achieved. No standing time required and the mixed plaster is ready to use.

C) Application

Davco Plaster Finish Coat (Internal) White / Grey is applied either by hand using a steel trowel or spatula to a maximum thickness of 3 mm and cured under shaded ambient conditions. After about 4 hours, the second coat is applied such that total thickness does not exceed 6 mm. It will remain workable for approximately 60 minutes after mixing. Davco Plaster Finish Skim Coat (Internal) White / Grey can be finished with soft hair brush or trowelled smooth.

PACKAGING

Davco Plaster Finish Skim Coat (Internal) White / Grey is supplied in 25 kg bag.

STORAGE

Davco Plaster Finish Skim Coat (Internal) must be stored in a dry place and free from moisture contact. It has a shelf life of 6 months from the date of manufacture.

MORTAR SKIM COAT (WHITE / GREY)

PREMIXED CEMENT-BASED THIN PLASTER



PACKAGING

Davco Mortar Skim Coat is supplied in 25 kg bag.

HEALTH AND SAFETY

Davco Mortar Skim Coat is non-hazardous. In case of eye contact, wash with plenty of water. If irritation persists, seek immediate medical attention.

STORAGE

Davco Mortar Skim Coat must be stored in a dry place and free from moisture contact. Davco Mortar Skim Coat has a shelf life of 6 months from the date of manufacture.

ADVANTAGES

- Premixed to ensure good consistent quality.
- Prepacked for convenience in handling.
- Mixing and application made easy.
- Eliminates surface crack lines.
- High bonding strength.
- Good weather resistance and high durability.

DESCRIPTION

Davco Mortar Skim Coat is a high quality premixed cementitious plaster which is easy to use by simply adding water. It is an excellent plaster that provides superior bonding to concrete substrate and brickwork surfaces.

Davco Mortar Skim Coat comprises of Portland cement, graded sand and chemical additives to provide a durable plaster for both internal and external plastering to meet specified stringent requirements.

USES

Davco Mortar Skim Coat is an extremely versatile material highly recommended for bedding, pointing brickwork and blockwork, backing and bedding for wall tiles, and for both internal and external plastering. Davco Mortar Skim Coat can be used for all types of concrete substrate, lightweight autoclaved aerated block, brickwall and blockwall.

METHOD OF USE

A) Surface Preparation

Remove all dust, oil or traces of foreign materials. Dampen the dry concrete or plastered surface before application of Davco Mortar Skim Coat.

B) Mixing

Add approximately 7.5 - 8.0 litres of water to 25kg of Davco Mortar Skim Coat. Mix thoroughly using an electrical mixer until the desired homogeneous mortar paste is achieved. Ensure the mix is free from lumps before use.

C) Application

Levelling of Davco Mortar Skim Coat can be done using a steel trowel. It will remain workable for approximately 20 minutes after mixing.

D) Curing

In hot ambient temperature, the plaster should be cured with water spray during the first 2 days, for better shrinkage control. Painting onto plastered surface should only commence after 7 days.

TECHNICAL DATA

Appearance	: Grey / Off-white powder
Water / Powder Ratio	: 0.3 - 0.32 (or 7.5 - 8.0 litre of water per 25 kg bag)
Bond Strength	: $\geq 0.5 \text{ N/mm}^2$
Recommended Thickness	: 2.0 mm to 5.0 mm
Consistency	: Homogeneous mortar paste
Wet Density	: 1600 - 1900 kg / mm^3
Coverage	: Approximately 0.4 m^2 / mm / kg
Pot Life	: 60 minutes at 28°C



PAREXDAVCO (MALAYSIA) SDN. BHD. (662835-D)

No. 9, Jalan Canang Emas 8/KS10, Jalan Telok Gong, 42000 Port Klang, Selangor D.E, Malaysia.

