



**DEPARTMENT OF BUILDING  
UNIVERSITI TEKNOLOGI MARA  
(PERAK)**

**MATERIAL SELECTION AND PURCHASING PROCESS**

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It is recommended that the report of this practical training provided

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**entitled**

**Material Selection and Purchasing Process**

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

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**FEBRUARY 2022**

**STUDENT'S DECLARATION**

I hereby declare that this report is my own work, except for extract and summaries for which the original references stated herein, prepared during a practical training session that I underwent at MSN Construction Sdn. Bhd. for duration of 20 weeks starting from 23 August 2021 and ended on 07 January 2022. It is submitted as one of the prerequisite requirements of BGN310 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

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## **ABSTRACT**

Materials selection and purchasing is a process of materials management in construction. It is critical to ensuring a continuous supply of materials needed for construction purposes. It not only ensures that construction deadlines are fulfilled, but it may also save cost on a final project while preserving quality through the materials chosen and used. Nevertheless, there are currently limited appropriate guidelines for material selection and purchasing process in building projects. Therefore, this report will discuss process of material selection and purchasing-during the construction of single unit house. This report was carried out at Bukit Kapar, Selangor. One of MSN Construction Sdn. Bhd projects. The objective of this report is (1) to identify the type of material involved in construction work. (2) to determine the process of material selection and purchasing and (3) to analyze the problem and solution during the material selection and purchasing process to enhance the material management process currently in use. These objectives are achieved by applying four different research methodology, observation on-site and off-site, unstructured interviews with parties involve, document reviews regarding the project, and internet browsing. Material selection and purchasing are key aspects to consider in desire to get a successful outcome in material management and provides materials at the right time, place, quantity, and quality. Inadequate material selection and purchasing, can result in unavoidable loss for a building project. To summarise, it is vital that the contractor and other parties involved cooperate in order to properly manage materials such as selection and purchasing materials in any construction. A focus on these aspects would improve material management in construction, resulting in considerably superior results.

**Keyword: Materials management, materials selection and purchasing process, parties involve, single unit house**

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## CHAPTER 1.0

### INTRODUCTION

#### 1.1 Background of Study

Materials are an essential element of the construction industry. Materials often account for a significant amount of the budget for a construction project. According to ~~some~~ statistics, materials may account for more than 60% to 70% of the cost of a building project (K. V. Patel & Vyas, 2011). The remaining 30% to 40% would be the cost for labour. Regardless of these statistics, once project budgets and efficiency are taken into account, labour and cost reduction were considered (Zairra & Narimah, 2017). When materials are efficiently tracked, project time can be optimised, costs can be reduced, and quality can be maximised. Because each project is typically viewed as an individual effort, each project requires a unique plan, there is a lack of efficient materials management in capital and investment construction projects. The geographical location and technology required for each project will provide new challenges (Zairra & Narimah, 2017). yet these projects will contain features that can be predicted from prior construction projects.

Construction projects suffer from delays, cost overruns, construction waste, and low productivity if material management is not properly managed (Zairra & Narimah, 2017). As a result, material management is an essential component of construction projects. Materials management is the process of planning, executing, and monitoring on-site and off-site construction operations. The materials management process attempts to ensure that the necessary quality and quantity of materials are chosen, purchased, delivered, and managed on site in a timely and cost-effective manner (Patel & Vyas, 2011). These material management process measurements may differ from one process to the next. The measures separate the materials management system into pieces and make the system run more efficiently. When the measures are combined, they form the complete materials management system.

The material selection and purchase processes were the steps that may improve building material management. As previously said, it may assist to reduce construction delays, cost overruns, construction waste, and low productivity. There are several material managements processes in these construction projects. The study's aim, on the other hand, is to discover about the material selection and purchase process in the building of a single unit house, which differs from a bigger project or megaproject, such as a residential project, because the budget and materials required are different.

