



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

**TITLE**

**LEAKAGE, CRACK AND DAMPNESS IN BUILDING  
AT UNIVERSITI TEKNOLOGI MARA ,  
SERI ISKANDAR , PERAK DARUL RIDZUAN**

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**PRACTICAL TRAINING REPORT  
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## **ACKNOWLEDGEMENT**

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Lastly, I would like to thank my supervisor, Puan Nur Fadhilah Binti Bahardin, who help give all information I needed along this practical training.

Thank you.

## **ABSTRACT**

Practical training is a course that must be completed by all students taking their final semester Diploma in Building Surveying. Students may choose any company or court to conduct practical training.



I select advanced technology university (UiTM) Seri Iskandar silver as a place for practical training. I was placed in the accounting faculty. Assistant supervisor as a leader in this website has been appointed as my supervisor during training.

During the practical training, I learned about making a payment to an employee in UiTM and learn mengendali complaints. For example, make some calculations made in building maintenance.

Practical training will end after four months of graduation. Finally, students will prepare a report according to the topics relevant to the current work of practical training has been done.

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# **CHAPTER 1**

## **INTRODUCTION**



## 1.0 Introduction

Universiti Teknologi Mara (UITM) Seri Iskandar , Perak was chosen as a practical training for four months. Along with the University Teknologi Mara (UITM) , I was placed in the Bahagian Pengurusan dan Fasiliti under the supervision of maintained is Encik Mohamad Syahidi Bin Samsuri.

I choose the maintenance that are on going of Universiti Teknologi Mara (UITM) . View this maintenance has been running , so the major work on the department of facilities and management site intensified . The site plan for the construction of provided by the architectural drawings from UITM has been entrusted. During the four months practical training at Universiti Teknologi Mara (UITM) Seri Iskandar, several topics of studies were identified accordance to the work done. The title that had been chosen is wall leaking of Universiti Teknologi Mara (UITM) Seri Iskandar, perak

The maintenance of Universiti Teknologi Mara (UITM) Seri Iskandar is being carried out under IMZA MAJU ENTERPISE. The discussion between project manager and the intensification of the projects had been done to identify the contents of the report. The field of the study is based on course program.

It will not be a problem for the students to make a report because the students have learned these topics involved in building maintenance.





## 1.2 Company Profile

### History of UNIVERSITI TEKNOLOGI MARA (UITM) PERAK

Universiti Teknologi MARA (UiTM) is a Public Higher Education Institution under the Ministry of Education established under the operation of the MARA Institute of Technology, 1976 (Act 173).

UiTM Board is a body formed to formulate policies, manage and facilitate the administration of the University's operations. The tasks carried out by the formation of policy are in line with the provisions of Act 173 (and amendments) and the operation of government regulation and the adoption by UiTM. While implementation is managed by the University staff, headed by the Vice-Chancellor as Chief Executive.

Implementation of student affairs and discipline is in accordance with the provisions of Act 174 (and its amendments).

ITM has been upgraded by the Prime Minister as Universiti Teknologi MARA on 26 August 1999.

### 1.2.1 Building of administration



*Figure 1.1: Building of Administration*

UiTM Perak was established on January 1, 1985 and was inaugurated by the Chief Minister of Perak, Dato 'Ramli Ngah Talib. Opening of Phase I groundbreaking in UiTM Seri Iskandar campus was done in 1995.

On July 21, 1997 Opening Ceremony of Phase I Campus Seri Iskandar was launched by HRH Paduka Seri Sultan of Perak. The transition from a temporary campus in Seri Manjung to permanent campus in Seri Iskandar started since January 1996 until July 2002. Universiti Teknologi MARA (Perak) was established with the co-operation of the Perak State Government and officially opened in 1985 at Bandar Baru Seri Manjung.



The campus is now located at Bandar Seri Iskandar, Perak Tengah District and occupies an area of approximately 392.36 acres. This campus is strategically located along the Ipoh – Lumut main road, which provides easy access to both Ipoh and Lumut.

The campus has built new hostels for the students and is able to accommodate a maximum of 8000 students. As of now, there are 9665 full-time students in 30 programs and 418 part time students in seven programs, with 539 full time lecturers and 359 administrative and support staff.

Apart from the classrooms, other facilities available are 38 computer laboratories with more than 1,000 computers, 10 technology-enabled classroom (TEC), drafting studios, building and ceramic workshops, a multipurpose hall, a library and various state of art sporting facilities.

*([uitm.perak.edu.my](http://uitm.perak.edu.my))*



## 1.2.2 Vision And Mision UiTM PERAK

### Vision

To establish UiTM Perak as a premier university of outstanding scholarship and academic excellence capable of providing leadership to Bumiputera's dynamic involvement in all professional fields of world – class standards in order to produce globally competitive graduates of sound ethical standing

### Mision

To enhance the knowledge and expertise of Bumiputeras in all field of study through professional programmes, research work and community service based on moral values and professional ethics