Tel: 603-3134 1816 (Hunting Line) Fax: 603-3134 3616

Email: sales_my@parexdavco.com Website: www.parexdavco.com

The information provided on this data sheet is not intended to be complete and is provided as general advice only. It is the user's responsibility to ensure that the product is suitable for its intended purpose. As we have no control over the treatment of the product, the standard of surface preparation, or other factors, we are not responsible for any damages or injury, including but not limited to special or consequential damages which may result from the use of our products, which includes any damages or injury caused by any failure of performance. The information contained in this data sheet may be modified by us from time to time, without any notice arising from our continuous product development activities.

LANKO
SPECIALIZED IN
TECHNICAL MORTAR



SKIM COAT PLUS
READY TO USE SKIM RENDERING COATING
INTERIOR AND EXTERIOR WALLS AND CEILINGS
THICKNESS 0.3 - 4 mm

103
LANKOWALL

R E N D E R I N G

LANKO



CHARACTERISTICS

- Thickness 0.3 to 4.0 mm
- Ready to use and easy application
- Perfectly white smooth finish.
- Excellent trowelability on application.
- Possible to be exposed or painted (with or without primer)
- Good weather resistance
- Cost and time saving

COVERAGE

0.5-1.5 kg /m²/mm.
 (Depend on the quality of substrate)

PACKAGING

- 5 kg Bucket
- 25 kg Bucket

STORAGE

1 year from date of manufacture if stored in unopened original packing in dry, frost-free conditions.

DESCRIPTION

103 LANKOWALL is a skim smoothing rendering paste. It's ready to use formula for repairing surface defects in concrete or render. A smooth surface is obtained by eliminating blemishes such as grooves, seams, fine cracks and rock pockets.

USES

Can be applied for Interior and exterior walls.

Permissible substrates

- Shuttered concrete
- Reinforced concrete shell-work
- Concrete Soffits
- Precast concrete
- Interior only**
- Light-weight concrete block (*Apply 751 Lankolatex mix with water by ratio 1:2 as a primer layer*)
- Bricks
- Gypsum block, gypsum board.
- Gypsum (*Consult ParexDavco Technical Service for further advice in this situation*)

Possible covering materials

- Thick plastic coating
- Paint
- Wallpaper
- Fabric
- Bonded plastic coverings
- Ceramic covering using a cement-free adhesive (interior only, maximum format 1200 cm)

SPECIFICATIONS

- White, hydraulic binder-free paste
- Composition : synthetic resins, mineral filler and admixtures.
- Particle size : 0 to 0.1mm
- Paste density : 1.8
- pH : 9 ± 0.5

Bonding strength (Mpa) at 28 days* on unsurfaced concrete

1mm thickness : 2 MPa

3mm thickness : 1.5 MPa

* average laboratory values provided as a general guide.

INSTRUCTIONS

Substrate preparation

- The substrate must be clean, sound, dust-free and without any traces of oil, laitance, curing compound etc....
- Overplus, seams and rock pockets exceeding 3mm must be treated prior to application.

Product preparation

- Ready-to-use paste. No water must be added.

APPENDIX F:
COLOR GROUITNG

COLOUR GROUT

Davcogrout

DAVCOGROUT

FLOOR & WALL GROUT JOINT FILLER



ADVANTAGES

- User friendly
- Easy application and clean up
- Available in full range of architectural colours
- Water resistant
- Easy maintenance
- No pre-soaking or wetting tile
- No pre-curing required

DavcogROUT Floor & Wall Grout Joint Filler is a mixture of cement, chemical additives and fillers. Designed specifically for grouting to stone, marble, granite ceramic tile etc. Available in a full range of architectural colours.

DavcogROUT Floor & Wall Joint Filler are designed to incorporate with water to fill up joints in between tiles and stones to interior / exterior area. For better performance it is recommended to incorporate with Davco Grout Admix Plus RL 1000.

- Do not use where chemical resistance is required.
- Do not use acid to clean coloured grout joints
- Do not allow grout to harden on the face of the tile. Clean promptly.
- It is advisable to check the ease of clearing with tiles that have a textured or matt surface prior to grouting.
- Colour shade may vary or mottle in some installations due to the wide variety of tiles available, job site conditions, finishing techniques and uneven drying conditions.

