



اُونِيُوَرْسِيْتِي تِي كُونُوَلُوْمِي مَارَا  
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TEKNOLOGI  
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**DEPARTMENT OF BUILDING**

**FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING**

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**(PERAK)**

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It is recommended that the report of this practical training provided

**By**

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**Entitled**

**Uco Solid Wall System**

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

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**OCTOBER 2015**

**STUDENT DECLARATION**

I hereby declare that this report is my own work, except for extract and summaries for which the original reference stated herein, prepared during a practical training session that I underwent at Zikay Group for duration of 25 May and ended 9 Oktober 2015. It is submitted as one of the prerequisite requirements of DBN307 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

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With the name Allah,

Alhamdulillah, all praises and thanks to the Almighty Allah for His mercy and compassion that allowed me to done this practical report completely and successfully.

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Last but not least, my special thanks to my beloved parents for their sacrifices over the years.

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## ABSTRACT

Wall system is very important thing to elaborate, therefore, this report will discuss about a type of wall system that can make a construction project become more efficient and less complicated. This report was conducted for wall system at Cadangan Pembangunan Satu (1) Blok Bangunan Perdagangan Bercampur 40 Tingkat (Mercury Zikay yang Mengandung Hotel dan Pangsapuri Servis) di atas Sebahagian Lot 62, 2233, 2234 dan 3371 (2582 dan 2583) Seksyen 41, Jalan Raja Abdullah, Kampung Baru, Kuala Lumpur. The system that will be discussed in this report is about UCO Solidwall System. The main purpose of this report is to investigate the characteristic of wall system that is different from the normal wall system which is brick wall system. The objective of this report is to discuss the application of UCO Solidwall System in construction, to study the advantages of using UCO Solidwall System and to investigate the method statement of UCO Solidwall System. One of method in conducting this report is through the observation. It helps to approach the construction of the wall system. Interview and discussion is very important to conduct this report because it helps in collecting more information about the case study. Beside the above stated methods, the mass media and electronic media is one of the methodologies of study. It is the way to find the information with easy and fast. The selection system for a building of the wall is very important for a building. This is because it will determine whether the building will function properly or not. Errors in the selection of the wall system will lead to the loss of a project. Therefore the wall system needs to be choose wisely and efficiently.

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# CHAPTER 1.0

## PREFACE

### 1.1 Introduction

Wall can be defined as any of various permanent upright constructions having a length much greater than the thickness and presenting a continuous surface. It can be describe as a structure that defines an area, carries a load, or provides shelter or security.

The construction of wall is very important for a building. The durability of wall will provide protection from whether or animal. Besides, wall also can act as a passive fire protection. This is because wall can limit the spread of fire and smoke for a limited period of time. Wall also can act as a partition and sound barrier inside or outside of building. The partition will provide privacy among the people inside the building. It also helps in dividing the area inside a building. As the result, wall provides a comfortable interior space for people. Wall also can act as building finishes. The aesthetic value that be found on wall can improve the building appearance.

Wall can be classified as two type of system which is load bearing wall and non-load bearing wall. Load bearing wall is a wall system that able to carry its own load or upper load and transfer it to the other structure or directly to the foundation. Non-load bearing wall is a type of wall that will only support its own load which normally use for structure building.

The construction of the non-load bearing wall is less complicated compared to the load bearing wall. It is also very suitable and economic method to be use in a high rise construction. The material that normally used to construct this wall system is brick wall. But nowadays, latest technologies have brought this system into a new level. There are systems called Industrial Building System (IBS) that will make the construction method become more economic and effective. IBS is also known as pre-fabricated construction. It can be describe as a technique of construction where components are manufactured in a controlled environment, either at site or off site, placed and assembled into construction works. The uses of IBS system help in reducing the construction cost. Besides, it also helps in reducing the construction time.

Example of IBS wall system is UCO Solidwall System. The usage of IBS wall system helps to increase the productivity of the construction. Besides, the quality of the wall is higher compare to the traditional method. Although this wall system has more advantages, it is important to study the method statement for this wall system. This is because the construction of this system is totally difference compared to the traditional method.

## **1.2 Objective of Study**

The objectives of this study are as follows:

1. To discuss the application of UCO Solidwall System in construction
2. To identify the advantages of using UCO Solidwall System
3. To investigate the method statement of UCO Solidwall System

## **1.3 SCOPE OF STUDY**

In ensuring all objectives of the study achieved, scope study need to be decided first so that study objective did not lose the way from the original objective. The scope of study is to determine the application UCO Solidwall System in construction. Besides, it is important to know the aspects that make this system is better to apply. This system also has its own advantage that make it appealing compare to the other wall system. The methods of construction are also an important aspect that needs to be clear so that it apply properly and efficiently.