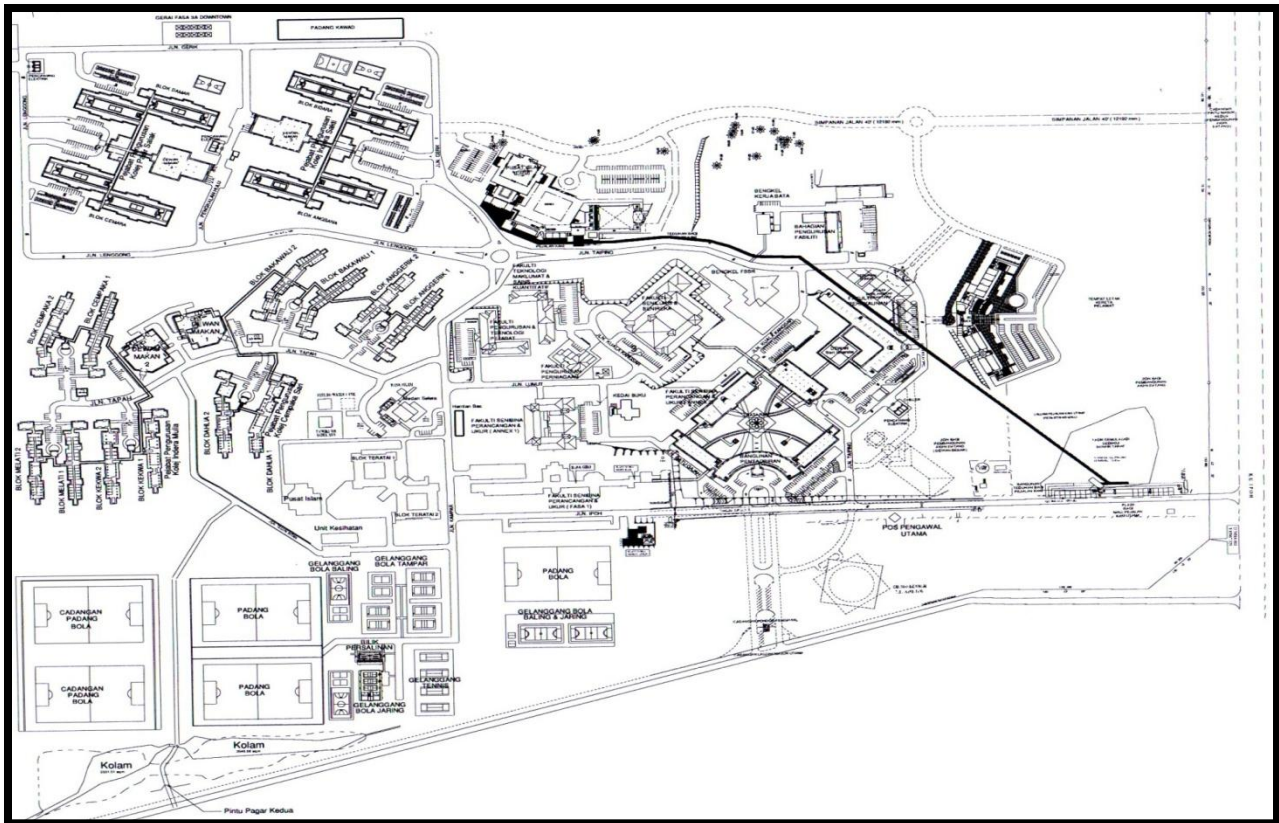
### Objective

- ❖ To provide maximum opportunities for bumiputeras to pursue professionally recognised programmes of study in science , technology , industry , business , arts and humanities
- ❖ To provide quality and innovative programmes of study relevant to current market needs and customer demands , and in line with policies of national development



- ❖ To establish a human resource development programme as a tool for the assimilation of a value system within the university community
- ❖ To ensure that UiTM graduates are adequately prepared to join the local as the global workforce
- ❖ To establish UiTM as a centre that is accountable for the effective and efficient management of its human resources , finances and assets in order to achieve its educational objectives , while playing its role as a catalyst in community development

## Campus map



*Figure 1.2 : Campus map university teknologi mara*

Figure 1.2 shows a plan that indicates the direction to move around the campus. The plan is showing on which area the classes and faculties are located, as well as offices, dormitories and other buildings inside the campus.

### 1.3 Location plan



Figure 1.3 Location map of UiTM Seri Iskandar

Seri Iskandar is well connected to the North-South Expressway. It can be reached through ipoh via Exit 137: Simpang Pulai or Exit 139: Ipoh Selatan. For those whom are directly heading to conference venue at Seri Iskandar, take the Exit 153: Gopeng and look for signage to Batu Gajah, Seri Iskandar or Lumut. Taxi charge from KLIA to Kuala Lumpur by airport LIMO is approximately above RM100 and from Kuala Lumpur to Ipoh is approximately above RM100. While, from Ipoh to Seri Iskandar is approximately RM50-RM100. (<http://perak.uitm.edu.my>)



## Department of Facilities and Management



*Figure 1.4 : Building of Department of facilities Management*





### 1.5.1 History of Department of Facilities Management

Development and Maintenance unit (DMU) was established in UiTM Manjung ,Perak (1985). Number of staff working with only three (3) people. The main role of this division at that time was to maintain five (5) shop houses that are used as classrooms. UPP transferred to UiTM Seri Iskandar (2002) and been renamed the Building Maintenance Unit and Area.

Changed name to the Development Civil and Electrical/Mechanical that fully responsible for the campus area of 392.36 acres. The change of new name Facilities Management Campus Division effective from 7 April 2006

This division is responsible for managing cases related to the development and maintenance of UiTM Perak. In addition, this section also provides electrical, mechanical, civil and projects because it is a very important service. Electrical service conducted by Electric unit including maintenance and repair electrical and telephone and air-conditioning systems in fully maintenance by the Mechanical Unit. Civil units are fully responsible for the maintenance and repair of buildings which includes pest control, cleaning and plumbing system in UiTM Perak .In other words, Facilities Management

Division is one (1) unit of the most important in managing on matters relating to development and maintenance of the university.

The units in facilities management division are: -



- 1) Administration - manage all problems in facilities management
- 2) Civil Unit - make repairs cloud in every silver UiTM building
- 3) Electrical Unit - make maintenance of electrical throughout UiTM
- 4) Mechanical Unit – doing the mechanical work
- 5) Project Unit - discuss and make a project to UiTM
- 6) Unit Council and Landscape - maintenance council and landscape at the University  
technology mara seri iskandar, perak

Enhance the achievement of the vision in University Teknologi MARA towards becoming a world-class civil education institutions globally, restructuring and renaming of the Facility Management Division was created in October 2011 and officially changed its name to the Division of Facilities Development and Management. This division is headed by the Chief BPPF and assisted by Engineer.

System service include:-

- 1) Office of the General Administration
- 2) Project Development Division
- 3) Division of Facilities Management



Beginning in October 2012 distribution method in campus facilities management area zoning system was introduced and led by the Assistant Engineer.

Zone system used is as follows:-

- 1) **Zone 1** – Administrative Block, Main Hall (DSI) Multipurpose Hall (DSG), the Islamic Centre and Library BPPF.
- 2) **Zone 2** – Block Academic / Faculty
- 3) **Zone 3** – College & Dining Hall
- 4) **Zone 4** – Student Center (PMU), Uptown, Central Sports, Health Unit, Main Post, Metro Campus.



### 1.5.2 Vision and Mission BFFF

#### **Vision**

Make the Development and Facilities Management as part of supporting the efforts UiTM (Perak) to achieve the vision of the top universities.

#### **Mission**

To serve the infrastructure and complete facilities through the development projects and campus facilities management with quality and structured.

#### **Company Objective**

To ensure that the operations, project management, customer service, management and occupational safety and health towards the efficient maintenance asset and effective so that education and teaching activities may function properly.



