DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

BRICKWALL CONSTRUCTION

Prepared by:

INTAN NAJIHA BINTI MOHD LATIF

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JULY 2021

It is recommended that the report of this practical training provided

By

INTAN NAJIHA BINTI MOHD LATIF

2019231334

Brickwall Construction

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

		_____
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DEPARTMENT OF BUILDING

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STUDENT'S DECLARATION

I hereby declare that this report is my own work, except for extract and summaries for which the original references stated herein, prepared during a practical training session that I underwent at Grand Dynamic Builders Sdn. Bhd for duration of 15 weeks starting from 27 September 2021 and ended on 7 January 2022. It is submitted as one of the prerequisite requirements of BGN310 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

…….

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Date : 16/10/2021

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I would like to extend my heartfelt gratitude for guidance, advice and help rendered throughout the period of training by the following group of amazing individuals. First and foremost, I would like to express my gratitude to Mr. Lam Jehn Shong and Mr. Lian Chee Kian for the given opportunity to conduct my training in his esteemed company. I got the opportunity to conduct my training in the Technical and Drawing Department. The team of professionals comprising of Miss Janet San Choo Lin, Mr. Low Mr. Kah Yean, Mr. Wong Chun Yen, Mr.Yong Weng Kheong, Miss Claudia Tsang, Mr. Goh Chun Wee, Miss Kakrina, Mr. Tang Poh Gek, Mr. Leonard Loh, and Mr. Albert Phang. They have enabled me to learn and develop my understanding, knowledge, and feel of real time projects, technical drawing and the theory involved in the analysis of structures, building and civil works. They are also responsible for streamlining and assessing my training. Next, to the site sub-contractor which is Qudotech Sdn. Bhd, Utusan Rekabina Sdn. Bhd and Stone Empire Marketing Sdn. Bhd who have extended their cooperation and help. From this training, I have learned to enhance my ability in understanding construction drawing, procedures in construction and site administration, site safety and best practices in the industry.

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Last but not least, my special thanks to my beloved family and friends for their sacrifices and supports over the years. I do appreciate all the helping hands they lend me and I have learned many things during my practical training.

Thank you so much.

ABSTRACT

Bricks are regarded as the ultimate standardized component and it is ideally suited to the production of customized solutions in building, particularly for the external walls of the housing and for a wide range of other larger building types. Facing brickworks provides a visually attractive and durable external building envelope. A wall is a structure and a surface that defines an area. A wall carries a load and also provides security, shelter, or soundproofing. The purpose of the wall in the building is to support the roof, floors, and ceiling. Walls are to enclose a space as part of a building envelope along with a roof to give building form and also to provide shelter and security. A brick wall is a vertical element of construction that is made of bricks and mortar. A brick wall is used to form the external walls of buildings, parapets, internal partition, freestanding walls, and retaining walls. Brickwork is masonry constructed with bricks and mortar by a bricklayer. Course is a term for the rows of bricks that are laid on top of one another to form a structure such as a brick wall. This report will discuss the brick masonry construction of the building. This report was prepared for the construction of 8 Conlay, a mixed-use development consisting of 3 tower blocks, i.e 5 levels of basements and ten levels of podium, with 61-story serviced apartments (Tower A), 56-story serviced apartments (Tower B), and 72-story Hotel and Hotel Suite Strata (Tower C) owned by Damai City Sdn Bhd. The objective of this report is to analyze the construction of the brick wall and how it is carried out on site. After that, it is also to investigate the handling and storage of materials in brickwall construction. This report also determines the time that has been taken to construct the brickwall on one level.

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CHAPTER 1.0

INTRODUCTION

1.1 Background of Study

Brick is also known as a building material used to make walls, pavement, and other elements in masonry construction. Bricks are laid in the course and numerous patterns known as bonds, collectively known as brickwork, and laid in various kinds of mortar to hold the bricks together to make a durable structure. Brickwork is masonry produced by a bricklayer, using bricks and mortar. A brick wall is a vertical element of construction that is made of bricks and mortar and is used to form the external walls of buildings, parapets, internal partitions, freestanding walls, retaining walls, and so on. The first wall was made from mud bricks held together by a thin mud slurry, some of which have proved to be surprisingly resilient. A contemporary brick wall is typically made of clay, concrete or calcium silica bricks size 215mm x 102.5mm x 65 mm. Bricks are bound together by a cementitious or lime mortar, usually 10mm thick for the horizontal joints and 10mm for the vertical joints.

Brick masonry is a highly durable form of construction. It is built by placing bricks in mortar in a systematic manner to construct a solid mass that withstands exerted loads. There are several types of bricks and a number of mortar that can be used to construct brick masonry. The bond in brick masonry, which adheres brick together, is produced by filling joints between bricks with suitable mortar. There are different types of bricks used in construction which include common burnt clay bricks, concrete bricks, sand lime bricks, fly ash clay bricks, engineering bricks, and so on. For this project, clay bricks are used to build the brick wall. Mortar is a workable paste used to bind construction in blocks together and fill the gaps between them. It is a mixture of sand, a binder such as cement or lime, and water. It is applied as a paste which is then set hard.

The placing and bonding style of bricks in walls are used to classify the different types of bonds used in brick masonry wall building. The mortar filling between layers of bricks and in grooves when bricks are laid near to each other and in layers in walls creates the bonding in brick masonry. There are types of masonry in

construction which are a flemish bond, stretcher bond, and english bond. The type of masonry wall bond used in this construction project is stretcher bond. When bricks are laid with only their stretcher visible, overlapping midway with the course of bricks below and above, a stretcher bond is created. The simplest repeating pattern in bricks is the stretcher bond. To obtain absolute strength, stretcher bonds disseminate loads across the structure. Stretcher bonds are utilized as the outer facing in steel or reinforced frame buildings.