PREPARATION

DavcogROUT Floor & Wall Joint Filler should be added to clean water and mixed to a creamy consistency. No further water should be added.

Note : It is the user's responsibility to determine the condition and suitability of all surfaces prior to application.

MIXING PROPORTION

Fine Series (unsanded)

Davco Grout Admix Plus RL 1000/Clean Water.	1kg
DavcogROUT Floor & Wall Joint Filler	± 3kg

Coarse Series (sanded)

Davco Grout Admix Plus RL 1000/Clean water.	1kg
DavcogROUT Floor & Wall Joint Filler	± 6kg

- Ensure that joints are clean and uniform in depth. Remove tile spacers.
- Work in small areas at a time and with the aid of a rubber grout float, compress the mixture into tile joints. Work diagonally to avoid lifting the grout.
- Ensure that tile joints are fully compacted with grout, as air void will cause grout to sink in or crack.
- When grout joints are firm, polish tile surface with a clean damp cloth.

APPENDIX G:
BROCHURES OF WATER
PROOFING



Davco K10 Dampflex

Davco K10 Sovacryl 102

Davco K11 Matryx

Davco K11 Slurry 613 HF

Davco K11 Slurry 613

Davco K555 Slurry

Davco K11 Slurry 222

Davco Kote Bitumen 485

• WATERPROOFING •



Waterproofing and Sealing Membrane

A synthetic resin modified concealed waterproofing and sealing waterproofing membrane, ready-to-use from the container.

Provides a seamless waterproofing system, which is ideal for use in shower recess prior to tiling.

Can also be used to waterproof terraces, balconies, concrete roofs and cement toppings.

Marbles & tiles can be fixed directly on Davco K10 Dampflex using Davco tile adhesive.

Davco K10 Dampflex is premixed waterproofing membrane, making it easy to use directly out of the container.

Davco K10 Dampflex is extremely flexible enabling it to cater for limited floor movement while absorbing vibration.

Being a waterproofing membrane, Davco K10 Dampflex prevents surface water penetration when applied correctly.

Davco K10 Dampflex is water-based product therefore it is non-toxic and non-flammable.

Davco K10 Dampflex is listed for Singapore use by accredited Authority.

Appearance	: Grey / Green paste
Specific Gravity	: 1.15kg/L
Touch Dry	: 1 hour
Drying time 20°C	: 24 hours
Elongation	: >500%
ASTM D412:92	
Tensile Strength	: 1.5MPa
ASTM D412:92	

Specifications are subject to change without notification. Results shown are typical but reflect test procedures used. Actual field performance will depend on installation method and site conditions.

General

Wallboards, flooring grade particleboard and fibrous cement sheet must be firmly fixed in accordance with manufacturer's instructions.

Screw or nail heads must be sealed with epoxy resin.

Gyprock joint need to be covered with 50mm wide gyprock tape.

All surfaces must be structurally sound, dry and free from dust, grease, wax, oil, curing compounds and other loose contaminating materials.

All loose mortar or plaster, etc must be removed and then the entire area cleaned to remove dust and dirt.

New Concrete

All new concrete slabs must be allowed to cure for at least 6 weeks before applying Davco K10 Dampflex.





Davco K10 Sovacryl 102

Flexible Acrylic Waterproofing System

DESCRIPTION

DAVCO K10 SOVACRYL 102 is a solvent free single component elastomeric liquid membrane design to cure to a flexible seamless waterproofing membrane. It comes in several colours for architectural finishes and is suitable for light foot traffic. It has excellent adhesion over most substrates like timber, clay tile, concrete & brick walls.

USLS

As an economical seamless membrane to concrete, timber, metal substrate, R.C roof slabs, basements, water retaining structures, concrete / slate or metal roof tiles, plaster brick wall, AC sheets retaining wall, etc. Also used as decorative repair waterproofing coating to hairline cracks in brick wall plasters.