1.4 Organization chart (fakulty of office management) BFF

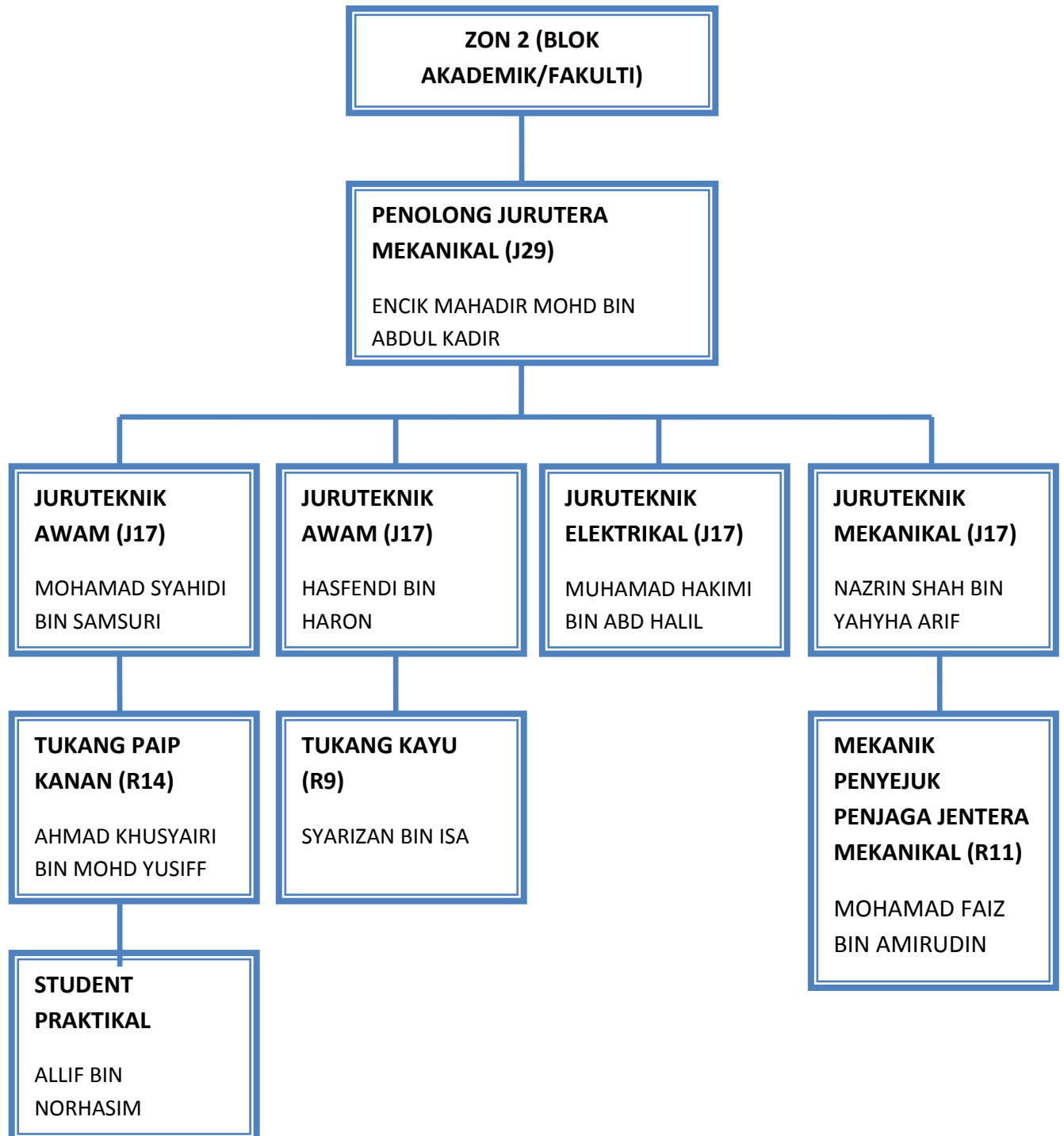


Figure 1.8 :organizazation chart department of facilities and management (BPF ZONE 2)



## 1.7 Objective of Department of Facilities Management

### 1.7.1 Principle management

Division of Facilities Management has outlined six (6) core objectives in order to realize the desire to become a professional indigenous facilities management organization to world-class universities such as the following:

- ✓ Provides management services and complete facilities to create an atmosphere of learning, teaching and research environment and safety
- ✓ Provides a planned package of facility management and strategic to increase the efficiency of service delivery facilities
- ✓ Ensure that the standard implementation of facility management is measured by the index of achievement outlined in Article 5.2
- ✓ Securing and enhancing strong customer service conjunction with its status Article 4.4.2
- ✓ Generate the University, through a number of financial packages that are appropriate to the portfolio of sustainable facility management, and
- ✓ It is a reference management organization (referral organization) in the field of facility management.

### 1.7.2 BPPF Function



- **Public Administration**

The function of Public Administration is to Manage general administration office manage the affairs of the department of posts and service., Arrange for the purchase of office equipment ,Manage and control the records and files department and Act as the secretariat for the meeting of Head of Division / Unit. Public Administration also provides advice and counselling to staff the department and also manage staff welfare. Furthermore, Public administration also Manage logistics requirement for training and Manage the Service Scheme ( PCS ) and Training. On the other Hand Public Administration also manage and train the Practical Student. Planning and Managing the training and career development staff

- **Division of Project Management**

Division of Project Management is provides the summary of project. It also ensure the implementation according to the Uitm to make the plan according the Uitm cost. Division of project management also help the UPP in the preparation of project budget for approval of the procurement Committee Uitm ( Perak ). It also Supervise and Coordinate the work undertaken by the consultant. On the other hand, helping monitoring & supervision at construction sites with contractor to determine the specifications & the contractor follow the building plan. Besides that Division of project management also prepared detailed expenditure & get additional provisions if necessary. The function Division of Project Management also Check & confirm the payment to the contractor and ensure all projects submitted in an orderly manner to be maintained by the Division of Facilities Management by zone



- **Unit of Contract and Project Supervision**

To improve payment – payment of Iktisas fees, Preparation of Offer Letter and Checking of Bon & Insurances is one of the functions Unit of Contract and Project Supervision. They also make a Preparation of Agreement Document & Contract Document and Contract Management Besides that Unit of Contract and Project Supervision also make an Investigation of Contract Issues and Manage and coordinate with the Bendahari the procurement tender document for privation including the other affairs. On the other hand, Unit of Contract and Project Supervision also manage the appointment of contractor and the consultant after getting the approvals from board of procurement and supervise the progress of project / operation / consulting in contractual terms. Next function is, checking and supervises the payments of project improvement and operation in contractual term

- **Department of Facilities Management**

The department of facilities management have a control all the building about the maintenance. The department to manage the building have the follow the procedure the maintenance. The procedure is the make sure the level ‘down time’ for each PABX not exceeding 600 minutes for 1 year period and for each telephone not exceeding 30 ,minutes for 1 year period ,implement the scheduled maintenance work , serve the maintenance of air conditioning and freezing services and then serve the alarm system maintenance and fire extinguisher services. The other maintenance is serve the lift system maintenance services , dining hall kitchen instruments ,punch and ‘building automation system’ (BAS) ,manage and supervise the vehicles maintenance works and also UITM official vehicles ,manage the sewerage water system and the cleanliness of building and areas.





Therefore, the department have maintained the building such as repairing and upgraded below RM 200,000 and the infrastructure such as roadway and all fitting , monsoon drain, gate, parking, sewerage system, slope stability and else. The other procedure is manage the environment facilities services such as pest control, cleaning instrument and waste collection and manage all the event department/faculty in UITM , implement the maintenance building work scheduled and planning the upgraded works of college building.

The facilities management can repairing and upgrading the sport facilities and the defect on building structures , planning and manage the work appraisal facilities audit and managing system and then customer services and information and last is supervisor the services of delivering and department performance.

- **Customer chattered.**

We are committed to providing a campus facility management services include environmental, electrical, civil, and mechanical to support the teaching and learning process as follow the customer will be treated immediatly at the customer services counter and the repair any damaged equipment will be dealt with in order of importance as late as 5 days after receiving the complaints.