## 1.2 Objectives

The objectives of this case study are:

- i) to identify the type of material involved in construction work.
- ii) to determine the material selection and purchasing process
- iii) to analyze the problem occurred and solution during the material selection and purchasing process

## 1.3 Scope of Study.

This case study is based on project of single unit bungalow, one and half story on Lot 6427, Plot c 1, Jalan Sebaya, Bukit Kapar, Mukim Kapar, Selangor Darul Ehsan (Figure 1). The focus of this case study is type of materials involve for the construction, process of selection and purchasing of the material and problem occurred and solution during the material selection and purchasing process:-



*Figure 1: Single Unit House at Jalan Sebaya, Bukit Kapar*

(Source: MSN Construction Sdn. Bhd:2021)

## **1.4 Methods of Study**

Regarding the chosen topic, material selection and purchasing process, the data was gathered using a various approach, including on- and off-site observation, unstructured interviews, document reviews, and internet browsing.

### **1. Observation:**

The observation is done on-site and off-site. The building site is located at Lot 6427, Plot c 1, Jalan Sebaya, Bukit Kapar, Mukim Kapar, Selangor Darul Ehsan. Off-site observation is generally done at the store office on Jalan Paip in Meru. The observation is done by observing the site engineer and senior site supervisor. Through the observation, the process of materials management is starting from selection of raw material to be used for certain work until the last process which is to storage and handling the materials. For instance, the brand of cement plaster used. The selection is decided after discussing the quality, quantity, price, and other factors with the site supervisor and office staff in accordance with the specifications and requests for the plastering work. The observation, which on August 33rd, 2021, until January 7th, 2022, includes some photos taken with a smartphone and put down on a short note to record essential information from the observation

### **2. Interviews:**

Unstructured interviews were used as the research approach. The person in charge of the site was questioned on the spot throughout the construction process to obtain more clear information for the study. The interview is also conducted by interviewing certain employees who manage material management and certain labours about their related works on site during this study. Furthermore, the interview takes place when meeting with suppliers directly when materials need to be collected. All the responses from the unstructured interview are written down in a notebook for reference in the future.

- a. On-Site.: Subcontractor and labours
- b. Off-site.: Office staff and supplier

3. Document reviews – Document review, such as drawing plans of the constructing house to identify specific materials used, Quotation, Delivery Order (DO), and Purchase Order (PO) receipt of ordered materials, contributes to providing additional

information to this study. Furthermore, in the materials WhatsApp group, there are some images and records from a previous order made by the senior site supervisor as reference.

4. Internet browsing: This method was chosen to support in the gathering of more information necessary to complete this study

## **CHAPTER 2.0**

### **COMPANY BACKGROUND**

#### **2.1 Introduction of Company**

MSN Construction Sdn. Bhd. is the main contractor for MSN Development Sdn. Bhd., popularly known as MSN Homes. MSN Development, a private corporation, has been in operation since 2004 and has an extensive regional network throughout Malaysia. MSN Development has a distinguished track record of successfully delivering and completing projects. MSN Development is separated into two divisions. MSN Homes is the primary subsidiary in charge of big projects such as residential construction. IM Homes is the company's second subsidiary, and it is in charge of the construction of private or single-family houses (MSN Construction Sdn. Bhd, 2021).

#### **2.2 Company Profile**

MSN Construction Sdn. Bhd. (759006-H) was founded on January 11, 2007, and the whole shareholding of the firm, with a Paid-up Capital of RM1.65 million, is held by Bumiputera (Malay). During the business's approximately 9-year engagement in this highly tough market, the company has finished the full project with a value of RM46.65 million, which does not include the 'on-going' project planned at RM30 million in 2018. MSN Construction Sdn. Bhd. is a CIDB Grade G7 registered pure construction firm. The company has sufficient staff with a variety of expertise and competences who are continuously motivated in progressing themselves and the company, in step with the quick pace of competition in this industry. The company is also working to get ISO 9001: 2015 Quality Management System accreditation. (MSN Construction Sdn. Bhd, 2021).

MSN Construction Sdn. Bhd competences in this field is as follows:

1. Residential/Building Construction

This is the main field of expertise for MSN Construction Sdn. Bhd., which is subsidiary of the MSN Group of Companies. MSN Construction Sdn. Bhd. is a 'Player' in the property development industry with Malay Reserve status, identical to its flagship company MSN Development Sdn. Bhd. As evidence, the company has built over 1000 affordable housing units for Malay ownership.

