

Industrialised building system by using precast concrete elements construction es...

[Business](#), [Industries](#)



In Malaysia, the execution of Industrialised Building System (IBS) by utilizing precast concrete elements were introduced since 1966 when the authorities launched two undertakings which involves the building of Rifle range Road Flats in Penang and Tuanku Abdul Rahman Flats in Kuala Lumpur.

From the study conducted by CIDB Malaysia, the degree of use in IBS in the local building industry is 15 % in 2003 although many authorities enterprises have been introduced to promote the usage of IBS. Therefore a survey is conducted to analyze will be conducted to analyze the current consciousness of the use of IBS in Malaysia. Furthermore this survey will be conducted to analyze ways to better the execution of IBS in the local building industry.

Chapter 1: Introduction1. 1 Rationale for the ResearchIndustrialised Building System (IBS) was introduced since the 60 ' s in Malaysia. There are several benefits of IBS such as velocity up the building advancement and perchance cut down labour force, building cost and hazard every bit good. Even IBS have many benefits but there is still hold some jobs in implementing IBS into the building industry chiefly due to miss of cognition in IBS among the contractor. Research done by Lim Sin Peng in twelvemonth 2009 showed that the use or execution degree of IBS is still low in Malaysia building industry. Harmonizing to Construction Industry Development Board (CIDB) (2003b) study building undertaking utilizing IBS in Malaysia stands 15 per centum (%) in the twelvemonth 2003 and the complete undertaking utilizing IBS in twelvemonth 2006 merely 10 % (CIDB, 2007b) less than tierce of the entire building undertaking (utilizing at least one IBS

merchandise) in twelvemonth 2006 (CIDB 2007a) . The first IBS undertaking, Pekeliling Flat, was initiated by the Government at Jalan Pekeliling, Kuala Lumpur in 1964.

The execution of IBS in Malaysia was non good accepted by the building industry after the first acceptance of IBS proves to be a failure in maintaining to building cost within the estimated budget. Therefore, the purpose of survey is to alter the perceptual experience of the building industry towards IBS.

1. 2 Problem Statement

The execution degree of IBS is perceived to be lower compared to the advantages outlined by the building industry. The undermentioned inquiries need to be answered before the issues could be addressed: Question 1: What is the execution degree of IBS in Malaysia building industry? If the execution degree of IBS is consider low in Malaysia building industry, so merely can continue to the following research inquiry. Question 2: Why there are fewer contractors implementing in IBS? This will supply some thoughts that about what halt the contractors from utilizing IBS. Question 3: How to actuate contractor to implementing in IBS? This will supply recommendation to increase the degree of execution to run into the aims of CIDB and Government to supply better production in building industry.

1.

3 Research Aim

The research purpose is to analyze the grounds and factors of why fewer contractors implement IBS in Malaysia building industry

1. 4 Aims

The aims of this survey are to set up the execution degree of IBS here in Kuala Lumpur as general of Malaysia. The survey besides determines the barriers to contractors for non implementing IBS. In add-on, it besides evaluates the utility and advantages of utilizing IBS.

Furthermore, the survey besides is to urge factors that would promote contractor to implement IBS.

1. 5 Importance and Benefits of Study

The importance of this survey is to happen out the grounds of unpopularity of this system in Malaysia in comparing to other states such as Japan, Singapore, and United Kingdom (UK) which have implemented the IBS successfully.

In chapter 2, the literature reappraisal will discourse farther. Beside that, the benefits of this survey are
Getting familiar with the construct of IBS
Clear of position on the type and features of IBS
Get to cognize the degree of credence of IBS in Malaysia building industry
Visualized the benefits and restriction of utilizing IBS

1. 6 Scope of Research and Limitation

In the thesis, the range of survey will on focal point on the acceptance degree of utilizing IBS particularly in the contractor point of position. Furthermore, some grounds and factors that might impact the execution of IBS and what would be the best motives for contractor to utilize IBS will be discuss every bit good. The restriction of this research is the questionnaire requires a batch of respondent around 200 and it does non guarantee that they will do any feedback. Due to the restriction of the conveyance and there are many contractor houses, so this research will merely stay in Kuala Lumpur and Klang Valley country.

1. 7 Research Methodology

1. 7. 1 Questionnaire

Quantitative method will be used to carry on this research. Question study will be conducted for aiming respondent from Kuala Lumpur and Klang Valley country to find their consciousness of the certain issues or factors. This method will take some clip of carry oning a study, so clip must be allowed for late returns and responses to follow up efforts. Furthermore, this is the simplest manner to obtain information from targeted groups.

Datas collected from questionnaire will foremost look into for the truth before carried out to work out the analysis by utilizing statistical analysis package such as SPSS.