## 1.8 Scope of work of BPPF

- ✓ Projects and Contracts Unit
- ✓ Building and Infrastructure Operations Unit
- ✓ Mechanical and Electrical Services Unit Telecommunications
- ✓ Administrative Unit
- ✓ Operating Unit Council and Landscape

### 1.8.1 Main functions: Project and Contract Unit

Scope of work:

- ✓ Site investigation work and project cost estimates
- ✓ Quotation document preparation
- ✓ Preparation of tender documents
- ✓ Work preparation quotes job offer
- ✓ Tender bid preparation work
- ✓ Job work payment



### **1.8.2 Main functions: Building Operations and Infrastructure Unit :**

Scope of work:

- ✓ Provide quotation document
- ✓ Prepare tender documents
- ✓ Civil damage repair
- ✓ Building cleaning services and area

### **1.8.3 Main function: Mechanical Electrical Service Unit and Telecommunications**

Scope of work:

- ✓ Repair of Mechanical and Electrical damage complaints
- ✓ The M & E services of UiTM
- ✓ Scheduled maintenance for high voltage power supply systems
- ✓ Electrical substation fault repair
- ✓ Site investigation and the estimated cost of project.
- ✓ Work preparation quotation documents
- ✓ Job offer quotation preparation
- ✓ Working payment



### **1.8.4 Main function: Administrative unit**

Scope of work:

- ✓ Responsible for the correspondence
- ✓ Manages the application and hiring office equipment
- ✓ Responsible for recording and updating the staff leave
- ✓ Handling telephone calls to customers (Special Assistant)
- ✓ Prepare reports punch card
- ✓ Receive damage complaints

### **1.8.5 Main function: Operation and Unit council Unit**

Scope of work:

- ✓ Installation banner, backdrop and bunting
- ✓ Managing the site preparation and equipment
- ✓ Maintenance and landscape areas
- ✓ Preparation of flower decoration for council
- ✓ Preparation of tree flower decoration for office furnishings
- ✓ Crop preparation



## 1.9 General Administrative Regulations

### 1.9.1 General

- ✓ Staff need to record time in / out on the card provided.
- ✓ Staff are required to fill the holidays form and supported by the Head of week before being forwarded to the Engineer approved.

### 1.9.2 Distinctive

- ✓ Provide cost estimates
- ✓ budget based on the specifications and plan/layout
- ✓ budget based on plans only
- ✓ budget based on Malaysian Standard Method of Measurement of Building Works Second Edition (SMM2)
- ✓ budget based on schedule of small work rates and repair
- ✓ provides tender price quotation

### 1.9.3 Others

- ✓ Staff needs to spend annual leave.
- ✓ To bring the holidays to the following year, staff must obtain the approval of the service of UiTM Shah Alam, with support of the Engineer and Director of Campus



# **CHAPTER 2**

## **LITERATURE REVIEW**



## 2.0 Theoretical study

### 2.1 Introduction

Buildings are important assets to everyone and it needs to be maintaining perfectly. Maintenance of a building is a process of reservation and restoration activity of the structure and components of a building. The term 'maintenance' means to keep the equipment in operational condition or repair it to its operational mode. It is a continuous operation to keep buildings, furniture inside the buildings, and equipment in the best form of normal use. Maintenance activity covers the whole building envelope which includes the building structures, roofing, building exterior and interior, wall, columns and fixed furniture.

Maintenance Management is an orderly and systematic approach to planning, organizing, monitoring and evaluating maintenance activities and their costs. A good maintenance management system coupled with knowledgeable and capable maintenance staff can prevent health and safety problems and environmental damage; yield longer asset life with fewer breakdowns; and result in lower operating costs and a higher quality of life.



Main objective of the maintenance is to have increased availability of production systems, with increased safety and optimized cost. Without the work of a proper maintenance, the entire structure and building materials over time will be faded, worn, damaged and dilapidated. The basic principle of maintenance is important to make sure that the work is done correctly and perfectly in time. ([www.nibusinessinfo.co.uk](http://www.nibusinessinfo.co.uk))

In UiTM Perak, the maintenance work is in charge by the Department of Facilities and Management. The scope of work is divided into few departments such as:

- ✓ Civil work and mechanical services
- ✓ Electrical and communication services
- ✓ Housekeeping services
- ✓ Buildings operation and infrastructure
- ✓ Projects
- ✓ contract and cost control
- ✓ occupational safety and health





Management includes all of the activities that can keep a heritage collection, site, asset or habitat in good condition and to maintain by having procedures or arrangements for:

- ✓ Environmental monitoring and control
- ✓ Safe and appropriate handling
- ✓ Emergency preparedness
- ✓ Storage and security
- ✓ Acquisition and disposal
- ✓ Complying with legislation and regulations and obtaining consents or licenses where needed
- ✓ Welcoming visitors or other users
- ✓ Having access to the specialist skills needed to look after it
- ✓ Providing training for volunteers and others who look after it
- ✓ Community involvement
- ✓ monitoring
- ✓ documenting sites, species, buildings or collections
- ✓ Meeting other standards (e.g. operating standards for historic railways or vessels)



## 2.2 LEAKAGE, CRACK AND DAMPNESS IN BUILDING

### 2.2.1 Introduction

The Leakage, cracks and dampness can be defined as water penetration through walls and other elements can be a serious matter, especially to buildings located near water sources, it is not only the building but also my degenerate structure divided building exposed to water.

### 2.2.2 Definition

- **Leakage**

the leak and dampness is the presence of unwanted moisture in the structure of a building, either the result of intrusion from outside or condensation from within the structure.

A high proportion of damp problems in buildings are caused by condensation, rain penetration or rising damp

- **Crack**

This is caused when the paint or varnish is applied over a base layer of different elasticity before it has been given enough time to cure (which can take up to a month). For example, two separate brands of varnish may react with each other and form cracks. The Remedy is to allow the surface to dry fully and then rub it down to make it ready for repainting. However, you could consider leaving the cracking visible. It is a very popular ageing technique.



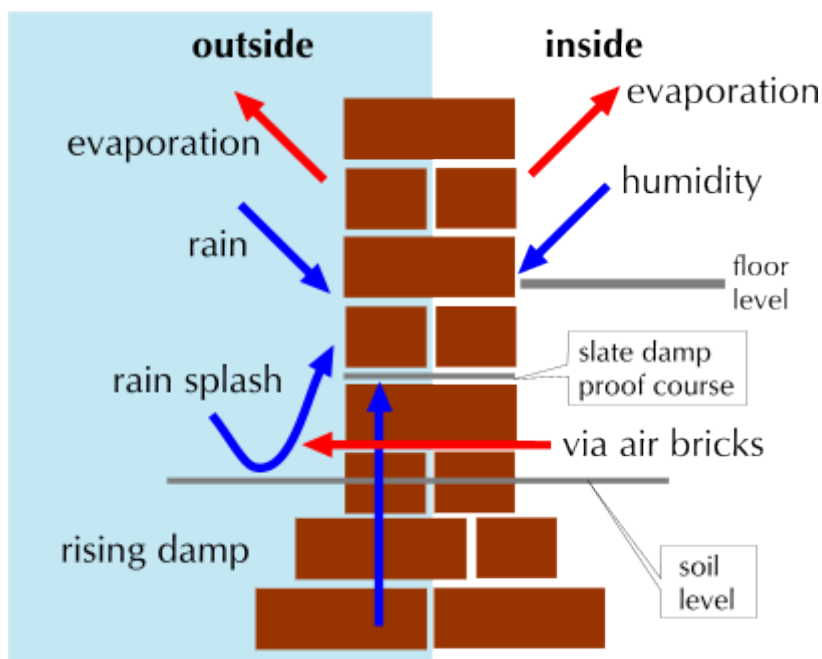
- **Dampness**

According to Ghafar (2007), dampness can be defined as water penetration through walls and other elements can be a serious matter, particularly to buildings located near water sources, not only does it deteriorate building structures but also damages to furnishings .

Dampness in a building could be classified as an excess of moisture that is causing a problem; a cosmetic problem, the spoiling of decorations; the deterioration of the fabric; structural problems; or a condition that is having an adverse affect on the health of the occupants.