2. Civil Infrastructure

Provide skills for civil/public infrastructure construction projects.

- a. Road Premix
- b. Drains
- c. Bridges (small and medium)
- d. Road curbs
- e. Groundworks

3. Mechanics and Electrical

With the help of a chain of the company subcontractor's registered with different government agencies for mechanical and electrical engineering work, the company also can carry out the work involved in building.

- a. Infrastructure for Telecommunications
- b. Electricity
- c. Streetlights
- d. Plumbing, both internal and external

4. Design & Construction'

The company also specialises in 'Design & Build' projects and has a specialised staff that is skilled in design, CAD drawing preparation, and perspective. In order to provide this service, the company relies on a network of Professional Consultants. As evidence, MSN Construction Sdn. Bhd. has already completed 400 units of houses using this service.

### 2.3 Company Organisation Chart

MSN Construction Sdn. Bhd. has 16 management and staff and 44 construction workers with a wide range of academic backgrounds, experience, and talents who are dedicated to the company's vision and mission. (MSN Construction Sdn. Bhd, 2021) Figure 2 shows individuals who play important roles in this company.



Figure 2: MSN Construction Organisation Chart

(Source: MSN Construction Sdn. Bhd, 2021)

## 2.4 List of Project

### 2.4.1 Completed Projects

There are 12 completed MSN Construction projects in past 5 years.

*Table 1: MSN Construction completed project*

(Source: MSN Construction Sdn. Bhd., 2021)

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration
1.	Taman Bentara Residence	RM8,157,201.00	January 2016	February 2017	1 years 1 months
2.	Taman Idaman Hati Residence	RM10,160,000.00	October 2015	March 2017	1 years 5 months
3.	D'Green Residence	RM15,000,000.00	April 2016	February 2018	1 years 10 months
4.	Taman Desa Meru Residence	RM7,573,120.00	February 2017	July 2018	1 years 5 months
5.	IndahVille Residence	RM11,000,000.00	December 2017	March 2019	1 years 3 months
6.	16 Units Single Storey Semi -Detached House on Jalan Nenas Meru	RM1,824,000.00	May 2018	November 2019	1 years 5 months
7.	DesaVille Shoplot & Residence	RM23,530,000.00	June 2018	November 2020	2 years 6 months
8.	Single unit Double Storey Bungalow in Taman Melaka Perdana	RM1,400,000.00.	September 2019	August 2020	11 months



9.	6 Units Single Storey Semi -Detached House In Jalan Meru.	RM720,000.00.	September 2019	October 2020	1 year 1 months
9.	Impian Villas	RM4,338,500.00.	April 2019	January 2021	1 years 9 months
10.	Surau Al-Hidayah, SMK Setia Alam	RM250,000.00.	August 2020	July 2021	11 months
11.	DesaVille2 Residence	RM14,733,900.00	February 2019	November 2021	2 years 9 months
12.	M1 Residence	RM8,088,085.00	October 2019	December 2021	2 years 2 months

### 2.4.2 Project in Progress

Five of MSN Construction's project are still on-going as shown in Table 2.

*Table 2: MSN Construction project in progress*

(Source: MSN Construction Sdn. Bhd, 2021)

<b>No.</b>	<b>Project Title</b>	<b>Project Value</b>	<b>Start Date</b>	<b>Completion Date</b>	<b>Project Duration</b>
1.	Single unit house at Jalan Sebaya	RM320,000.00	January 2021	February 2022	1 years 1 month
2.	IndahVille2 Residence	RM4,445,449.54.	June 2020	May 2022	1 years 11 month
3.	GreenVille Residence	RM10,496,700.00.	December 2019	June 2022	2 years 6 months
4.	M2 Residence	RM6,904,450.00.	March 2021	May 2023	2 years 2 month

## CHAPTER 3.0

### MATERIAL SELECTION AND PURCHASING PROCESS

#### 3.1 Introduction to Case Study

This case study is based on a project for a single unit house with one and a half storey on Lot 6427, Plot c 1, Jalan Sebaya, Bukit Kapar, Mukim Kapar, Selangor Darul Ehsan. The project is estimated to be about RM 320, 000.00. The construction is started in January of 2021, with an estimated completion date of June of 2021. However, after a month of building, the construction is delayed due to a Movement Control Order (MCO). However, the construction resumes operations in August 2021, with a revised completion date scheduled for December or January 2021.