CHARACTERISTICS & ADVANTAGES

- Excellent waterproofing properties
- Flexible & elastomeric
- Easy to apply
- Environmentally friendly and non toxic
- Good resistance to aging & ultra violet degradation
- Reflects heat
- Decorative
- Protects concrete spalling & has anti carbonation properties

APPLICATION

Prime the surface with a layer of primer consisting of Davco K10 Sovacryl 102 diluted 10-15% with water.

When the primer has dried, apply the 1st coat of Davco K10 Sovacryl 102 membrane and whilst it is still wet, roll out the approved reinforcing matt and press into the wet Davco K10 Sovacryl 102. allow to dry for at least 2 hours.

Apply the intermediate coat of Davco K10 Sovacryl 102 to completely fill the reinforcing matt.

Apply the final Davco K10 Sovacryl membrane to create the required thickness. Leave to cure overnight.

SURFACE PREPARATION

The surface before waterproofing must be sound, clean and free from irregularities, sharp projections, loose particles, oil and contaminants. Old coatings which are stable and unable to be removed can remain.

New concrete must be cured for at least 28 days, with sufficient falls provided to avoid ponding on the finished membrane surface.

IMPORTANT

To avoid blistering of the coating, the 1st coat application must be of a thin coating, allowed to dry for at least 4 hours before the 2nd coat can be applied.

SURFACE PREPARATION

Ensure that the surface is free from dirt, oil and grime.

Pencil Hardness Test	B
Water Permeability (ASTM E 96-66)	0.001 perms-cm
Drying Time (28°C) - Surface Dry - Hard Dry	2 hours 8 hours
Recoating Interval (28°C)	24 hours

Plaster / Concrete

Repair crack lines and honeycomb concrete with Lanko 731 or 732 repair mortar. If necessary, pressure grout serious honeycomb concrete with Lanko 702.

Roof Tiles:

Water blast surface & remove fungus or dirt.

Metal surface:

Sandblast / Water blast with inhibitors or power grind to remove stains.

COVERAGE

1 to 1.5kg/m²/2 coats

PACKING

1kg, 5kg, 20kg pails

SHELF LIFE

12 months when stored in sealed container

COLOUR

Grey



PAREXGROUP
Building expertise, together

EXDAVCO (MALAYSIA) SDN. BHD. (662835-D)

, Jalan Canang Emgs 8/KS10, Jalan Telok Gong, 42000 Port Klang, Selangor D.E, Malaysia.

l: sales_my@parexdavco.com Website: www.parexdavco.com

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LANKO

**SPECIALIZED IN
TECHNICAL MORTAR**

ISO 9001 : 2008



Cert. No.: 682907

ISO 14001 : 2004



Cert. No.: 682873

ISO 18001 : 2007



Cert. No.: 682653



Matryx

Cementitious Waterproofing System by Crystallization

DESCRIPTION

Davco K11 Matryx is a cementitious waterproofing system which protects and waterproof concrete structures by crystallization. The active chemicals react with moisture in the concrete resulting in crystalline formation within the pores and capillary tracts of concrete, thus waterproofing the structure against penetration of water and other liquid from any direction. Davco K11 Matryx gives a strong and lasting waterproofing protection against dampness and ground water hydrostatic pressure.

USES

Recommended for use on interior and exterior below grade surfaces. Davco K11 Matryx gives protection against concrete decay and waterborne corrosive salts.

Can be use for negative waterproofing of concrete structure and on horizontal structural slabs against hydrostatic pressure as it provides strong resistance to impact and abrasion.

Area of application

- Basement
- Tunnels
- Planter box
- Wet areas
- Underground garages

ADVANTAGES

- Single component and easy to apply.
- Can be used for positive or negative waterproofing of concrete structure.
- Protection against rising dampness on ground slab.