### 2.3 Theories/practice leak , crark and dampness in walls

Think about leaking and dampness , before you involve contractors to solve a leak and damp problem, have a good look at your walls. It is only in recent decades that buildings have been built with damp-proof courses, yet there are mediaeval buildings which have stood for hundreds of years. You need to achieve a balance between water entering and leaving the walls:



Leak and moisture enters the wall from three directions:

- from the soil upwards
- from rain
- from humidity inside the building - from bathing, washing and human bodies



Most houses of the period have a slate damp proof course. This prevents ground water passing further up the wall.

Moisture then leaves the wall by evaporation, either into the internal air or outside, and by the air flow through air bricks. Expect a saturated wall to dry at one month per inch of wall i.e. an eight inch wall will take eight months to dry out.

Our objective is therefore to manage this balance. We can do many things to improve it:

- where possible, use mortars and plasters made from lime rather than cement and/or gypsum. These lime mortars and plasters are vapour permeable and allow low levels of damp in walls to be removed by the process of evaporation.
- ventilate the rooms adequately to reduce the level of internal humidity and enable evaporation from the wall
- try to avoid drying clothes indoors
- keep room temperatures moderate so that internal water vapour will not condense on cold walls
- do not seal the walls inside with vinyl paints or wallpapers which stop moisture reaching the wall but also trap moisture in the wall. Instead use a vapour-permeable finish such as limewash, distemper, or microporous emulsion.



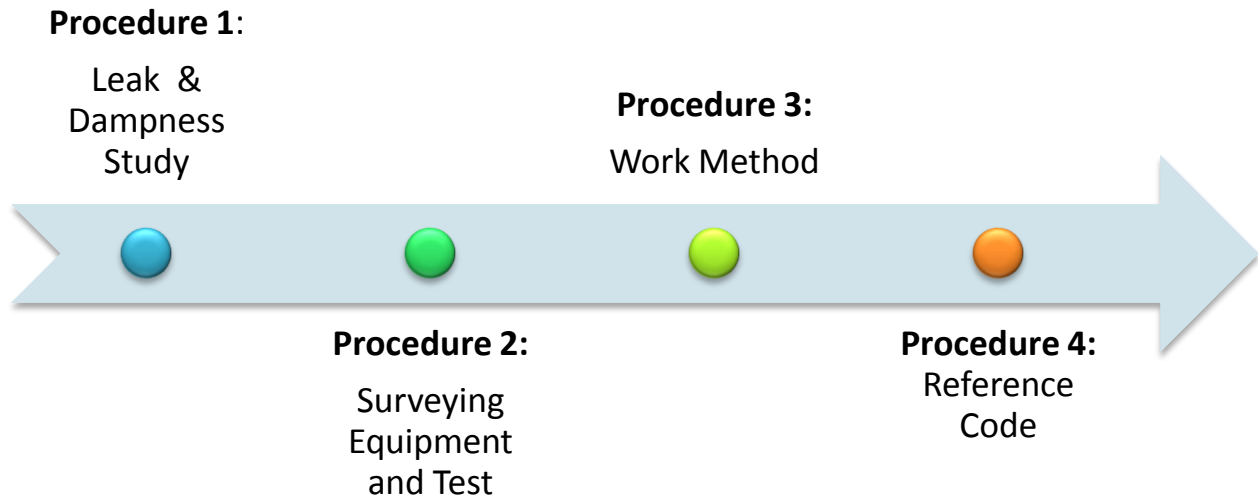
- avoid sealing the walls outside with masonry paints which stop moisture reaching the wall but also trap moisture in the wall. If the paint flakes, moisture can enter the wall but not escape. This can cause spalling of the brickwork as well as damp problems.
- keep the soil level 15cm below the damp-proof course
- keep the ground around the walls bare, or perhaps covered with gravel to minimise splashing and allow evaporation. Concreting the ground outside prevents rain reaching the ground but also stops evaporation. Any slope towards the wall, or a crack next to the wall adds to problems.
- keep air bricks clear

There is inevitably a trade-off here; we want to have a warm house but we don't want damp walls.

A 'french drain' is a useful method for drying the base of walls. Dig a ditch 30cm deep and 30 cm wide. Paint the bottom liberally with rubber compound or bitumen, and paint the wall with it too up to about 8cm below the top of the ditch. Make sure that the drain runs away around the house in a smooth run to a soakaway or at a rainwater drain. By painting with rubber or bitumen you will stop the water soaking through at any low spots in the drain. Check the water runs away through this drain by using a hose or buckets of water. Then make a wall to the side of the trench away from the house wall with old slates and then fill with gravel. Avoid walking on the gravel as this will compress the gravel and may puncture the membrane.



## 2.4 Work procedure



### 2.4.1 Flowchart

More drastic solutions are:

<b>FLOWCHART :-</b>
<b>inject a chemical damp-proof course (DPC)</b>
<b>fit extra air bricks; the objective is the maximum draught through the house so add more bricks on opposite sides.</b>
<b>install a modern bituminous damp-course by cutting into the walls</b>
<b>add air vents in the affected rooms, as high up as possible to take warm, damp air out</b>



## 2.5 Problem with leak and dampness at wall

Damp and excessive humidity are perhaps the two most annoying problems we experience in old houses, although neither are absent from modern buildings! From condensation and peeling paper to wet and dry rot, the results demand our attention.

Symptoms to look out for are:

- peeling paint and wallpaper
- black spots on paper and paint
- cold areas on outside walls
- smells of mould
- floor-boards that 'give' when stood on (though damp is not the only cause of this)
- mould on clothes and carpets
- cracks in internal walls which open and close over a year





then, the problem statement is :-

- Most damp problems in historic building arise through the failure of materials and building detailing. (Roger Curtis,2007)
- 83% defects in historical building in Malaysia is caused by dampness. (Kamarul Syahril,2007)
- Poor understanding regarding the extent and nature of the building defects, would render an inappropriate approach and scope of repair work being carried out during the conservation project. (Ghafar, 2004)
- About 60% of conservation and maintenance of historic buildings are done by the inexpert and inexperience workers in Malaysia. (Brit Kayan, 2003)

Dampness is the serious defect occurs in the heritage building in Malaysia; a detail diagnosis work must be conducted and the correct remediation must be given to prevent the same defect occurs in the future.

The most serious of these are mouldy smells; both may indicate wet or dry rot.

Of these, wet rot is the easiest to treat; remove the moisture and the rot will die out. The most severely damaged wood will need to be replaced.



Dry rot is more difficult. Although recent research has shown that removing moisture and improving airflow does largely kill it off, this is not always possible, and any recurrence of damp will tend to revive the fungus.

Here are the steps to take when you see a wall crack.

- ✓ Take a picture of the crack and note the date.
- ✓ Walk around the inside and the outside of your house checking for other signs of cracks.
- ✓ Look at door frames and window sills, fire places, basements and garages.
- ✓ Take pictures of any other cracks you find. Note the dates, and ideally print them out in a note book, or save them on a disk with your home records.