*Figure 3.1: Surrounding area of construction site*

The project's site, as shown in Figure 3.1, is in a green area. It is surrounded by a pineapple garden, to be more specific. The soil at the site is in fair condition, having



*Figure 3.2: Skylight of swimming pool area*

peat soil that is suitable for planting. As a result, the contractor has chosen to install piles as the building's foundation. The building's construction is unique in that it has a swimming pool (Figure 3.2) with dimensions of 10ft length, 6ft width, and 5ft depth. However, the focus of this study will be on material management processes during the building's construction.

The location plan of construction is shown in Figure 3.3 below:

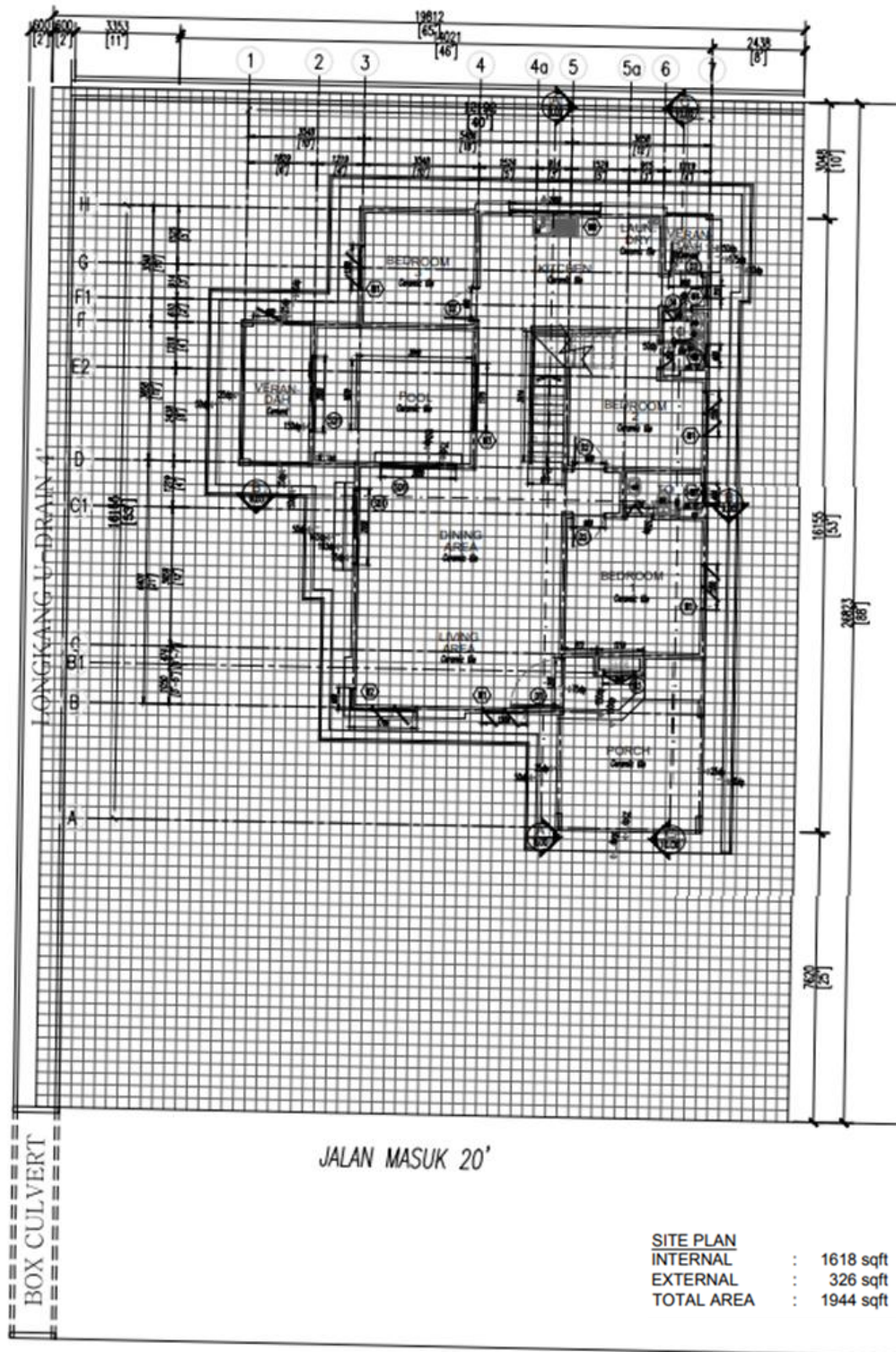






Figure 3.3: Location plan (Jalan Sebaya)

Source: MSN Construction Sdn. Bhd, YEAR?





### 3.2 Type of material involved in construction work

The materials used in this construction are widely applied in other projects completed by the company. However, the quantity and quality required for current construction differ since the total built-up area may be larger or smaller than the prior construction. Nevertheless, the materials or raw materials used for the construction can be referred to. Table 3 shows some of its most regularly used materials, and there are numerous types to choose from, depending on the client's needs.

Table 3: Raw materials

No.	Material	Description
1.	<p data-bbox="480 763 697 797">Portland cement</p> 	<ul style="list-style-type: none"> <li>- Numerous brands/variety</li> <li>- The YTL Cement brand is widely used. (Used in this construction)</li> <li>- Flexible (provided by any supplier),</li> <li>- Used for the production of concrete mixtures for columns and beams.</li> </ul>
2.	<p data-bbox="421 1151 756 1184">Coarse and fine aggregate</p> 	<ul style="list-style-type: none"> <li>- Flexible &amp; No variety</li> <li>- Used for the production of concrete mixtures for columns and beams.</li> </ul>