TECHNICAL DATA

Final set		< 16 hours
Flexural strength	7 days	4.8N/mm ²
	28 days	8.6N/mm ²
Compressive strength	7 days	> 25N/mm ²
	28 days	> 45N/mm ²
Adhesive strength		> 1.2N/mm ²
Resistant to hydrostatic pressure when applied or negative side	28 days	> 0.8MPa

Specifications are subject to change without notification. Result shown are typical but reflect test procedures used. Actual field performance will depend on installation methods and site conditions.





Davco K11 Slurry 613 HF

Two Component Cementitious Waterproofing System, A Highly Flexible Synthetic Resin Deposited With Other Polymeric Micro Compound

K11 Slurry 613HF is a highly flexible synthetic resin, combination of polymeric micro mortar based on cementitious, fine-grained selected aggregates and special additives. It high content and quality of the synthetic resins, the hardened layer of K11 Slurry 613HF remains constantly flexible under all environmental conditions and , completely waterproof up to pressure of 1.5 water head and resistant to the chemical.

- Concrete tanks used for containing water and drinking water
- Bathrooms, showers, balconies, terraces, swimming pools etc, before final finishes
- Retaining walls, precast concrete elements embedded in the ground
- A flexible smoothing layer for light-sectioned concrete structures, including small deformation when under load such as precast panel.
- Protection of render or concrete with cracks caused by shrinkage, against the infiltration of water and aggressive atmospheric elements.
- Protect against the penetration of carbon dioxide, of concrete pillars and joist and road and railway viaducts repaired with products from Lanko Range, and structures with an insufficient layer of concrete covering on the reinforcement rods.

- Economical to use and Easy to mix and apply
- Good crack bridging capability
- Impermeable
- A highly flexible
- Good adhesion to sound well prepare substrates
- Protects against concrete carbonation and penetration
- Non-toxic – suitable for drinking water
- Non corrosive to steel or Iron

28kg/set (Part A + Part B)

Part A: 20kg (Powder)

Part B: 8kg (Liquid)

Typical condition	Quantity
Ground moisture	1.5kg/m ² /2 coats
Water seepage with hydrostatic presure	3kg/m ² /2 coats
Water seepage with hydrostatic presure	2kg/m ² /2 coats

TECHNICAL PROPERTIES

Standard	Methods	Results
ASTM D 4541 – 2002	Pull Off Strength	0.97 N/mm ²
ASTM D 412 – 06ae2	Tensile Strength Elongation at Break	1.01 N/mm ² 54.53%
ASTM D 471 – 06e1	Immersion Change	12.28%

Standard	Methods	Results
ASTM D E 96/E96M -05	Water Vapour Transmission	9.08
ASTM D D 624 – 00 (2007)	Tear Strength	45.1

Standard	Methods	Results
ASTM D 2240	Shore A Hardness	83





Davco K11 Slurry 613

Two Component Cementitious Waterproofing System, A Flexible Synthetic Resins Deposited With Other Polymeric Micro Compound

K11 Slurry 613 is a flexible synthetic resins, a combination of polymeric micro compound and cementitious waterproofing slurry.

- Interior and exterior waterproofing and damp-proofing of concrete wall
- Repairing and waterproofing underground masonry subject to waterhead and moisture seepage
- Rendering to brick and stone walls exposed to atmospheric agent
- Levelling smoothing waterproofing compound of the underground walls before laying bituminous sheets / liquid membrane and concrete repair works.
- Sealing fine hairline cracks in concrete structure but not subject to movement as the material is rigid.