Objective 1

To happen out the execution degree of IBS in Malaysia

Objective 2

Determine the barriers for contractor to implement IBS Literature

Review Quantitative method

Objective 3

Measure the positive consequence of utilizing IBS Questionnaire

Objective 4

Give factors that would promote contractor to implement IBS Analyze and

develop solutions SPSS package Achieve purpose and aims. Decision and

Recommendation Figure Research Methodological Method

1.8 Structure of Dissertation

This thesis is consists of five (5) chapters every bit described as below:

Chapter 1 Introduction

This chapter includes brief description of the job statement with the intent of carry oning this research and its purpose and aims. It besides includes the range of survey and benefits of the survey.

In add-on, a brief description of the method that used in survey, roll uping relevant informations and information. A brief debut on the subsequent chapters is discussed every bit good.

Chapter 2 Literature Review

This chapter focuses on the reappraisal made from articles, diary, newspapers cutting, quotes from writers and on-line articles related to IBS.

The cardinal portion of this chapter is to discourse in deepness about the benefits of utilizing IBS, restriction of utilizing IBS and barriers implementing IBS in building industry of Malaysia.

Chapter 3 Research Methodology

This chapter explains the methodological analysis will adopted in item including the method used by the research worker to accomplish the earlier mentioned aim for the research intent.

Chapter 4 Analysis of the Consequences

This Chapter will covers the presentation on the consequence from carries out the informations collected from the respondents through the study questionnaire will be analyzed and will be tabulated in the signifier of chart and discussed in item.

Chapter 5 Conclusion and Recommendation

This chapter concludes the research, its findings and analysis sing the issue of the survey including the restrictions encountered during the research. The last portion of this chapter is the recommendations and some personal remark had been given to better the survey every bit good as future research.

Chapter 2. 0 Literature Review

2.

1 Introduction

In this chapter, the writer reviewed plants done by others through diaries, articles, newspaper film editing, and quotation marks from writers and on-line articles collected. IBS system is a procedure to rush up the building work and to minimise the dependence of labor on site. The aim of this survey is further discussed about the barriers of contractor in implementing IBS.

Besides that, this chapter besides will concentrate on the basic reappraisal of IBS such as definitions, background, types and features in IBS and have a basic debut about the item of IBS. 'Industrialised edifice ' is the term given to constructing engineering where modern systematized methods of design, production planning and control every bit good as mechanized and automated industry are applied (Ingemar Lofgren and Kent Gylltoft, 2000)While ' Building system ' intend a edifice system includes design regulations and a merchandise system whose parts have compatible interfaces, therefore allowing the usage of several alternate constituents and assemblies is assured by agencies of a dimensional and tolerance system every bit good as connexion and articulation (Ingemar Lofgren and Kent Gylltoft, 2000)

2. 2 Definition of IBS

There was no normally accepted or agreed definition of IBS. Several writers have defined IBS as procedure or a technique.

Blimas et. Al. (2006) and Pan et.

Al. (2008) defined that IBS is frequently referred by literatures as off -site building, off-site production, industrialised and automated building.

Warszawski (1999) explain in item that an industrialised procedure is and investing in equipment, installations, and engineering with the aim of maximising production end product, understating labour resource, and bettering quality while a edifice system is defined as a set of interrelated component articulation together to enable the designated public presentation of a edifice. Another definition by Trikha (1999) claimed that IBS besides may be defined in which all edifice constituents such as wall, floor slab, column and stairway are mass produced either n mill or at site under rigorous quality control and minimal on site activitiesAnother definition that clarified by Junid (1986) where IBS as procedure by which constituents of edifice are conceived, planned and fabricated, transported and erected at site. The system includes balance combination between package and hardware constituent.

The package elements include system design, which is complex procedure of analyzing the demand of the terminal user, market analysis and the development of standardise constituent, constitution of fabrication and assembly layout and procedure, allotment of resources and stuffs and definition of a edifice interior decorator conceptual framework. The package elements provide a requirement to make the contributing environment for industrialised to spread out. Harmonizing to Junid (1986) , the hardware elements are categorised into three major groups. These include frame or station and beam system, panel system, and box system. The framed

constructions are defined as those construction that carry the tonss through their beams and girders to columns and to the land whilst in panel system burden are distributed through big floor and wall panels. The box systems include those system that employ 3-dimensional faculties (or boxes) for fiction of habitable units are capable of withstand burden from assorted waies due to their internal stableness.

CIDB defined IBS as building system whereby the constituents are manufactured in a mill, on-site or off-site, so positioned and assembled into constructions with minimum addtional site work.