## **1.4 Methods of Study**

### **I. Observation**

Through the observation, it helps to approach the construction of the wall system. The observation method has been carried out by visiting the construction site that applying this system. This is important to see and understand clearly about the method used to construct this system. Every detail and information will be recorded to complete the objective of this report. Besides, observation is an important method to get an overview of the advantages of using this system. This is because the point can be seen clearly during the observation. Observation methods are also important in collecting some picture that helps in making reference about the system latter.

### **II. Interview and Discussion**

Interview and discussion is very important to conduct this report because it helps in collecting more information about the case study. In addition, interviews were conducted on the workers, the site supervisor and the construction manager to find out more information about the wall system. The interview and discussion was held during the free time. Besides, it also conducted during the site visit to the construction site. This kind of method of study helps in understanding more about the usage of this system.

### **III. Mass Media and Electronic Media**

Beside the above stated methods, the mass media and electronic media is one of the methodologies of study. Example of mass and electronic media used to get the information is reference book, local newspaper and internet. Those media helps to understand more about the theory and fact about the study. It is a faster and easier way to get some information or fact to support the other information.

## CHAPTER 2.0

### COMPANY BACKGROUND

#### 2.1 Introduction of Company

Kembang Serantau is a class a construction company which already involved in the construction industry for nearly 20 years. It is a private limited company, under the management of a general contracting company called Zikay Group. As a company committed to the pursuit of excellence, the company had preserved in its policy of “Total Commitment’ and to excel in all its commitments and undertaking. With this, the company had grown successfully. It had established itself as one of the leading Bumiputera Company in construction industry.



**Photo 2.1:** Zikay Group Sdn. Bhd. head quarters

Kembang Serantau has been recognized by Pusat Khidmat Kontraktor (PKK) and awarded with class A Contractor License with Bumiputera Status. On top of that Kembang Serantau also registered with Construction Industry Development Board (CIDB) under G7. Besides, this company not only focusing on building construction but also in civil engineering and landscaping work.



## **2.2 Company Profile**

Kembang Serantau Sdn Bhd, a Private Limited Company was incorporate on 5<sup>th</sup> September 1991 with Authorized Capital of RM25, 000,000.00 and Paid up Capital RM25, 000,000.00. As an organization with multi-discipline, the company is managed by an excellent team of qualified and technical know-how professionals who had years of experience and skill in all aspects of management, human resources and financials.

Since its establishment in 1991, the company had achieved excellent record in building, civil engineering and landscaping works which entitle them to be awarded the Class A Contractor license with Bumiputera status and CIDB Grade G7. To date the company has been involved in several prestigious projects including Royal Selangor State Theater, Taman Rimba Alam Putrajaya, Kompleks Penjara Tegar Lembah Klang and the latest is 40 Storey Mix Development Building Mercu Zikay.

In pursuing to the pinnacle of excellent, the company holds to its policy with Total Commitment in Quality, Safety and Performance. Kembang Serantau has streamlined and upgraded its management system in line with its consistent objective of continuously upgrading its skill and professionalism to excel in the industry while providing quality services.

Hence, the company has successfully established their Quality Management System ISO 9001: 2008 Certification in giving their total commitment to provide construction services and enable to penetrate into the international market abroad.