Last but not least, the advantages of a brick wall include its strength and durability. Brick is tough, able to withstand a barrage of strikes and hits while remaining unfazed by the pressure. Brick doesn't rot or leave an imprint, and terminates aren't fond of eating heated mud. It's been a long time. Then there's the fact that brick is fire-resistant. Other building materials are less heat resistant than brick because brick is made of non-flammable materials, it takes longer to catch fire. Better insulation is provided by a brick wall. Brick is unlike any other type of protective siding used on structures. When bricks are laid around the outside of a structure or home, they provide an additional layer of insulation from the elements.

The aim of this practical training report is to discover the brick wall construction on one level of Tower B.

1.2 Objectives

There are objectives to be obtained in providing this practical training report. The objectives are as follows:

1. To investigate the method of the brick wall construction process.
2. To investigate the handling and storage of materials in brick wall construction
3. To determine the time of the brick wall construction process.

1.3 Scope of Study

The scope of the study has been carried out at Lot 20000 (Lot 111 & 112) Seksyen 63, Bandar Kuala Lumpur, Jalan Conlay, Wilayah Persekutuan Kuala Lumpur. The project is the construction of 8 Conlay, a mixed-use development consisting of 3 tower blocks, 5 levels of basements, and 10 levels of podium, with (Tower A) 61-storey, serviced apartments, (Tower B) 56-story serviced apartments, and (Tower C) 72-story Hotel and Hotel Suite Strata. The project was started in 2017 by the previous contractor, but Grand Dynamic Builders Sdn Bhd took over the project on 23 November 2020. Grand Dynamic Builders Sdn Bhd continues to build the remaining buildings and will be completed in 2023 for the entire building. The project is currently ongoing. Therefore, the focus of the study is to investigate how the brick wall construction process is carried out on site. Throughout the construction of the brickwall can also identify the materials and equipment used. Next, investigate the handling and storage of materials in brickwall construction. This study can also determine the time is taken to build a brick wall at one level, level 24 is also included in this report.

Figure 1: Project signboard

1.4 Method of study

There are some data collection methods used to achieve the objectives of this report such as:

1. **Observation**

   The observation is carried out on-site to monitor the construction process. The problems that have occurred throughout the brick wall construction on-site and drawings can be determined by observing. It took that time to build a brick wall on one level. The problems that have occurred on-site and drawing can be determined by observing. The construction drawing such as the floor plan is referred to when on-site observations. The photos and notes were taken throughout the observation process to record all the information.

2. **Interviews**

   The interview is a great way to get a lot of information. A structured interview occurs when the question can be answered on the spot. During the educational site visit, interviewing people with experiences in the construction industry, such as supervisors, architects, engineers, quantity surveyors, and laborers, is used to conduct qualitative research. The site discussions were also carried out with the sub-contractor and consultant responsible for the project in the meeting room and on-site. It is beneficial to gain a better understanding and knowledge while conducting the interview. The collected information through the structured and semi-structured interview was recorded in notes.

3. **Document review**

   This method involved collecting company information records such as construction drawings, company profiles, monthly progress reports, and worker photos. Construction drawings such as floor plans and brick wall setting out plan drawings were required to refer to the brick wall at the site. These images can be used as a guide during the document review process to keep track of the progress of the construction. The relevant data about the company and project can be obtained from the website or site server to achieve the objectives of this report.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

Grand Dynamic Builders Sdn. Bhd formerly known as Jelita Megah Sdn Bhd was incorporated 28 February 2013 in Malaysia under the companies act, 1965 as a private limited company under the name of CHC Synergy Venture Sdn. Bhd as an investment holding company and deemed registered under the Act. On 15 July 2016, our name was changed to GDB Holdings Sdn. Bhd, GDB Holdings Berhad (GDB) has a proven track report in delivering high-rise developments ahead of schedule. GDB is led by a highly qualified management team with strong technical knowledge and experience. GDB is registered with CIDB as a Grade G7 contractor that allows GDB to tender for projects with unlimited value. GDB Group is primarily engaged in the provision of construction services through our wholly-owned subsidiary Grand Dynamic Builders (incorporated in Malaysia under the Companies Act, 1965), with a focus on high-rise residential, commercial, and mixed residential and commercial projects as the main contractor and principal works contractor. Construction Green 5S programme certification. The first construction company in Malaysia to be certified Hong Kong 5S Association and SIRIM STS for implementing the 5S and lean 5S programme. GDB is involved in the implementation of construction projects, which includes day management of all work required for the projects' timely completion. Grand Dynamic Builders Sdn. Bhd also hire subcontractors to do things like source and install construction supplies, machinery, and equipment, as well as other specialized trade work like mechanical and electrical engineering, piping and plumbing, exterior paint, waterproofing, and other related works

2.2 Company Profile

Grand Dynamic Builders Sdn Bhd founded in 2013, GDB Holdings Berhad has a proven track record in delivering high-rise developments ahead of schedule. This company head office is in Selangor located at A-02-01, F-02-01 & F-02-02, Sekitar 26 Enterprise, Persiaran Hulu Selangor, Seksyen 26, 40400 Shah Alam, Selangor.

Grand Dynamic Builders Sdn Bhd is equipped with quality, environmental, safety and health certificates, including the ISO 9001: 2015 Quality Management System, Environmental Management System ISO 14001: 2015, OHSAS 18001: 2007 Occupational Health & Safety Management System, QLASSIC, CONQUAS, BuildQAS, and SHASSIC certifications for various projects.

The company's mission is to employ, cultivate and support our knowledge and motivated teams through continuous development and improvement driven by the synergy of efficiency, teamwork, and commitment of the management and staff, to build dedicated and lasting relationships with our valued customers by delivering progressive excellence, reliable quality and cost effective projects that exceed their expectations via an exceptional performance by every member of GDB-every time and also to safeguard mother nature and provide sustainability as well as additional peace of mind for our customers by upholding ecological, resource-efficient green technologies and environmentally responsible practices during every stage of construction.