- Concrete Water Tanks
- Terraces and Balconies
- Retaining Walls and Reservoirs
- Swimming Pools and Fountains
- Planter boxes, Lift-pit and RC-gutters
- Bathroom floor, Wet Kitchen and Yard

- Economical to use
- Easy to mix and apply
- Good adhesion to sound, well prepared substrates
- Protects against concrete carbonation and penetration
- Non-toxic – suitable for drinking water
- Non corrosive to steel or iron

29kg/set (Part A + Part B)
Part A: 20kg (Powder)
Part B: 9kg (Liquid)

Typical condition	Quantity
Ground moisture	1.5kg/m ² /2 coats
Water seepage with hydrostatic pressure	3kg/m ² /2 coats
Water seepage with hydrostatic pressure	2kg/m ² /2 coats

SIRIM Tests Report :

- Report No : 2004KL0334 – BS 6920
- Methods : APHA 2120B & APHA 2130B – BS6920 : 2000
- Methods : APHA 3500 & CTS/TP/AE/ In-house – BS 6920 : 2000
- Reference standard: MS 1583 : Part 1: 2003

Type of Test	Method Used	Req. Under BS 6920 : Part 1 – 2000 Clause 5	Sample	Sample	Net Increase
Color as Color Unit*	APHA 2120B	The increase in color and turbidity of the water in the final extract shall not be more than 5 standard units (of color) or 0.5 NTU respectively.	Less than 5	Less than 5	Less than 5
Turbidity NTU*	APHA 2130B		0.3	0.3	0.1





Two Component Cementitious Waterproofing

Davco K555 Slurry is a rigid 2-component alkali reactive waterproofing product based on alkali resistant synthetically modified cement and slightly flexible.

Specially developed for waterproofing to water tanks, basements, balconies, precast panel, bathrooms, swimming pools, RC gutters, planters, water fountains, floor slabs and etc.

- Interior and exterior waterproofing and damp-proofing of concrete, cementitious rendering, brickwork and blockwork.
- Rigid waterproofing of water tanks, swimming pools, etc.
- Sealing fine "hairline" cracks in concrete structures not subject to movement.
- Waterproofing of surface before laying marble to help prevent efflorescence.

Davco K11 Slurry 555 can be applied on the positive as well as on the negative side of the building or structure.

A) Surface Preparation

Clean and remove surfaces of projections and ensure that it is free of all laitance, oil, grease, curing agents or other foreign matters. Avoid cracks and fillet edge, and shall be repaired to ensure that the surface is sound, even and clean. The applied waterproofing should be kept damp with mist spray if the weather is exceptionally hot and dry or cover with shed to avoid accelerated drying.

B) Mixing

Mix Part A to Part B in a clear container with a power stirrer until a homogenous blend is achieved. Presoak the surface with water and allow no ponding while applying.

C) Application

Apply a minimum of 2 coats with a bristle brush or broom. The application shall be done in a perpendicular direction. The thickness of the coated surface shall be monitored to ensure the requirement is achieved which shall withstand the specific water pressure. The second coat must be applied whilst the first coat is still green but sufficiently set so that it is drawn off while applying the second coat. The mixed material must not be applied at temperature below 5°C (40°F) or on frozen surface. In no instance should the total thickness exceed 5mm in a single application.

D) Curing

It is advisable to allow the waterproofed surface to cure for at least 36 hours before backfilling or applying any foreign toppings.





Davco K11 Slurry 222

Single Component Cementitious Waterproofing

DESCRIPTION

Davco K11 Slurry 222 is a single component waterproofing system based on crystallisation formation throughout the pores and capillary tracts of concrete, to withstand strong hydrostatic pressure. The material gives a strong and lasting waterproofing system against dampness, ground water and hydrostatic pressure.

USES

- For applications to interior and exterior below grade surfaces, against concrete decay and waterborne corrosive salt.
- For applications in negative waterproofing and horizontal structural slabs against hydrostatic pressure.

Areas of application:

- Basements.
- Wet areas.
- Underground garages.
- Planter boxes.
- Potable water tanks.
- Tunnels.

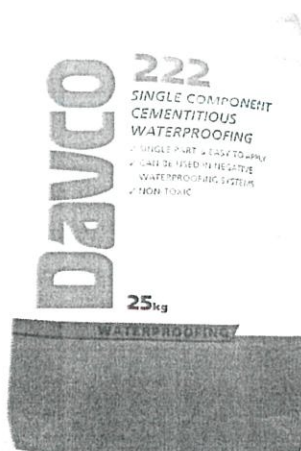
ADVANTAGES

- Single component and easy to apply.
- Can be used in negative waterproofing systems.
- Protection against rising dampness on ground slabs.
- Non toxic and can be used in contact with potable drinking water.