### 2.3 Organization Chart

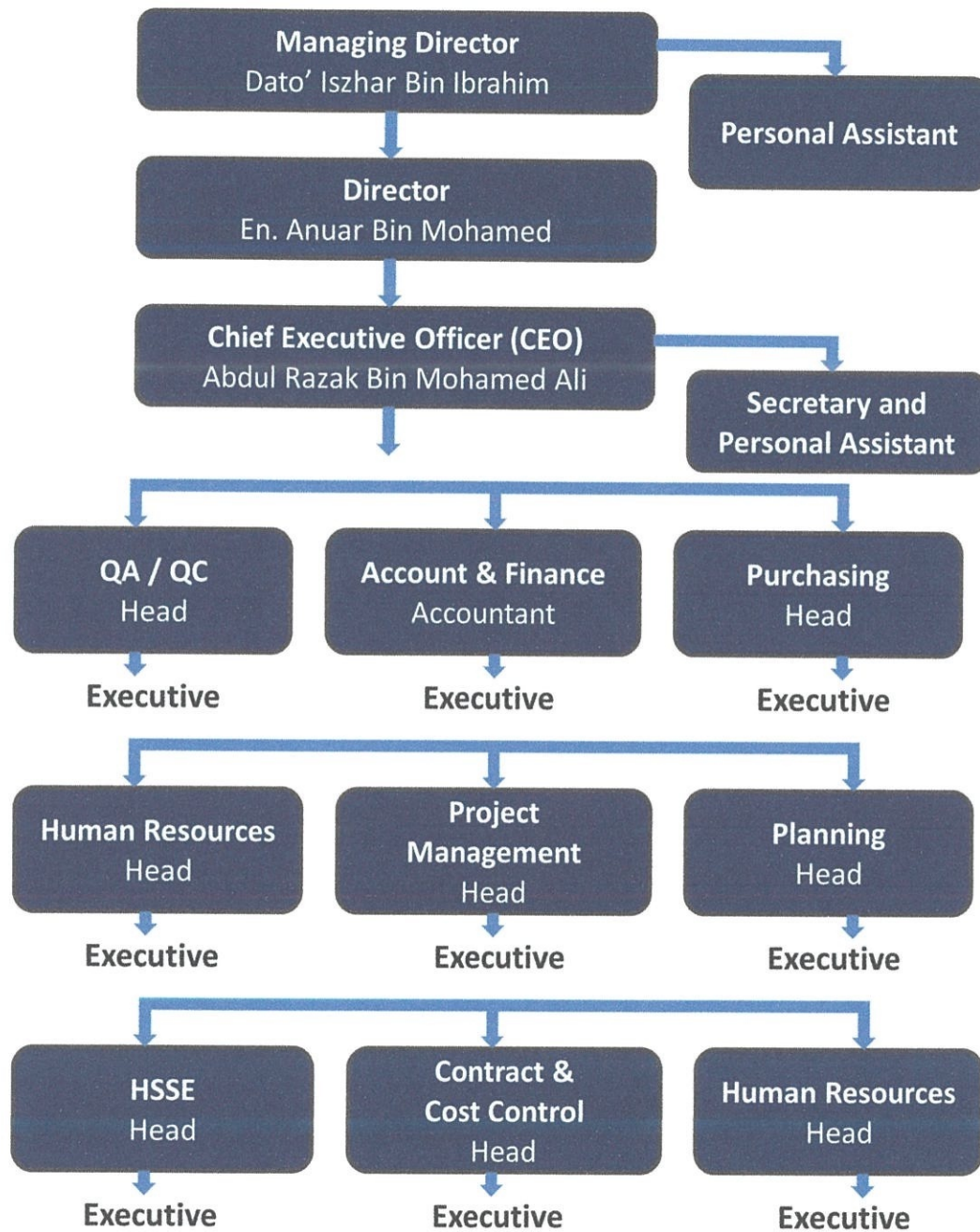


Figure 2.1: Organisation chart

Source: Kembang Serantau Company Profile

## **2.4 Project Involve**

Since its establishment, Kembang Serantau has evolved in building construction where participation in projects may either in conventional tender method as well as design and build.

Kembang Serantau have involved in the construction of buildings ranging from the landed property to the high rise apartment for private sector as well as government link companies. Development of government quarters and office are also of the experience gained through association with Government and Semi-government department.

Kembang Serantau have also participated with the programmed by Ministry of Defense for the design and construction of National Service Training Center in Johor and Perak which include dormitory, training field, dining hall and other facilities required by the operator. The list of completed project and current project can be referring to Table 2.1 and 2.2.

## 2.4.1 List of Completed Project

**Table 2.1:** List of Completed Project

NO	COMPLITED PROJECT	IMPLEMENTATION AGENCY	WORTH (RM)	DATE START	DATE FINISH
<b>INFRASTRUCTURE WORK</b>					
1	Proposed Road Upgrading Jalan Puchong, Batu 7 – Batu 9, Di Dalam Daerah Petaling, Selangor Darul Ehsan.	Jabatan Kerja Raya	19,320,967.00	May 2010	Febuary 2012
<b>BUILDING WORKS</b>					
1	Development Of 6 Blocks With 17 Storey Apartment (1224 Units) inclusive of 23 Units Of 23 Storey Shoplots In Pekan Kuang, Mukim Gombak, Selangor.	Syarikat Perumahan Negara Berhad	109,042,000.00	August 2009	September 2012
2	Proposed Design And Built Of The Selangor State Theater In Shah Alam Selangor.	Selangor State Government	109,042,000.00	January 2008	March 2010
3	Proposed Design And Built Of The Selangor State Theater In Shah Alam Selangor.	Selangor State Government	43,838,000.00	August 2011	May 2012
4	Development of 5 Blocks Apartment Section U5, Shah Alam.	Pimpin Manis Sdn Bhd	22,000,000.00	May 2008	Desember 2009
5	Develop of Civil(Bulding Works) for Satellite Control Room(SCR08), Unit 18, 19 and 31.	PETRONAS Penapisan (Melaka) Sdn Bhd	9,100,000.00	March 2013	Mey 2014
<b>LANDSCAPE WORK</b>					
1	Proposed Planting And Maintaining Of Forest Species Trees Inclusive Of Infrastructure And Lanscaping Works In Taman Rimba Alam Di Precint 14 & 15, Wilayah Persekutuan Putrajaya.	Putrajaya Corporation	58,757,209.25	January 2013	September 2014