## 2.6 Wall crack in middle of the wall next to fireplace

If you find more than one crack, especially if you find a number of them, it's time to get a referral ;-

- ✓ Only call the companies with the best reputations; take the experiences of those you speak with to heart!
- ✓ Set up appointments for them to see the house.
- ✓ Take notes about what they say when they look at the house.
- ✓ Then talk it over with your trusted friends.
- ✓ You may want to get the expert opinion of an engineer before making your final decision of waiting, or proceeding with any recommended repairs.



- ✓ A wall crack can be serious in a variety of situations. The size of a crack is an indication, growth of cracks over time, and the number of cracks occurring, are all clues to help the professionals determine the scope of the problem.

## 2.7 TYPE OF LEAKAGE AND DAMPNESS

There were six identified factors contribute to the high level of dampness in this building. It consist of:

- Rising damp
- Roof leakage
- Plaster Crack
- Defective Rainwater Goods
- Pipe Leakage
- Driving Rain

### 2.7.1 Rising Damp

- Rising damp occurs as a result of capillary suction of moisture from the ground into porous masonry building materials such as stone, brick and mortar.
- The moisture evaporates from either face of the wall (inside or outside), allowing more to be drawn from below.
- The height to which the moisture will rise is determined by the evaporation rate and the nature of the wall. The normal limit for rising damp ranges from 0.5 to 1.5 metre above ground level.

- Rising damp may show as a high-tide-like stain on wallpaper and other interior finishes, and, when more severe, as blistering of paint and loss of plaster. Damp walls encourage the growth of moulds, which, with the high humidity, can lead to health problems for occupants, unsightly & unpleasant to occupy.

### 2.7.2 Plaster Crack

There are hairline & plaster crack occurs on wall lime plaster which means the existence of capillary effects that cause water penetration into building wall.



Grid: B/7-8 (Y3), Checklist 37  
Photo: Minor Cracks Along Wall Plaster



Grid: B/9-10 (Y4), Checklist 38  
Photo: Vertical Cracks

### 2.7.3 Driving Rain

Driving rain always occur at the exposure area, the effect of driving rain will cause high level of dampness at wall. The material of wall is derived from lime and bricks, the property of lime such as porous will lead to penetration of rain water and from the environments.



# **CHAPTER 3**

## **CASE STUDY**



### 3.0 CASE STUDY

#### Intoduction

The case study is about wall leaking at Department Facilities and Management Seri Iskandar.

The title of the project is “**CADANGAN KERJA-KERJA BAIKPULIH KEBOCORAN DINDING UNTUK FAKULTI PERAKAUNAN,FPP DAN FSPU ZON 2, UNIVERSITI TEKNOLOGI MARA (PERAK) SERI ISKANDAR, PERAK DARUL RIDZUAN**”. The name of the contractor is Imza Maju Enterprise and the contract amount is RM 18,110.03.

The causes of the leak happened at Department Facilities and Management is because of the unsuitable materials used during construction and also because of environmental factors such as wind and heavy rain. Design of the wall construction is also one of the causes of one of the leak , crack and dampness problems.

### 3.1 History of Case study building



*Figure 3.0: Academic Block Faculty of Office Management*

Academic block building was built in 2008, April 16 and was completed in October 30, 2010. This building was built to accommodate students from the state office management courses, apart from that it is also used for special occasions organized by UiTM.

The building was built as a result of co-operation by the FAA ltd architects, civil and structure of Aidid Consulting ltd, Mechanical and electrical engineering from Perwira Al Shuara construction and Syarikat Lingkaran Muhibah contractors' ltd. The building is estimated to be around 12 million ringgit Malaysia.