The company's vision is to be a highly reputable and progressive construction firm that delivers products and services of sustainable and excellent quality via innovation in PEOPLE, QUALITY, SAFETY and TECHNOLOGY.

Figure 2: Location of GDB head office

2.3 Company Organisation Chart

Company organisations charts at site office for overall teams.

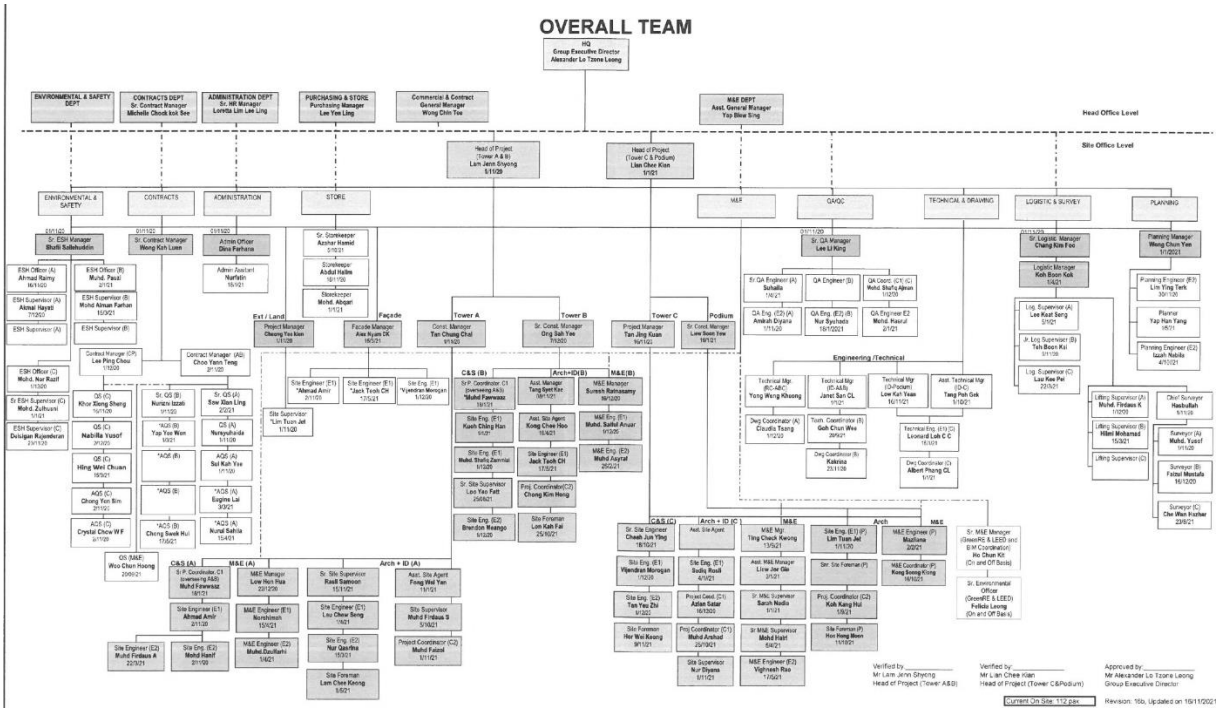

Figure 3: Site organization chart

2.4 List of Projects

2.4.1 Completed Projects

Table 1: List of completed projects

No	Project Title	Contract value	Start date	Completion date	Project Duration	Client
1	Proposed development of show units features a pavilion and show unit for two types of the serviced apartments at Bukit Bintang Centre City, Kuala Lumpur.	RM 2.4 million	9 May 2016	27 Jun 2016	2 months	BBC Development Sdn. Bhd
2	Proposed development of 45-storey residential tower consists of 359 units, 5 level podium car park and 1 level facilities floor at Jalan Residen 2, Desa ParkCity, Kuala Lumpur.	RM 236.8 million	16 December 2013	15 February 2017	3 months	Perdana ParkCity Sdn Bhd
3	Proposed development of basement and podium for parcel B at Kampung Haji Abdullah Hukum, Kuala Lumpur.	RM 217.9 million	Section 1 7 April 2014	15 February 2016	23 months	Trans Resources Corporation Sdn Bhd
			Section2(A) 7 April 2014	14 February 2017	35 months	
			Section 2A 7 April 2014	2 October 2017	19 months 15 days	
4	Proposed development 32-storey office Tower A and balance of work to basement and podium at Kampung Haji Abdullah Hukum, Kuala Lumpur.	RM 188.5 million	16 February 2016	8 December 2017	22 months	Trans Resources Corporation Sdn Bhd.

5	Proposed development of 32-storey office Tower A and balance of works to basement and podium at Kampung Haji Abdullah Hukum, Kuala Lumpur.	RM 188.5 million	16 February 2016	2 October 2017	19 months 15 days	Trans Resources Corporation Sdn Bhd
6	Proposed development of 38-storey commercial building with 27-storey of office space, a 3-storey allocation with facilities and 10 levels of basement parking at Bangsar, Kuala Lumpur.	RM 186.6 million	1 August 2016	13 July 2018	23 months 12 days	Etiqa Insurance Tower
7	Proposed development of 49-storey residence block with 469 residential units and 7 levels of car park at Jalan Residen Utama, Desa ParkCity, Kuala Lumpur.	RM 245 million	21 December 2015	20 October 2018	35 months	Perdana ParkCity Sdn Bhd
8	Renovation of an old hanger into a purposeful part of the local community on Lot 34810 & 43095, Persiaran Arifah, Kuala Lumpur.	RM 2.6 million	17 December 2018	28 January 2019	2 months	Esprit Icon Sdn Bhd
9	Proposed development of 26-storey building features a 6-storey basement car park, 2 levels of exhibition space, a showroom and 20-storey office space on Jalan P.Ramlee, Kuala Lumpur.	RM 312.9 million	1 November 2017	24 December 2019	26 months	Hap Seng Land Development (Puchong) Sdn Bhd