Source: Kembang Serantau Company Profile

## 2.4.2 List of Current Project

**Table 2.2:** List of Current Project

NO	CURRENT PROJECT	IMPLEMENTATION AGENCY	WORTH (RM)	DATE START	DATE FINISH
1	Cadangan Pembangunan Satu (1) Blok Bangunan Perdagangan Bercampur 40 Tingkat (Mercu Zikay yang Mengandungi Hotel dan Pangsapuri Servis) di atas Sebahagian Lot 62, 2233, 2234 dan 3371 (2582 dan 2583) Seksyen 41, Jalan Raja Abdullah, Kampung Baru, Kuala Lumpur.	Zikay Group of Company Sdn.Bhd.	RM 190,000,000	June 2012	In Pogress

**Source:** Kembang Serantau Company Profile

## CHAPTER 3.0

### CASE STUDY

#### 3.1 Introduction of Project

This project titled " Cadangan 1 Blok Pembangunan Perdagangan Bercampur 40 Tingkat Yang Mengandungi 2 Tingkat Besmen, 1 Tingkat Ruang Lobi Dan Ruang Meknikal Dan Elektrikal, 1 Tingkat Mezanin, 10 Tingkat Tempat Letak Kereta, 1 Tingkat Ruang Dewan Seberguna Dan Kemudahan Lain, 1 Tingkat Kemudahan Rekreasi, Spa Dan Kemudahan Lain, 12 Tingkat Unit-Unit Hotel, 1 Tingkat Kemudahan Rekreasi Dan Unit-Unit Hotel, 12 Tingkat Unit-Unit Pangsapuri Servis, 1tingkat Sky Lounge, Ruang Tangki Air, Bilik Motor Lif Dan Helipad Yang Dirangkumkan Dengan Bangunan Sedia Ada Pejabat 7 Tingkat, Ruang Kedai 1 Tingkat Dan Bangunan Podium 3 Tingkat Sedia Ada Di Jalan Raja Abdullah, Kampung Baru, Kuala Lumpur.



**Photo 3.1:** Mercu Zikay project title board



**Figure 3.1:** Architect impression of the view of Mercu Zikay building

**Source:** Zikay Group Company Profile

Mercu Zikay is been fully developed by a developer company, Zikay Group Sdn. Bhd, with a gross development value of RM300 million. Mercu Zikay provide four-star hotel with a capacity of 289 rooms as well as a 12-storey parking spaces, (Mercu Zikay Ikon, 2013)

Besides, the top also provide a capacity of 130 units of serviced apartments as well as two penthouses. This building is very strategic as it offers beautiful views of the Petronas Twin Towers and Kuala Lumpur. Mercu Zikay Construction was began in June 2012 and expected to be completed by May 2015.

According to "Mercu Zikay Ikon",(2013) the building was constructed with a mix of hotel and serviced apartments because of its strategic location and the limited land factor. To attract more tourists, a place of rest Sky Lounge on the 27th floor and the 40th floor Sky Dinning will be built. The ground breaking ceremony was officiated by Prime Minister Datuk Seri Najib Tun Razak at the project site located adjacent to Masjid Kampung Baru.

Mercu Zikay is a pioneering high-rise development that brings new level of style, luxury and convenience to Kampung Baru, the unique and historic enclave tucked quitly in the heart of the Kuala Lumpur.

Style meets substance fenestration that provides protection against rain and shine. The dynamic colors and architecture of Mercu Zikay create attractive facades and shadow play.Besides, the cotemporary aesthetic appeal doesn't come at the expense of functionality at Mercu Residence.



### 3.2 Introduction of UCO Solidwall System



**Photo 3.2:** UCO Solidwall

UCO Solidwall System is a non-load bearing wall system which fits into modern day commercial, institution and residential building construction. It is a type of industrial building system which was certified by Construction Industry Development Board Malaysia (CIDB).

UCO Solidwall System comprises UAC fibre cement sheets fixed onto metal studs and infilled with light weight concrete mix. It is versatile in complying to the fire-rating, sound and thermal insulation, wet application, impact strength and robustness requirements (UAC Berhad, 2011)

According to UAC Berhad (2011), UCO Solidwall System is lightweight thereby greatly reducing the dead load on the structure, which in turn reduces the embodied carbon of the building if incorporated into the design from the beginning. With UCO Solidwall System, there are no wet works and minimal wastage on-site compared to conventional masonry works (UAC Berhad, 2011)

UCO Solidwall System complies with the required fire-rating, sound proofing, thermal insulation and is certified as an Industrial Building System (IBS) by CIDB Malaysia. The fibre cement boards that are used for this system contain low VOC and have low formaldehyde.