3.	<p data-bbox="507 1413 668 1447">Coarse sand</p> 	<ul style="list-style-type: none"> <li>- Flexible &amp; No variety</li> <li>- Used for the production of concrete mixtures for columns and beams.</li> <li>- Used for mortar mixture to build brick wall.</li> </ul>
4.	<p data-bbox="528 1718 647 1751">Fine sand</p> 	<ul style="list-style-type: none"> <li>- Flexible &amp; No variety</li> <li>- Quality can be difference</li> <li>- Used for plaster mixture.</li> </ul>



5.	<p style="text-align: center;"><b>Plywood</b></p> 	<ul style="list-style-type: none"> <li>- Flexible</li> <li>- Waterproofing or non-waterproofing</li> <li>- - Used as a base plate for formwork in the construction of flat roofs and slabs.</li> </ul>
6.	<p style="text-align: center;"><b>Cement sand brick</b></p> 	<ul style="list-style-type: none"> <li>- Many variety (size/weight)</li> <li>- Inflexible (limited stock for these construction).</li> <li>- Quantity per pallet is difference. (616pcs per pallet used)</li> <li>- Used as brick wall for the building.</li> </ul>
7.	<p style="text-align: center;"><b>Plaster cement</b></p> 	<ul style="list-style-type: none"> <li>- Numerous brands/variety</li> <li>- Stock might be limited according to brand.</li> <li>- Walcrete cement brands are used.</li> <li>- Used as mixture for plastering work at internal and external wall</li> </ul>
8.	<p style="text-align: center;"><b>Skim coat base and finish</b></p> 	<ul style="list-style-type: none"> <li>- Have difference variety (white/grey colour)</li> <li>- Stock might be limited according to brand.</li> <li>- Used for finishing work for internal wall to create smooth surfaces.</li> </ul>

### 3.3 Process of material selection and purchased

The materials for the building are selected and purchased before any work begins. To avoid future material issues such as shortages or waste, the type of materials, quality, pricing, and quantity of materials are adequately identified.