10	Proposed development of a mixed condominium consisting of 2 towers apartments and include the refurbishment of an existing tower block of 49 units and a 19-storey tower at Jalan Batai, Bukit Damansara, Kuala Lumpur.	RM 432.0 million	10 August 2017	11 March 2021	43 months	Selangor Properties Berhad
11	Proposed development of 7-storey building complete with two mezzanine floors at Setia Alam, Selangor.	RM 67.9 million	28 November 2019	11 October 2021	23 months	Hap Seng Land Development (Puchong) Sdn Bhd

2.4.2 Project in Progress

Table 2: List of projects in progress

No	Project Title	Contract value	Start date	Completion date	Project Duration	Client
1.	Proposed development of 18-storey serviced apartment 8-storey podium, and 7-storey car park at Jalan Lapangan Terbang Subang, Ara Damansara, Petaling Jaya.	RM 135.0 million	16 April 2019	15 October 2021 Granted EOT (MCO/MCCO) 14 March 2022	35 months	Trans Resources Corporation Sdn Bhd
2.	Proposed mixed-development 2 towers, 5 level podium, a 4 level car park, and a series of leisure areas on Lot 61299, Jalan 2, Desa ParkCity, Kuala Lumpur.	RM 517.0 million	2 December 2019	30 June 2023	43 months	Cloudvest Sdn Bhd
3.	Proposed development of 7-storey building complete with 2 mezzanine floors at Setia Alam, Selangor.	RM 22.5 million	Main buildings work 2 January 2019	16 November 2021 Granted EOT (MCO/MCCO) 9 March 2022	39 months	Sunhill Ventures Sdn Bhd
			Upgrading works of Lorong Ewan 1 February 2020	24 January 2023	26 months	

4	Proposed mixed-use development consisting of 3 tower blocks i.e. 5 levels of podium, (Tower A) 61-storey serviced apartments, (Tower B) 56-storey serviced apartment and (Tower C) 72-storey hotel and hotel suite strata on the Lot 20000 (Lot Lama 111 & 112) Seksyen 63, Jalan Conlay, Kuala Lumpur.	RM 1.249 billion	Section 1 (podium) 23 November 2020	14 October 2022 Granted EOT (MCO/MCCO) 24 January 2023	26 month	Damai City Sdn Bhd (KSK Land)
			Section 2 (tower A) 23 November 2020	22 January 202 Granted EOT (MCO/MCCO) 23 December 2022	29 months	
			Section 3 (Tower B) 23 November 2020	12 May 2023 Granted EOT (MCO/MCCO) 4 August 2023	33 months	
			Section 4A (Tower C-Hotel) 23 November 2020	22 January 2023 Granted EOT (MCO/MCCO) 18 April 2023	29 months	
			Section 4B (Tower C-Hotel Suite Strata) 23 November 2020	27 October 2023 Granted EOT (MCO/MCCO) 19 January 2024	38 months	

CHAPTER 3.0

CASE STUDY (BRICKWALL CONSTRUCTION)

3.1 Introduction to Case Study

The case study is about brickwall construction on one floor which is level 24. The project was has started by Grand Dynamic Builders Sdn Bhd on 23 November 2020 for all towers. This project has given an extension of time will be completed on 24 January 2023 for Tower A, 23 December 2022 for Tower B, 4 August 2023 for the hotel in Tower C, and 19 January 2024 for hotel suite strata in Tower C. The contract sum of the project is RM 1,249,000,000.00. The construction progress is still ongoing currently. Therefore, this study will explain the brick wall construction process, the handling and storage of materials and time spent in brickwall construction. The construction location is on Lot 2000 (Lot Lama 111 & 112) Seksyen 63, Jalan Conlay, Kuala Lumpur.