UCO Solidwall System gives a straight and smooth surface that can fit into modern day commercial, institution and residential building constructions. It readily accepts a wide range of surface finishes such as acrylic and emulsion paint, wallpaper, ceramic tiles, and marble. This type of system is suitable for institution, hotels, resort, high-rise building, houses, factories, shopping malls and shop office

The selection of UCO Solidwall system can be specified as an economic choice. This is because it is very suitable to be applied in Mercu Zikay building. Mercu Zikay is a building which is built in the middle of Kuala Lumpur which is known as a busy city. The construction process should be organized properly so that it will not give too much negative effect to the construction or surrounding. The UCO Solidwall system is used in almost every floor of Mercu Zikay building. It commonly used as the partition between room and external wall. Because of the durability of this system, it also been used as the fence of this project.

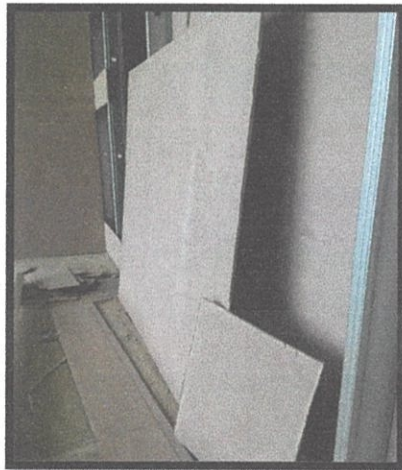
This system will be installed by the sub-con. The mixing work for the light weight concrete mix will be done at the first floor. After mixing the concrete, it will be transfer to the upper floor by using the concrete pump. The number of worker that needed to operate this system is normally about 4 to 6 workers which handled by the sub-con.

### **3.3 Characteristic of UCO Solidwall System**

#### **3.3.1 System Component**

The UCO solid wall consist the combination of some compartment which makes it a strong structure. This system consists of UCO flexaboard, metal stud, and light weight concrete mix.

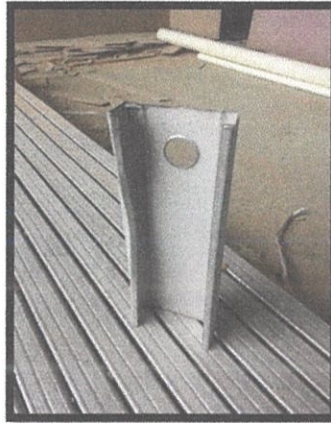
##### **3.3.1.1 UCO Flexaboard**



**Photo 3.3:** UCO Flexaboard

UCO Flexaboard is a type of wooden board that acts as the external surface of the wall. The function of the board is to protect and support the light weight concrete inside wall. It also acts as the concrete mold. besides, it also help to make the surface of the wall smoother and help in making the finishing work easier. It comes with variety of thickness such as 6.0mm, 9.0mm, and 12.0mm thickness. The selection of the flexaboard thickness is determined by identifying the purpose of the wall. Each thickness leads to differences of characteristic.

### 3.3.1.2 Metal Stud



**Photo 3.4:** Metal Stud

The metal stud is act as the metal holder for the UCO Flexaboard. It consists of 3 compartments which is head track, wall stud and base track. The function of this metal stud is to hold the Flexaboard to make it stable and durable.

#### 1. Deflection Head Track

Head track is the metal stud that is located at the top of the UCO solidwall. It serves as the holder of the flexaboard at the top. 64/92 x 50mm leg deflection head track to be installed at the head connection to allow some structural movement or deflection.



**Photo 3.5:** Head Track Metal Stud

## 2. Wall Stud

Wall stud is the stud that is located along the flexaboard in a vertical position. It is installing from the top of the top to the bottom of the UCO wall. It serve as the holder to keep the flexaboard in their position. The size is normally about 64mm x 92mm wall stud is fixed to receive fibre cement sheet installation with self-drilling screws.



**Photo 3.6:** installation of wall stud

## 3. Wall / Base Track

Base track is the stud that is located at the bottom of the UCO wall. It is act as the flexaboard holder at the bottom of the UCO wall. It is very important to keep the wall in the right position. The sizes normally come with 64 x 92mm wall base track.



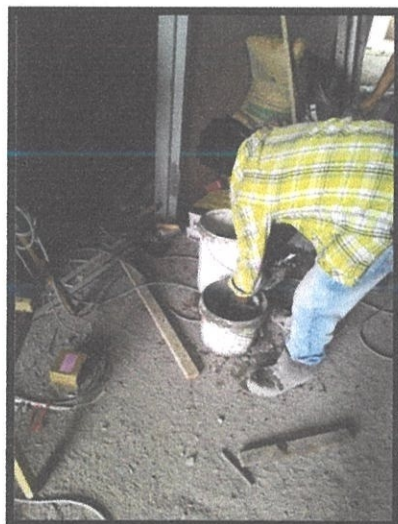
**Photo 3.7:** Base Track

### 3.3.1.3 Light Weight Concrete Mix

The standard of mix per batch consists of one bag of 50kg Portland cement, 120kg of washed river sand, 1.2 kg of grade f polystyrene, 1.2kg of U.A.C. admixture, and 30 litre of water. Cube test is provided randomly at site.