### 3.2 The Faculty of Office Management (FPP) floor plan.

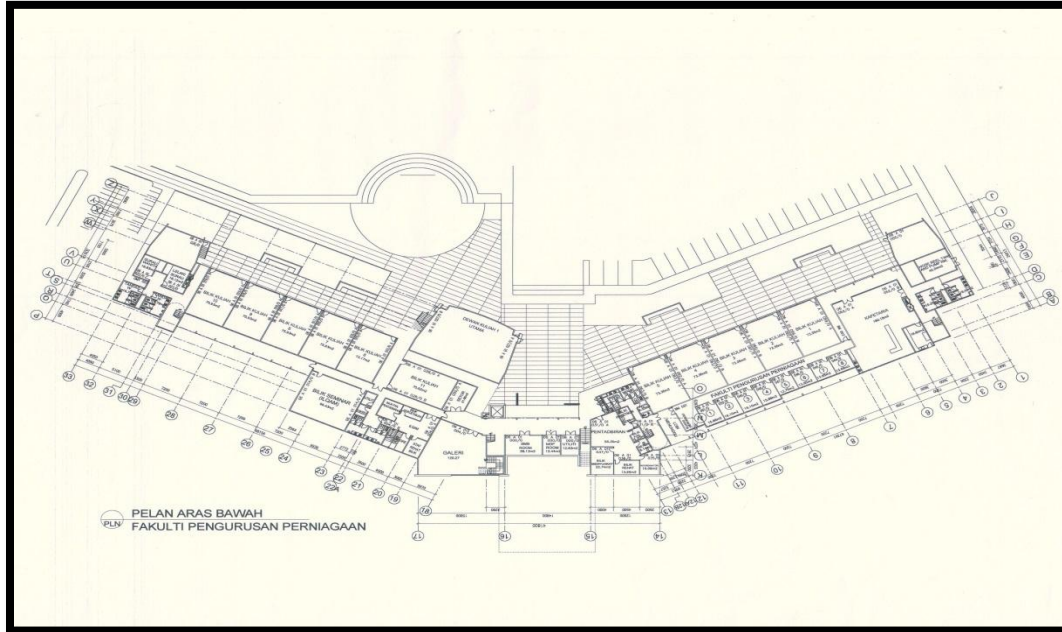


Figure 31 Ground level

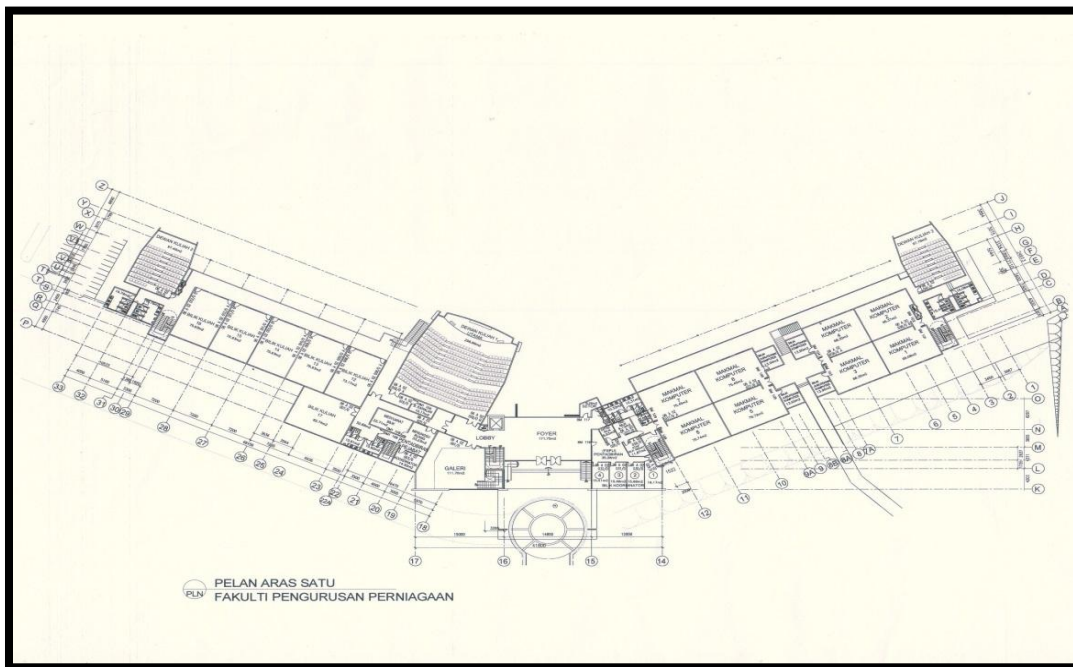


Figure 3.2 1<sup>st</sup> Floors



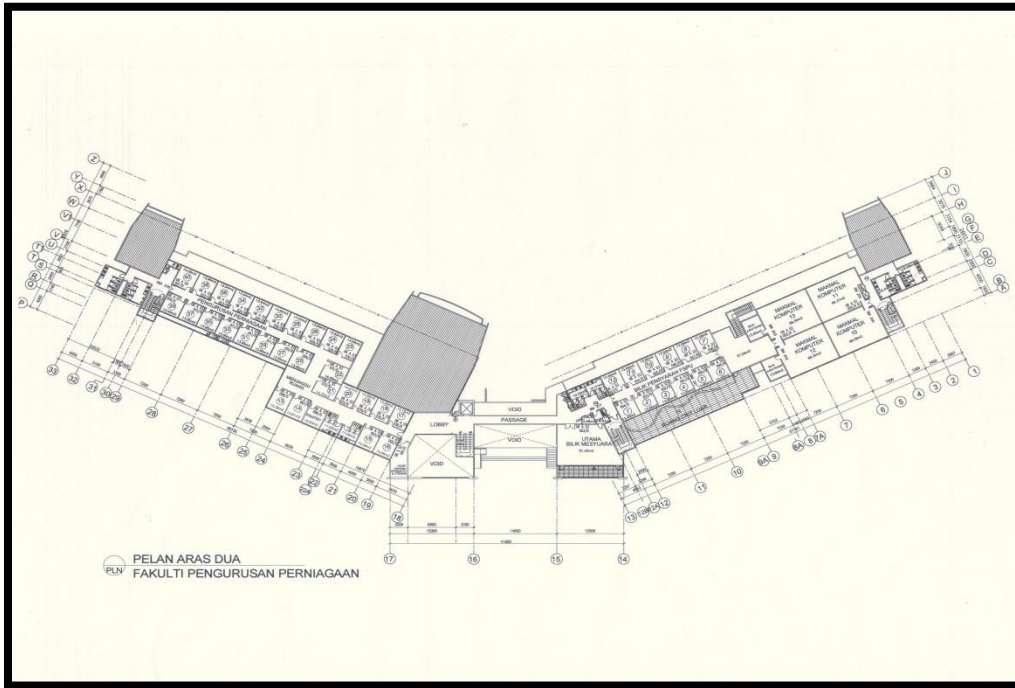


Figure 3.3 2<sup>nd</sup> Floors

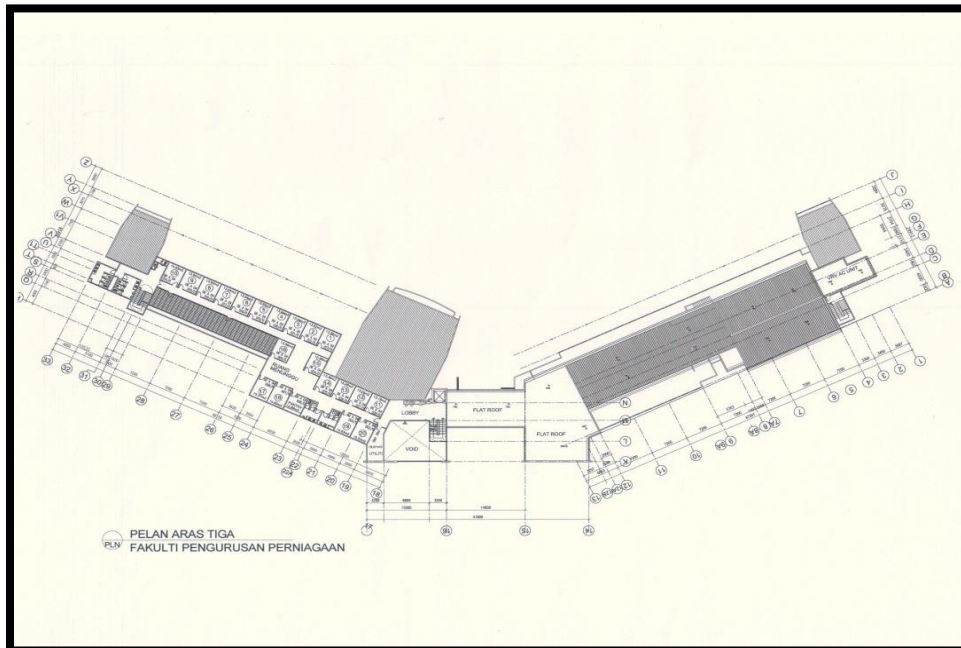


Figure 3.4 3<sup>rd</sup> Floors

### 3.3 Area of defects in Building

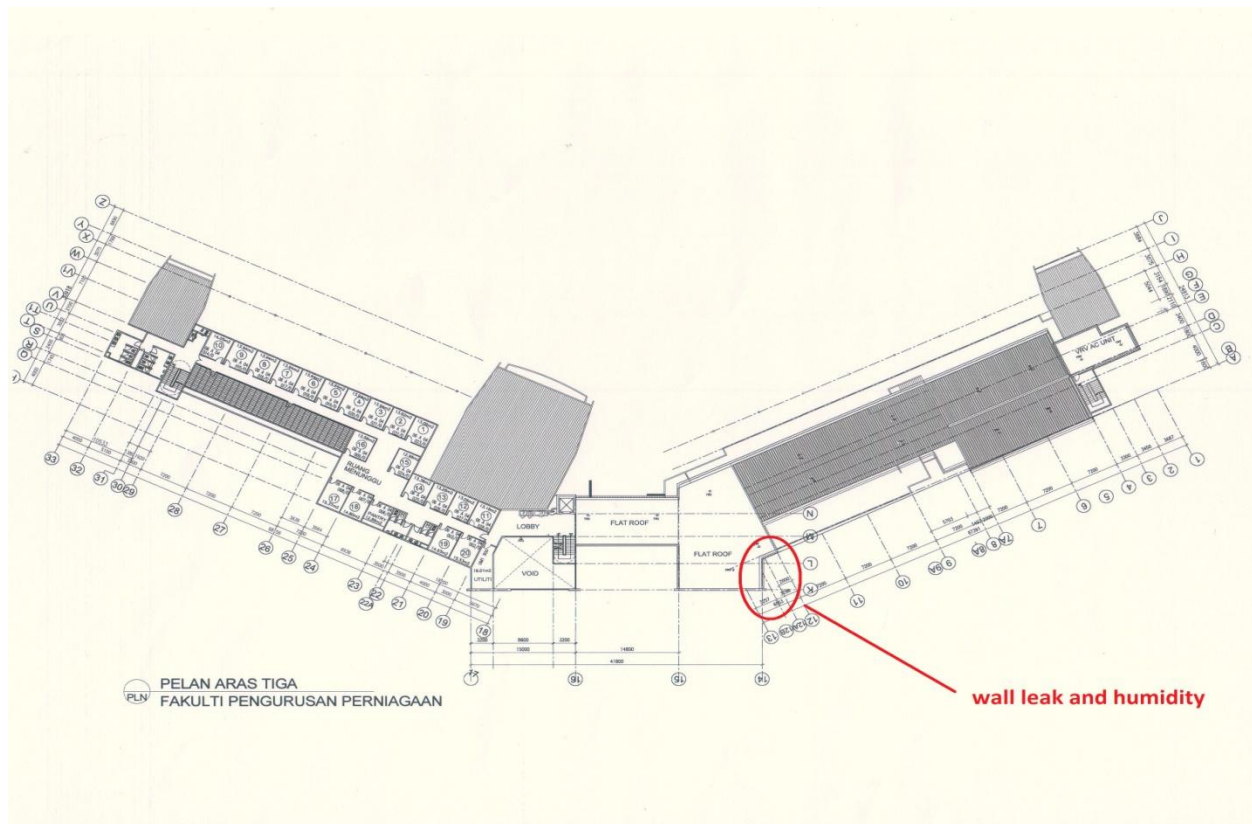


Figure 3. :5 area of defects for Faculty of Office Management



### 3.4 Research and information

In case study research, this leakage is a result of rain on parts of the wall and water flowing through the wall because the wall is not covered with a roof and uncertain weather conditions, causing leakage, crack and dampness in the walls.

Once checked, experienced quite severe leakage and crack on the outside is more than 40 mm and a depth of 6mm and it can cause the wall worse if left unchecked.

In addition, on the inside (meeting) on the building to be dampness on the walls and the reading taken at that time was 32.0% RH in accordance with the equipment used (moisture meter). This causes the walls to be broken down and replaced with a stronger material.

Therefore, the repair work is taking time due to leakage at the 3rd floor of the office building management. Leaks can cause floors below suffered the same effect if the leak is not addressed early and accurate.



### 3.5 Procedure work for repairing work

The first step:

Make test and inspection to determine the cause of the leakage on the wall using the existing equipment.



Step two:

Taking measurements, notes and picture to calculate the cost to make repairing work and put out to tender. Having received special approval, work will be done with instant rates.



Step three:

With a professional staff, work to break the walls done with the right tools and the fractured parts.



Step four:

After that, the part that has been broken will be cleaned and placing bricks and cement with the corresponding amount given.



Step five:

After laying the bricks, cement plastering work will be done on the inside and outside of the building.



Step six:

After completed plastering, painting work will done and make the inspection to ensure the work is done in a neat and orderly condition.

### 3.6 Methods to overcome leakage, crack and dampness

In the walls that leak, we have a method of the rules that have to be taken into account to ensure that the work done is correct.

Below are the sequences of the works:

stage 1: learn about defects

stage 2: identify problems that are on the wall.

stage 3: take notes on books

stage 4: step the repair wall is :-

-provide equipment



*Figure 3.6 : Moisture Meter*



*figure 3.7 : Digital Caliper*



- break down the wall that has defects
- clean the walls
- Load and compiling the new rock and bpm correctly
- laying cement
  - make plastering
- re-painting
- Make a clean

### 3.7 The process of repairing work

This picture shows the part that need repair before breaking work on building walls. It has a crack and dampness in the walls that are categorized as broken wall. It had to be repaired before they spread and cause buildings to collapse.



Figure 3.6 : *Crack Outside*



Figure 3.7 *Peel of paint (dampness)*



After inspecting and collecting data, the work done is break the wall for the purpose of repairing the wall that has Leakage and crack. Was it done for a few days to work on these. After that, work to clear the wall and insert a brick to replace a new purpose. Next plaster the walls with appropriate materials.



*Figure 3.8 repairing work*



*Figure 3.9 plastering work*