Figure 4: Location of a site based on the satellite map

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

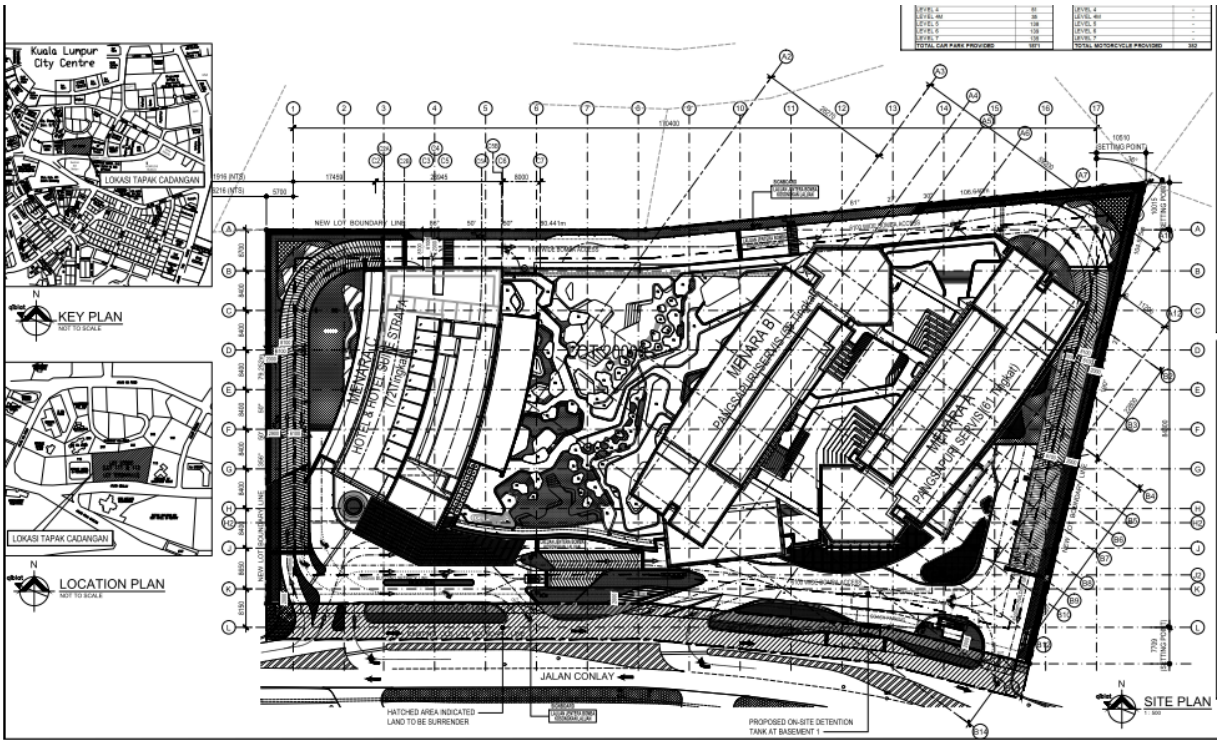

Figure 5: Site plan, location plan and key plan

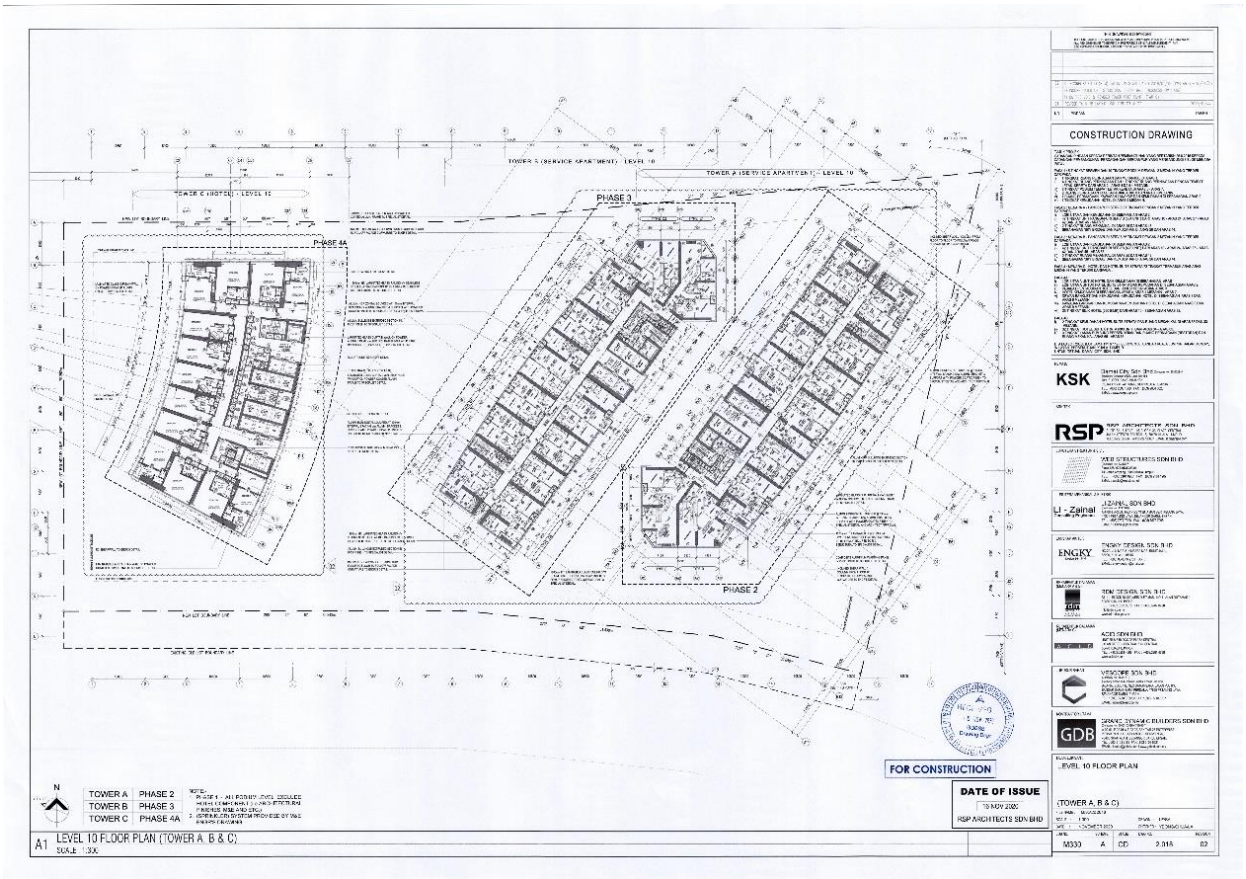

Figure 6: Floor Plan (Tower A, B & C)

The construction is located in the urban area which is the center of Kuala Lumpur, between KLCC and Bukit Bintang, it is a short hop and a skip away from the urban attractions as well as hotels and shopping malls. The construction is facing the road of Jalan Conlay. The building close to this construction site is Pullman Hotel, Pavillion, Royale Chulan, Banyan Tree, Prince Serviced Apartment and Badan Warisan Negara. Public Transportation such as MRT is also available nearby and the food court, LaPark is located in front of the construction site where the food court is in the parking area. There are also many construction sites besides 8 Conlay nearby.

Tower B has 55 floors. There are 12 units in Tower B, where each unit has its own type. Tower B also has typical units and non -typical units. Typical units are floors 10 to 49 except floors 25, 26, 43, and 44. Floors 24, 25, and 42 are M&E services level while floors 44 and 44M are facilities and landscape level. Non -typical units are floors 50 to 55 except for unit 9 on non -typical floors.

Next, time is very important for the success of construction. By referring to the building drawing plan for this apartment, there is a living room, kitchen, master bedroom and master bathroom for all units. In addition, there is also a corridor, two bedrooms and a powder room for units 1, 4, 5, 8 and 10. Next, a study room and one bedroom for units 2, 3, 6, 7 and 9. Study room, powder room and two bedrooms for units 11 and 12. Before starting the work of installing bricks, columns, beams and reinforce concrete kerb must be done first. The string will be glued with a brick pin and pulled from each column to the other to form a line as a work mark for installing the bricks. The bricks will be tied together guided by a rope to get a straight wall. This process will take a long time as it requires precision.