**Photo 3.8:** concrete mixing process



**Photo 3.9:** concrete mixing process

### 3.4 Advantages

Although the functions of the Uco Solidwall are the same as the other wall system, it may contain more benefit compared to the other wall system. There are many benefit of using UCO Solidwall system such as longer fire rated period, lighter weight, faster construction, highly quality, more versatility, cleaner and safer construction, impact resistant, durable, and thermal insulation.

#### 1. Fire Rated

Wall can be categories as passive fire protection. This is because it helps to limiting the spread of fire and smoke for a limited period of time. Wall will remain silent in coating system till the eventuality of fire.

UCO solid wall system is a non-combustible material. It has the fire rated period which is up to 4 hours according to British standard (bs 476: part 22). It does not typically required electric or electronic activation or degree of motion to stop a fire spread. It is quite similar to the brick wall system. Since the primary ingredient in brick is clay which is fired to around 20008 f, it is a non-combustible material. (Fire resistance of brick, 2008).

As such, both systems are excellent choice to resist or confine fires but UCO solidwall sytem is more economic system compared to brick wall system. This is because the fire rated period for brick wall system is depending on the thickness or number of the wall. As the result, the brick wall need to be construct thicker to have the same fire rated period as UCO solid wall system.

## 2. Light Weight

The UCO wall can be categorized as a lightweight wall. In a building, a light weight element is very important to make the construction become less complicated. This is because a light element will transfer less dead load to the structure of the building compared to the heavy weight element. There is no need to spend a lot of cost for the structure work because the structural work has been simplified. This situation helps to make the structure work become easier. As a result, it can reduce the period of the construction. Because of those reasons, the light weight wall is very suitable to be applied to the high rise building.

The weight of UCO Walls is approximately 2-3 times lighter compared to brick walls. The density is only about 900-1300kg/m<sup>3</sup> (UAC Berhad, 2011). This is because this system consists of UCO Flexaboard, metal stud, and light weight concrete mix only while the brick wall consists of brick which is very heavy. This means, the UCO solid wall system may transfer less dead load compared to the brick wall system which makes the structure work way easier. As a result, the cost and period of the construction can be reduced. Because of this reason also, it is very suitable to be applied to high rise building.

## 3. Fast Track Construction

The UCO Solidwall system has faster wall construction. In a construction, the period of time for the construction to finish is very important. The faster the period of time for the construction to finish, the higher the profit the contractor gets. This is because most of clients want their building to be constructed quickly. To make the construction become faster, the contractor should choose the best method of construction to compile the client's need.



The UCO solidwall method construction is very simple compared to the brick wall system. The UCO Solidwall system has faster wall construction because it is constructed rapidly which make it a lot more easier method. It constructed by installing the metal stud first. Then, the uco flexaboard will be installing and lastly, fill in the light weight concrete into the wall. The method of construction of this type of wall is very suitable to be applied for the building that required many wall such as school, office, apartment or hotel.

Compared to the brick wall system, the brick wall system is constructed by laying the brick and this work required longer time. This is different from uco solidwall which only required some hour to be constructed.

#### 4. High Quality Wall Finishing

The UCO Solidwall system has a better wall finishing compared to other wall system. Wall finishing is very important for a building. This is because it is needed to increase the aesthetic value of the building.

The UCO solidwall is straight with smooth surfaces. This is because the UCO wall is made up from UCO flexaboard which is very smooth. The smooth surface of the UCO Flexaboard help to make it easier to applied for any type of finishes (UAC Berhad, 2011). The UCO Solidwall readily accepts a wide range of surface finishes, such as acrylic and emulsion paint, wall paper, ceramic tiles, and marble. This benefit help in improving the wall aesthetic value (UAC Berhad, 2011).

Compared to the brick wall system, the brick wall system is made up from brick which is very rough surface. Because of that, it needs to be plastered thicker to make it become smooth. As the result, this system will provide higher cost than the UCO solid wall for the finishing.

## 5. Cleaner And Safer Construction

One of the advantages of using Uco solidwall system is, this system is a clean and safe construction. The safety aspect is not a matter to be taken lightly. This is because the construction industry is facing to many hazards and accident potential. Any accident during the construction will make the construction period longer. To overcome the problem, the contractor should choose the most suitable method of construction.

The Uco Solidwall system consist of easier wall construction method which lead to the efficient management of material and equipment. This situation make the construction can be organize way better. Besides, it also can reduce the number of hazard indirectly make the construction site safer. It also help to reduces messiness and thereafter easy to clean up at site. As the result, the site clearing work can be reduce and this situation help to reduce the construction period and reduce money. Also minimizes inconvenience to other trades compared to the labour-intensive conventional trade (UAC Berhad, 2011).