#### 3.3.1 Material selection

The flowchart in Figure 3.4 illustrates the material selection.

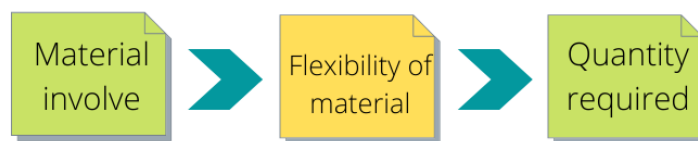


Figure 3.4: Material selection flowchart

#### Phase 1: Materials involve

In general, each new work will need a different material. The office staff in charge of material selection and purchasing identify exactly which materials to purchase by reviewing the drawing plan specification. The drawing document provides all of the material specifications. Some materials, such as cement brands, were not stated in the drawing specifications. The project manager then discusses with the office staff to determine which brand is wanted.

#### Phase 2: Flexibility of materials

The flexibility of materials is significant in determining what sort of material they are. Furthermore, the flexibility of the materials aids in distinguishing between inflexible and flexible materials. For inflexible, materials are purchased two weeks before the work schedule since stock is limited and in great demand. Cement sand brick were the inflexible materials for this project since they needed to be ordered two or three weeks advance of the construction schedule. However, for more flexible materials such as coarse and fine aggregate. Because the availability of the materials is not limited, these items can be ordered one or two days before the work schedule.

### Phase 3: Quantity required

Following the completion of the required quantity, two methods will be used to determine the final quantity to be purchased. The methods are used in two separate situations. The first method is used on delicate materials. Materials such as roof tiles, for example, are prone to breaking even when handled properly. As a conclusion, 2% is added to the calculated amount to be more prepared. The second method is used for supplies that can last longer or meet schedules until the next re-ordering. The actual calculated quantity is purchased. This is due to the fact that all of the materials are flexible in numerous aspects. The aspects are materials is readily available from any supplier, durable, can be stored for an extended period of time, do not require longer delivery time or are delayed, and most importantly, price is consistent amongst suppliers. YTL Portland cement is one of the materials that meets all of the standards. Because of the well-known brands in Malaysia that make it available anywhere at a reasonable price,

#### 3.3.2 Purchasing of materials

The flowchart in Figure 3.5 illustrates the material selection

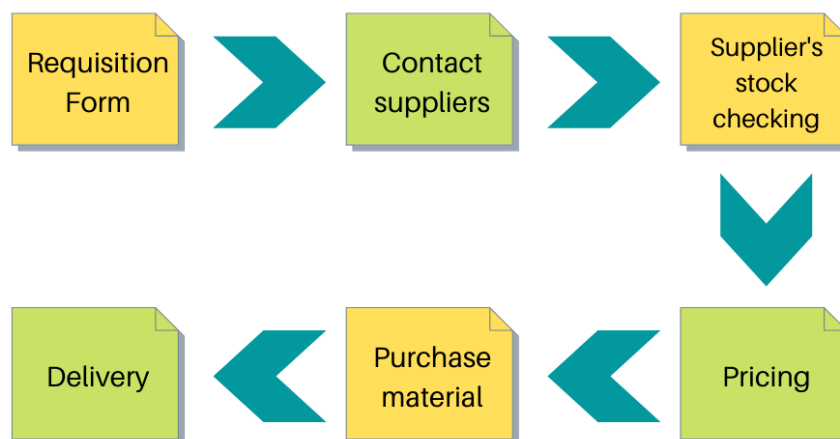


Figure 3.5: Flowchart for purchasing of materials

The main purpose of the purchasing process is to provide materials at the correct time, location, quality, and within the agreed-upon budget for the construction. Essentially, the purchasing process begins with the person in charge receiving the requisition form (Figure 3.4) from the site supervisor, followed by the purchase.





**Phase 2: Contact suppliers**

Before the purchasing process is completed, the person in charge of making the purchase, which is office staff, consulted with the next parties involved, who are suppliers. Because of the company has been in the industry for many years, company regularly uses the supplier's services that has a connection with them.