Last but not lease, there are many activities that have been carried out on the site, the activities that are still on-going for the level are brickwork. There are many sub-contractor involved in constructing the brick wall at level 24. This work needs to be handled by skilled workers to get the perfect wall bond. There were also some unskilled workers who helped mix the mortar and brought it along with the bricks to the construction site. The machinery and tools involved in this construction are wheelbarrows, trowels, scaffolding, spirit levels, concrete mixers, buckets, brick lines and pins, brick hammers, shovels and measuring tapes.

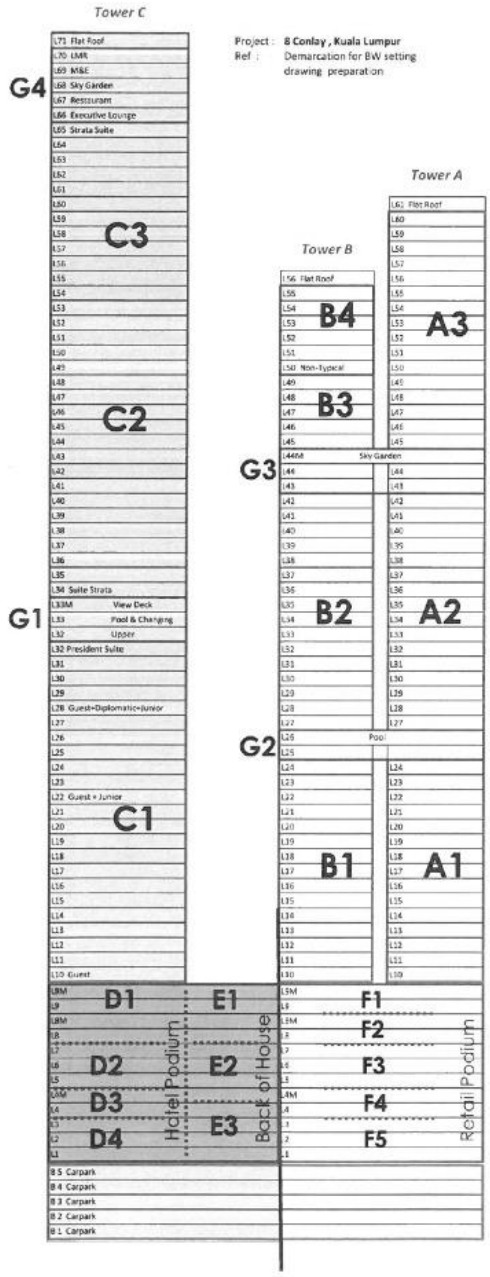

Figure 7: Project elevation (Tower A, B, C & P)

3.1 To investigate the method of brick wall construction

Materials

There are various materials used in brickwall construction

Table 3: Materials used in brickwall construction

No.	Materials	Descriptions
1.	Bricks 	Clay bricks are made by pressing clay into moulds to create the desired shape, then drying and firing them in a kiln. It's frequently used in general construction projects that don't require any aesthetic qualities.
2.	Cement 	Cement is a binder, a substance used for construction that sets, hardens, and adheres to other materials to bind them together. Cement mixed with fine aggregate produces mortar for masonry.
3.	Exmet 	Exmet is a brickwork reinforcement material. It forms an integral structure to absorb stress and vibration in the building by embedding it in the cement mortar at every fourth joint.
4.	Fine sand 	Sand is used for making concrete, mortars and plaster. Fine sand provides more cohesion than coarse sand as it requires less quality compared to other sand. Sand helps to prevent mortar shrinkage and prevent cracking of mortar during setting.

Machinery and equipment

Machinery and equipment used in brickwall construction are cement mixer, wheelbarrow, spirit levels, measuring tapes, masonry nails, mason's spade.

Brickwork methodology at Level 24, Tower B

Figure 8: Clay brick used for the construction

Plan out the wall by referring to the length and height of the wall on the approved construction drawing from the floor plan and elevation plan. Using string, a level, and a tape measure, plan out the exact dimension of the wall, enclose and structure. The type of brick that used in the construction is clay brick with 21 m x 9.5 m x 6.5m.

Figure 9: Clean the surface from grease or dirt

Clean the surface to receive the bricks and ensure it is free from grease or dirt. For dowel bars installed at the reinforced concrete walls or columns, face the bars to the direction of brick wall. R6 dowel bars at every 6 layers of brickworks. Provide stiffener as required in the construction drawings. Stretcher bond is used for single bricks in brickwall construction.

Figure 10: String

Make guidepost or gauging rods to ensure the walls are consistently level. Set up a string line from one gauge rod to the other. This will be the second row of the bricks, as the first string will be sitting in the trench. Make sure the line is straight and level with no sag.

Figure 11: Laying brick

Mix mortar on the mixing board to the proportion (1:3) at site. Lay the brick on the mortar. Carry out the laying bricks on layer by layer basis to a maximum wall height of 1.8m per span. Maintain the joints evenly during laying of bricks. Do not allow straight joints. Joints to be raked out to receive plastering. Brush away loose mortar and dust. The brick pointing shall at least 10 mm thick. Check the vertically of bricks wall frequently during laying bricks. Use a plumb or spirit level.

Figure 12: Provide exmet reinforcement on the bricks

Provide exmet reinforcement at every second course for the first two layer and every fourth course subsequently. By embedding it in the cement mortar at every fourth joint, it forms an integral structure to absorb stress and vibration in the building.

Figure 13: Lintel at door opening

Lintel are provided for opening such as doors, windows and wc low wall. Check both ends of bearing min. 150mm for window opening lintel should for top and bottom. The brick below the beam is laid with soldier course at about 60 and all gaps are fully filled with cement mortar.