### 3.5 Method Statement

#### 3.5.1 Diagram of Installation of UCO Solidwall System.

1. Installation of metal stud



**Photo 3.10:** Installation of bottom stud

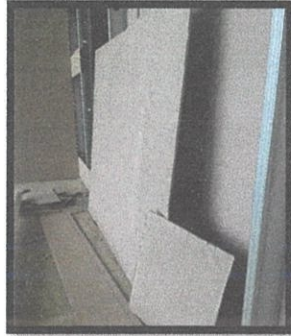


**Photo 3.11:** Installation of top stud



**Photo 3.12:** Installation of metal frame

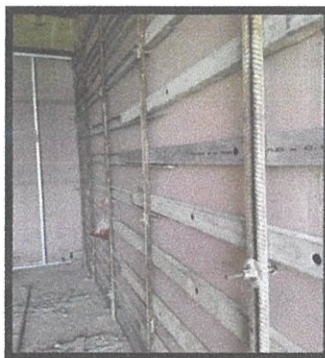
2. Installation of mechanical and electrical system



**Photo 3.13:** Installation of UCO flexaboard of the back side



**Photo 3.14:** Installation of mechanical and electrical



**Photo 3.15:** Installation of UCO flexaboard of the front side

### 3. Concreting process



**Photo 3.16:** Concreting mixing process



**Photo 3.17:** Concrete fill into UCO wall frame




**Photo 3.18:** jointing process on UCO flexaboard


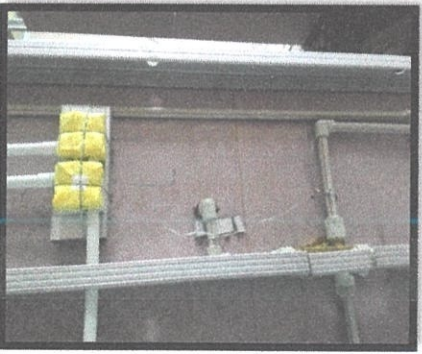
### 3.5.2 Installation of UCO Solidwall System



This method statement is general introduction to the UCO Solidwall System. It covers standard procedures for the installation of UCO Solidwall System.

Table below show the installation method for UCO solidwall system


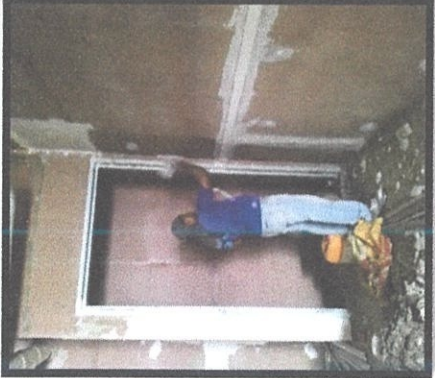
**Table 3.1:** Method statement of UCO solidwall system

No	Operation	Diagram	Plant	Labour	Equipment	Period	Remarks
1	Fix top metal track to structural support and bottom metal track onto the floor, thereafter light gauge metal stud frame is installed.	 <p><b>Photo 3.19:</b> installation of metal stud</p>	-	1 skilled labour 1 unskilled labour	Spirit level Hand drill Meter tape	1 hour	The position of the metal stud is refer from the Architecture Drawing

2	UCO flexaboard is fixed to one side of the metal frame	 <p><b>Photo 3.20:</b> installation of UCO Flexaboard to one side of the wall</p>	-	1 skilled labour 2 unskilled labour	Hand drill	1 hour	
3	Door and window frames, plumbing and electrical services can be easily installed where required.	 <p><b>Photo 3.21:</b> installation of electrical service on the UCO Flexaboard.</p>	-	1 skilled labour 1 unskilled labour	metal string meter tape	2 hour	The services arrangement refer from Mechanical & Electrical drawing

4	<p>Wall paneling is completed by fixing UCO flexaboard to the other side of the metal frame.</p>	 <p><b>Photo 3.22:</b> installation of UCO Flexaboard</p>	-	<p>1 skilled labour 2 unskilled labour</p>	<p>Meter tape Spirit level</p>	<p>1 hour</p>	<p>Inspection need to be done to check the verticality of the wall</p>
5	<p>Lightweight infill mixing can take place in designated areas.</p>	 <p><b>Photo 3.23:</b> light weight concrete mixing process</p>	<p>Concrete mixer</p>	<p>1 skilled labour 2 unskilled labour</p>		<p>2 hour</p>	



6	<p>The lightweight infill mix is pumped to each floor to fill the wall cavity.</p>  <p><b>Photo 3.24:</b> infill the light weight concrete into the UCO wall</p>	Concrete pump	1 skilled labour 2 unskilled labour	Concrete spatula	2 hour	
7	<p>Joint setting is done using the UCO jointing compound.</p>  <p><b>Photo 3.25:</b> Jointing process on the UCO wall</p>	-	1 skilled labour	Concrete scraper	2 hour	

8	<p>Lightweight infill mixing can take place in designated areas.</p>						
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**Photo 3.26:** UCO wall as the external wall of building

## CHAPTER 4.0

### CONCLUSION

#### 4.1 Conclusion

The selection system for a building of the wall is very important for a building. This is because it will determine whether the building will function properly or not. Errors in the selection of the wall system will lead to the loss in a project. Therefore the wall systems need to be choosing wisely and efficiently.