**Phase 3: Supplier's stock checking**

Every material will be verified by suppliers. and the materials' availability, quantity, and pricing will be confirmed. Sometimes the materials have a limited stock to fulfill the required quantity. If the condition of the material was not urgent to use on site, office staff decided to either purchase the available stock and wait for the next stock to receive. Otherwise, office staff will negotiate with other suppliers.

**Phase 4: Pricing**

After receiving confirmation of the quantity available, the office staff will discuss the final pricing of the materials. The office staff will check on construction budget for materials to ensure that cost for the materials purchased were not exceeding to the budget of the construction materials.

**Phase 5: Purchased materials**

After the company's and suppliers' agreements were reached. Materials are purchased, and a Purchase Order (PO) is generated by office staff to be sent to suppliers and the site supervisor to refer.

**Phase 6: Delivery**

For the materials' delivery date. It either followed the requisition form's specified delivery date or the availability of suppliers to provide the materials. The Delivery Order (DO) or Invoice is then given to the on-site supervisor.

### **3.3 Problem occurred and solution during the material selection and purchasing process**

Every project, no matter how big or small, may encounter problems. Despite the fact that the contractor has been in this field for a long time. The issue brings a new set of obstacles to the job site. With the prepared staff and resources available, contractors might soon find themselves in a position that is beyond their control. The problem occurred from all parties involved in material selection and purchasing.

#### **3.3.1 Drawing plan specification**

Incomplete drawing plan specification given to office staff which cause an insufficient material quantity purchased and delayed work. Office staff then have told the quantity surveyor or person in-charge in providing the specification of the material. Moreover, have to re-ordering the materials that needed.

#### **3.3.2 Office staff (person in charge making an order).**

Overlooked the specifications and quantity of materials, as well as the date of delivery of materials stated in the requisition form, resulting in the materials received on-site being unclear and inadequate to begin the work. The labour then must wait for another delivery, or the site supervisor self-collect it if the materials can be collected with a 4x4 vehicle. Following that, Staff ensure to ask specific information about the brands, quantity, delivery schedule, and materials requested so that similar incidents do not occur again in the future.

#### **3.3.3 Supplier.**

There is a shortage of material stock at suppliers, causing in delivery delays, and when materials are delivered early than scheduled. As a result, a complaint has been made with the supplier to ensure that sufficient stocks available before accepting any demands from the company. The site supervisor then must extend the work schedule to one more day or find alternative suppliers. Furthermore, since a schedule for the arrival of the items has been agreed on, the site supervisor cannot accept the early delivery. Unless, of course, the site is adequately prepared to receive it.

## **CHAPTER 4.0**

### **4.1 CONCLUSION**

To summarise, the 20-week research shows everything that needs to be taken into account in order to build a better material management process in construction. The objective of this study to identify the type of material involved in construction work, to determine the material selection and purchasing process, and to analyze the problem occurred and solution during the material selection and purchasing process. Data of this study was obtained using a variety of methods, including on- and off-site observation, unstructured interviews, document reviews, and internet browsing. There are several factors that play a major role to helps the materials selection and purchasing process going well. Communication is the key, good communication with all parties involve could prevent misunderstanding, insufficient instructions, unclear and inadequate details in purchasing materials. To properly manage materials selection and purchasing process in any construction, it is critical that the contractor and other parties involved work together. Besides, there were four phases for material selection and six phases for material purchase, which helped in the seamless operation of this building. The problems occurred throughout the materials selection and purchase process, which involved the drawing plan specification, suppliers, and an unclear person in charge of purchasing the materials.

Additionally, keeping track of material purchases may ensure that the requisition or purchase of the material does not exceed the project budget. It can also assist to compare with different suppliers to identify a better cost-effective material. Last but not least. schedules for labour and material delivery should also be prioritized. It is because the time wasted due to problems would affect the cost and quality of the construction. Cost and quality may be achieved to the greatest level with an efficient and detailed schedule. A focus on these factors would enhance material management in construction to far better results.

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