Figure 14: Brick wall at unit

The maximum height of the bricks panel is not exceeding 1.8m high erected at one time. Adequate limit time is to allow for mortar beds to set before continuing with erection. Carry out inspection with clients or Client's Architect on brickwall completed and obtain acceptane.

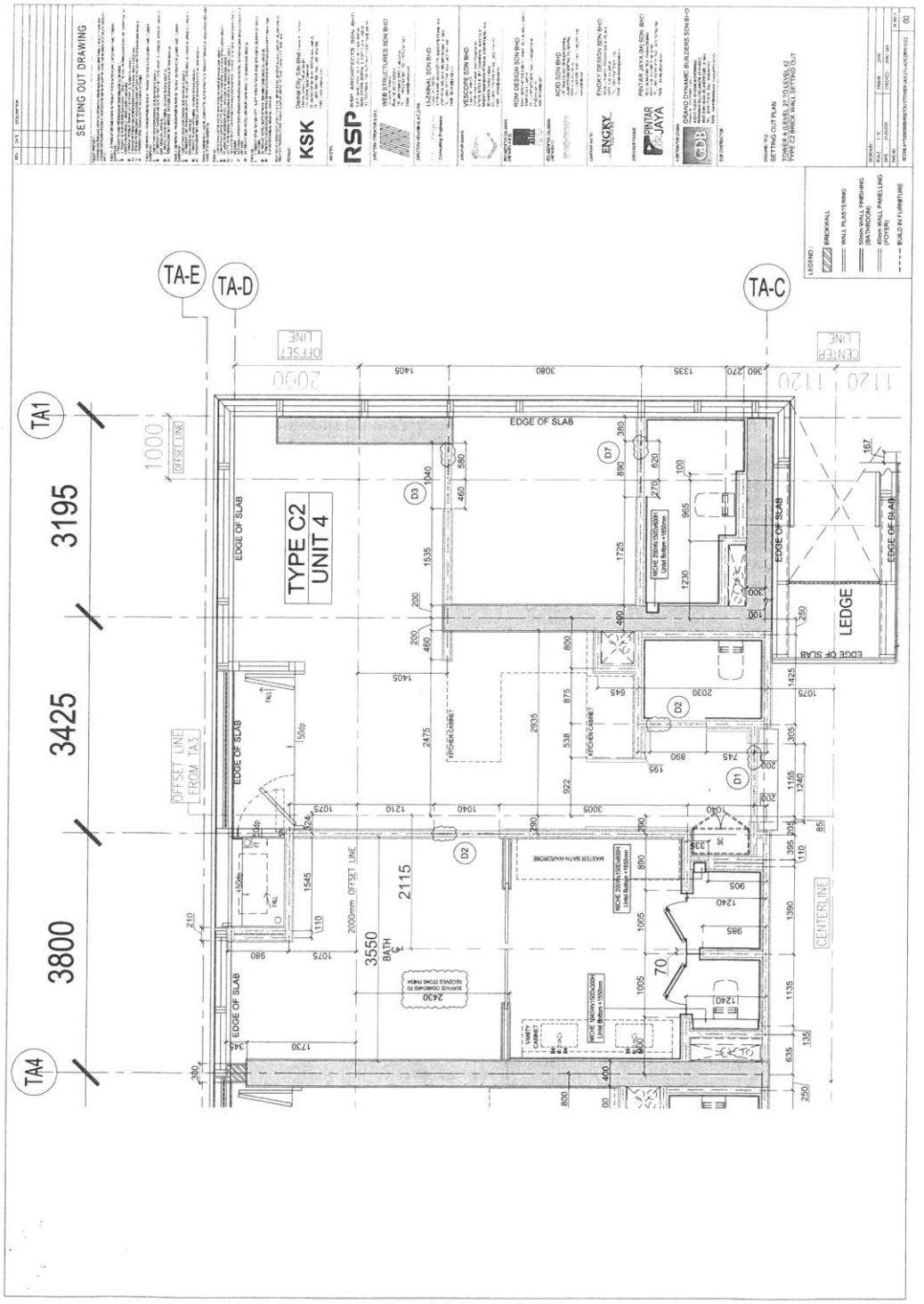

Figure 15: Brickwall setting out

3.2 To investigate the handling and storage of materials

Handling

The bricks are stacked in pallet form of approximately 600 pieces and transport by lorry to the site. The bricks should be not stacked for more than 2 stacks high bad cover with a protective sheet supplied by the manufacturer. Unload pallet bricks using a mobile crane or tower crane at the site.

Storage

1. Bricks

Bricks should not be exposed to weather as fungus will grow and this will affect the plastering work. All defective bricks are inconsistent in size, dent, cracks are rejected from the site.

2. Sand

Ensure the source of sand is from a reputable sand pit or supplier to supply fine washed clean sand free from impurities. The sand should be unloaded at the dry ground with a layer of a plastic sheet as backing to avoid contact with the ground.

3. Cement

Cement will be delivered and stored in a shaded area on a raised floor or wooden pallet to avoid contact with dampness or weather. Any torn bag and hardened cement and plaster are rejected and removed from the site.

4. Exmet

The exmet are delivered and stored in a shaded area on a raised floor or wooden pallet to avoid contact with dampness or weather.