UCO Solidwall system is a type of wall system that is very economic and efficient to be applied in large project such as high rise building. Besides, this type of system is suitable for institution, hotels, resort, high-rise building, houses, factories, shopping malls and shop office. Although the functions of the UCO Solidwall are the same as the other wall system, it may contain more benefit compared to the other wall system. There are many benefit of using UCO Solidwall system such as longer fire rated period, lighter weight, faster construction, highly quality, more versatility, cleaner and safer construction, impact resistant, durable, and thermal insulation.

Besides, the method of construction and maintenance of this system is less complicated compared to the brick wall system. This situation will allow the construction and maintenance work became more efficient. As the conclusion, the UCO Solidwall system is an economic wall system that should be applied in construction because of the benefit.

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# APPENDICES

## Appendix A: IBS company verification status



**CIDB**  
MALAYSIA


**PENGESAHAN SYARIKAT STATUS IBS**  
*IBS STATUS COMPANY VERIFICATION*

Adalah dengan ini disahkan bahawa :  
*It is hereby verified that :*

No. Siri : 0147  
*Serial No. :*



**UAC BERHAD**  
TINGKAT 10, MENARA UAC  
12, JALAN PJU 7/5, MUTIARA DAMANSARA  
47800 PETALING JAYA  
SELANGOR DARUL EHSAN

Merupakan :  
*is :*

**PENGELUAR**

Lokasi Kilang :  
*Factory Location :*

36, JALAN PORTLAND  
TASEK INDUSTRIAL ESTATE  
31400 IPOH  
PERAK DARUL RIDZUAN

No. Laporan  
*Report No. :*

Sebagai syarikat Status IBS yang mengeluarkan produk IBS berikut :  
*As an IBS status company that manufactures the following IBS components :*

Tarikh Dikeluarkan :  
*Issue Date :*

**INNOVATIVE SYSTEM :**  
- DRYWALL CONCRETE PANEL  
XX

Sah Sehingga :  
*Valid Until :*

31 DISEMBER 2015


No. Laporan  
*Report No. :*

FPK141212IBSG0309

Source: UCO Solidwall System Manual

Appendix B: Certificate of materials

No. Fail: JBPM/IP/BKK:700-7/2/9-411 ( 5 ) (PEMBAHARUAN: PERTAMA)



**SIJIL PERAKUAN BAHAN**  
**CERTIFICATE OF MATERIAL APPROVAL**

Jabatan Bomba dan Penyelamat Malaysia  
dengan ini memperakui bahawa  
Fire and Rescue Department of Malaysia  
hereby certify that

UAC BERHAD (5149-H)  
Level 10, Menara UAC,  
12 Jalan PJU 7/5, Mutiara Damansara,  
47800 Petaling Jaya,  
Selangor DE.

Bagi bahan binaan / pemasangan keselamatan kebakaran  
For building material / fire safety equipment

**DRYWALL CONSTRUCTION**

Berdasarkan piawaian  
As complying with

**BS 476:PART 22:1987**

Tempoh sah perakuan: 15/03/2013 hingga 14/03/2014


(DATO' RUSMANI BIN MUHAMAD)  
Penolong Ketua Pengarah,  
Bahagian Keselamatan Kebakaran,  
b.p. Ketua Pengarah  
Jabatan Bomba dan Penyelamat Malaysia.

Tarikh: 31 Januari 2013

Source: UCO Solidwall System Manual

## Appendix C: Certificate of materials

No. Fail: JBPM/IP/BKK:700-7/2/9-411 (5 )	LAMPIRAN A1
No.Siri: BB/DD/1683/2012 (P1)	
Jenama, Model & Spesifikasi	<b>SOLIDWALL PARTITION SYSTEM (2 JAM) NON-LOAD BEARING</b>
	: 'UCO SOLIDWALL SYSTEM' (TOTAL THICKNESS: 105mm)
Nama & Alamat Pengeluar	: UAC BERHAD
No. Laporan ujian/Tarikh	: SIRIM 2011FE0339 (11/01/2012)
Skim Persijilan Barangan	: -----
Had Kegunaan	: <b>TIDAK DIBENARKAN SEBAGAI 'PARTY WALL'. PERLU MEMATUHI SPESIFIKASI UJIAN DAN UBBL 1984.</b>



Tempoh sah perakuan: 15/03/2013 hingga 14/03/2014

Source: UCO Solidwall System Manual