Upon completion of plaster work, work continues to clean and repaint the walls properly and make sure the walls in good condition. On the inside is also doing the same job that takes in a few days.



*Figure 3.10 painting work*



*Figure 3.11 inside work*



# **CHAPTER 4**

## **PROBLEMS & RECOMMENDATIONS**



## 4.1 Problems

As human beings, problems come and go without giving a tiny hint. That is one of the reasons why maintenance is important and significant. It helps to keep things in good condition, or even when it is already broken, it won't get worse in the future.

There are a few problems occurred when the maintenance work is in process, the problems are:

1. Employees do not do investigations and maintenance of the building and did not see the situation around
2. Work cannot be done in time for workers to begin their work after office hours at 5:00. They are not allowed to work before time as the building is used and there are a lot of people wandering around. It may be dangerous to anyone and cause problems. Sound coming from maintenance work may also affect the learning process in the immediate area.
3. The changing contract workers because of their discipline.
4. The contract workers are not doing their job well and always skip work and their reasons for postponing the maintenance work.
5. take about the story and careless attitude while doing the work



## 4.2 Recommendations

Every problem has its own solution. Here are some recommendations that I think are convenient to use to upgrade the maintenance work process and can also be use whenever problems occurred.

1. Supervisor should supervise the workers more, and make sure that they are at work when they should be at work.
2. Workers should start their work on time. Whether they have to start their work late on 5.00PM every day, but if they start on time there should not be a problem to finish it on time.
3. A board should monitor and improve the work of the inquiry and he maintained around the building.
4. Attendance form should be created to make sure that workers come to work. Signature must be stated on the form.



# **CHAPTER 5**

# **CONCLUSION**



## 5.0 Conclusion

As a result of this research, the research is clear on leak repairs and refurbishment to the building management office UiTM Seri Iskandar, Perak. Therefore able to identify the materials used during construction, and equipment used during the repair process performed. At the same time, all the problems that occur before, during or after and how to solve the problem can also be solved. Based on observations at the site, the method of repair of the building is organized and systematic. Besides, they are the relevant material use to a building.

In addition, based on a survey conducted during the wall repair involves several key materials such as cement, stone aggregates, sand to make the main ingredient. Further, the equipment involved has been identified.

Finally, the maintenance and operation and monitoring of the site and supervisor involved to make the construction work can be carried out properly and systemic that can work properly conducted.



## 5.1 reference

### 1. Interview

- Encik Syahidi Bin Samsuri (Civil Technician) – supervisor
- Encik khusyairi bin Mohd Yusoff (carpenter)

### 2. Internet

- <http://home.howstuffworks.com/ac3.htm>
- <http://www.sciencedirect.com/science/article/pii/S036013230300060X>
- [http://inspectapedia.com/Wet\\_Basements/Basement\\_Water.htm](http://inspectapedia.com/Wet_Basements/Basement_Water.htm)

### 3. Books And Note

- Note BS - dampness ANALYSIS Of HERITAGE BUILDING  
(*CASE STUDY: IPOH OLD POST OFFICE BUILDING, PERAK*)



# APPENDIX



## THE STAGE OF WORK FOR REPAIRING WORK

### STAGE 1



### STAGE 2



### STAGE 3