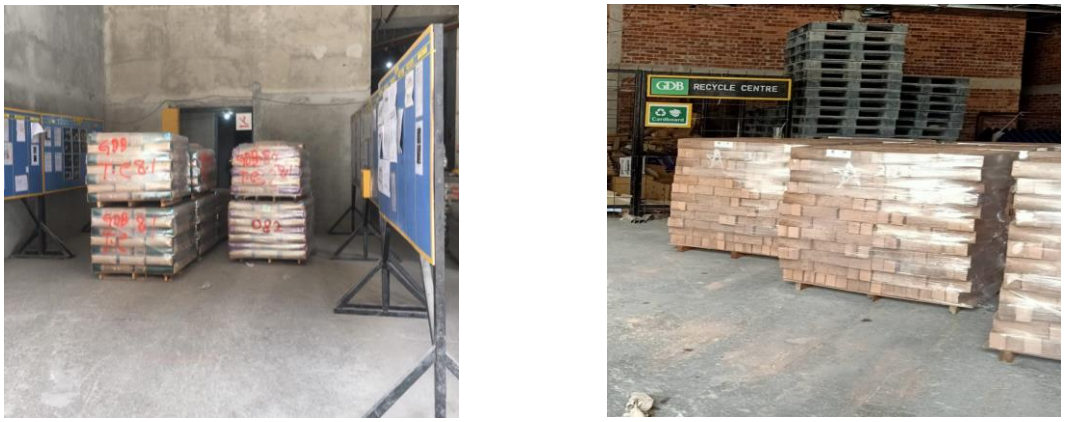

Figure 16: Cement and bricks stored in the shaded area

3.3 To determine the time of the brickwall construction process

Completion time is an important concept in the contract. When the obligation in the contract has a time limit, failure to complete the obligation within the specified time is usually a "major" breach of contract, and the other party may be entitled to compensation for damages. If there is no increased time obligation, then the default is usually that the allowance must be reasonable, or in some cases, time is considered "large" and it is considered irrelevant.

For the brick wall construction in this project, it took around 2 to 3 weeks to finish the wall construction without plaster finishes. Throughout the construction, there are some natural obstacles such as rainy days and also the pandemic that caused the project has given an extension of time from clients. Tower B has 55 levels which are every level took around 2 weeks to finish the brick wall construction. There are 55 levels and units in Tower B. Level 24 is a typical unit with 12 units in total.

Among the sub-contractors involved in the brickwall constructions are Lim Ah Bah Builders and Utusan Reka Bina Sdn Bhd. The brick wall area corridor, main entrance, master bedroom, bedroom 2, bathroom, powder room, study room, opening and wc low wall. Shear walls are also constructed beside a brick wall in this residential building. Shear wall is a structural member used to resist lateral forces that are designed to resist in-plane lateral forces, typically wind and seismic loads. It resists the loads due to cantilever Action.

Figure 17: Tower B Key Plan

Brickwall location and area

Corridor at Level 24

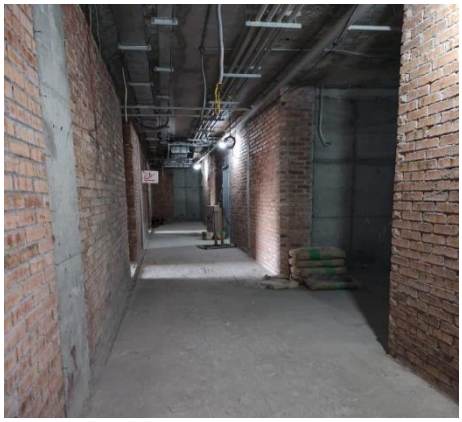

Figure 18: Brickwall for Corridor Level 24

Figure 19: Brickwall process for Corridor

Main entrance at all units

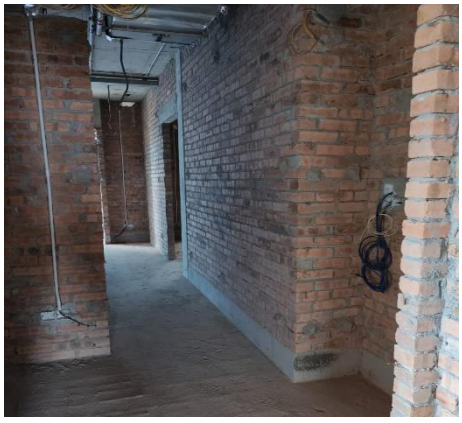

Figure 20: Brickwall for main entrance unit 5

Figure 21: Brickwall for Main entrance from Corridor

Master bedroom at all units

Figure 22: Brickwall process for Master bedroom

Figure 23: Brickwall for Master bathroom at door opening

Master bathroom at all units

Figure 24: Brickwall for Master Bathroom

Powder room at Unit 1, 4, 5, 8, 10, 11 and 12

Figure 25: Brickwall for Powder room at Unit 3

Study room at Unit 2, 3, 6, 7, 9 and 12

Figure 26: Brickwall for Study room at Unit 6

Bedroom 2 at Unit 1, 4, 5, 8, 10, 11 and 12

Figure 27: Brickwall for Bedroom 2 at Unit 11

Bathroom 2 at Unit 1, 4, 5, 8, 10, 11 and 12

Figure 28: Brickwall for Bathroom 2 at Unit 4

WC low wall at Master bathroom

Figure 29: Brickwall process for WC low wall at Master bathroom

Lintel door opening

Figure 30: Brickwall process for lintel door opening

CHAPTER 4.0

CONCLUSION

A wall is a structure and a surface that defines an area. A brick wall is a vertical element of construction that is made of brick and mortar. Bricks is also known as a building materials used to make walls, pavement and other elements in masonry construction. There are several types of bricks and a number of mortar that can be used to construct brick masonry. Clay bricks are a type of brick that offers a cost-effective and sustainable option with little to no maintenance required. It is applied as a paste which is then set hard. The mortar filling between layers of bricks and in grooves when bricks are laid near to each other and in layers in walls creates the bonding in brick masonry. Types of masonry in construction are stretcher bonds. Brick is unlike any other type of protective siding used on structures.

The construction of brickwork in substructure and superstructure require quality control on various aspects of materials and construction procedure. This report are focus on brickwall construction on Level 24, Tower B. There are two types of walls in this construction which is shear wall and brickwall. Brickwork is masonry made with bricks and mortar by a bricklayer. To construct a building such as a brick wall, rows of bricks called courses are often laid on top of one another. By size, bricks and blocks can be distinguished. Completion of time is an important concept in the contract. For the brickwall construction. For the brickwall construction in this project, it took 2 to 3 weeks to finish the wall construction without plaster finishes.

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