MIXING & APPLICATION

- Make sure the substrate is clean and free from laitance, oils, grease, curing agents or other foreign matters.
- Fill all voids, cracks, fillet edges and angles with Davco 702 Non Shrink Grout so that the prepared surface is round, even and clean.

- Davco K11 Slurry 222 must be applied on damp substrate. Pre-wet until damp prior to application of Davco K11 Slurry 222.
- Mix with 8.5 to 9 litres of clean water to 25kg of Davco K11 Slurry 222.
- Always mix the powder into the clean water by using a mechanical stirrer.
- Mix for 2-3 minutes until a smooth lump free consistency is achieved.
- Apply in 2 coats in a perpendicular direction using a block brush or roller. The 2nd coat must be applied while the 1st coat is still green, but sufficiently set so that it is not drawn off while applying the 2nd coat.
- The mixed material must not be applied at a temperature below 5°C or on frozen surfaces. At no instance should the total thickness exceed 5mm in a single application.





Davco Kote Bitumen 485

Liquid Waterproofing

DESCRIPTION

Davco Bitu 485 is a water based bitumen emulsion stabilized with asbestos fibers. It is dark brown in colour and dries to a black flexible coating. When dry, it will not re-emulsify in water and it is odorless and taint free.

USES

- Roof waterproofing, floor and wall damp-proofing, and basement tanking waterproofing.
- Protective application on exposed surfaces such as concrete, cement rendering, metal, etc.
- Where increased weathering and abrasion resistance is required.
- As a binder for sand to provide flexible protective mastic or bitumen mastic.
- Anti-corrosion and anti-trumming effect when applied onto thin roofing sheets.

TECHNICAL SPECIFICATION

APPLICATION TEMPERATURE LIMITS

Between 5°C to 50°C.

CHEMICAL AND WATER RESISTANT

Resistance to water alcohol, most salt solution and some dilute acids and alkalis. Not resistant to oils, solvents and strong detergent solution.

CONSISTENCY

A non-drip thixotropic paste of brushing consistency.

FLEXIBILITY

Provides a firm but flexible coating within the services temperature range from 5°C to 50°C.

FIRE RESISTANCE

Wet : Non-flammable

Dry : Will burn, but no flame spread.

HEAT FLOW RESISTANCE

The cured film will not flow or sag under direct sunlight.

SETTING OR DRYING TIME

Under indoor condition at room temperature of 30°C and humidity of 80%, a wet thickness of 0.6mm will dry in 4 hours.

SHRINKAGE FACTOR

Approximately 40% when fully dried.

SPECIFIC GRAVITY

Approximately 1.05

STORAGE LIFE

Indefinite under good storage conditions and in undamaged containers. The material is subject to damage by frost and should be stored at temperature between 5°C to 40°C.

TOXICITY: Non-toxic

APPLICATION: By brush or by spray

COVERAGE: 0.6 liter per sq. m per coat.

HANDLING PRECAUTIONS

Cleans hands and tools with cold water when wet and use kerosene or solvents when dry.

PACKING

Available in 3.5 liters per tin and 18 liters pail.



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Information provided on this data sheet is not intended to be complete and is provided as general advice only. It is the user's responsibility to ensure that the product is suitable for its intended purpose. As we have no control over the treatment of the product, or of surface preparation, or other factors, we are not responsible for any damages or injury, including but not limited to or consequential damages which may result from the use of our products, which includes any damages or injury caused by failure of performance. The information contained in this data sheet may be modified by us from time to time, without any notice from our continuous product development activities.

LANKO

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TECHNICAL MORTAR

ISO 9001 : 2008



ISO 14001 : 2004



OHSAS 18001 : 2007



APPENDIX H:

Example of Water Features Drawing