2. 3 Categorizations of IBS

This subdivision will concentrate on the categorization of the edifice system that are published internationally and in Malaysia. There are four types of edifice system under IBS in Malaysia and there are namely conventional column-beam-slab frame systems with lumber and plyboard as formwork, cast unmoved system with steel or aluminum as formwork, prefabricated system and the composite edifice system is shown in figure 2. 1. Each edifice system is represented by its building engineering, functional and geometrical constellation (Badir et al, 1998) . (cited at Thanoon et. al. , 2003)

Figure Type of Building System in Malaysia

Beginning: Adopted from Thanoon et Al, 2003

Harmonizing to Majzub (1977) has different construct in sorting edifice system that is the comparative weight of the constituents should be used as a footing for constructing categorization shown in figure 2.

2. The factor of weight has important impact on the transportability of the constituents and besides has influences on the production method of the constituents and their hard-on method on site. This categorization method is found to be unequal to integrate other constructing system flourish late. Figure Building System Classification harmonizing to Relative Weight of Components Beginning: Adopted from Majzub, 1977 (cited by Thanoon et. al. , 2003) There are five types of IBS had being used in Malaya:(IBS Road Maps 2003-2010)

Type 1: Pre-Cast Concrete Framing, Panel and Box System

The most common group of IBS merchandises is pre-cast concrete of elements in building industry. For illustration, there are including columns, beams, slabs, Three-Dimension (3D) constituents (balconies, stairway, lavatory, lift Chamberss) , lasting concrete formwork, and so on. (CIDB, 2005) . Pre-cast concrete framing, panel and box system is under classs of prefabricated system. The advantage utilizing this is because it cans minimal waste due to work environment in mill is easier to command.

Panel system is use for the building of interior walls and exterior walls offer velocity of building in many ways. For box system will accomplish ultimate aim of industrialisation that is a maximal economy of human labor on site. Figure Pre-cast Concrete Elementss

Type 2: Steel Formwork Systems

This system considered as least prefabricated IBS, as they by and large involve site casting and capable to offer high quality coatings and fast

building with less site labor can come in tunnel formwork, beams, columns, and slab molding signifiers lasting steel formworks (metal decks) and so on. (CIDB, 2005) The steel formwork is prefabricated in the mill and so installed on site. Figure Steel Formwork Systems

Type 3: Steel Framing System

This system ever be the popular pick and used intensively in the fast-track building of skyscrapers. Recent development in this types system included the increased use of light steel trusses.

Steel is non combustible stuff and improves fire safety and reduces sum of structural amendss in the event of a fire happen. Example: Steel beam, columns, portal frames, roof trusses. (CIDB, 2005) . Steel bordering besides see as prefabricated system and it to be erected whereby welding at articulations are conducted.

This system cans faster the advancement building. Figure Steel Frame Systems

Type 4: Prefabricate Timber Framing System

While the latter are more popular, timber edifice frame offering interesting designs from brooding units to edifices necessitating high aesthetical values such as chalets for resortsExample: Timber frame, timber roof trusses (CIDB, 2005) . The advantage of the system is chiefly in the interior flexibleness, as big infinite can be used for different maps and can be easy changed or modified harmonizing to the usage. Figure Prefabricated Timber Framing System

Type 5: Block Work System

This system has revolutionized by the development and use of meshing concrete masonry units (CMU) and lightweight concrete blocks. The boring and time-consuming traditional brick-laying undertakings are greatly simplified by the use of these effectual alternate solutions. Block work system besides see under prefabricated system. The benefits of block work system are faster building and increase bricklayer length of service.

Furthermore, it ' s besides increased energy nest eggs like lightweight concrete ' s opposition to heat flow is twice of medium and heavy weight concrete, it ' s average that less heating/cooling energy is needed. Figure Block work

2. 4 Features of IBS

It is of import to hold the following features merely see to be accepted as portion of the IBS and guarantee the accomplishment of proved benefits of IBS. Each of them will be discuss briefly at below (CIDB 2008) : Industrial production of constituents though pre-fabrication ; or extremely mechanised unmoved procedures.

For illustration, lasting steel formwork Reduced labour during pre-fabrication of the constituents and site plants. Modern design and fabrication methods affecting information Technology such as the use of Computer Aided design (CAD) and Computer Aided Manufacturing (CAM) Systematic Quality control such as ISO 9000 rules Open Building Concept i. e allowing the loanblend applications, and adaptable to standardisation and Modular Coordination

(MC)Figure The Characteristics of Building System Beginnings: Adopted from Abdullah M. R. , 2009

2. 5 Implementation Level of IBS in Malaysia

The usage of IBS have assorted advantages such as the decrease dependence of foreign workers, less wastage, less volume of edifice stuffs, increased environmental and building site cleanliness and better quality control compare to conventional method. These advantages besides promote a safer and more organized building site, and cut down the completion clip of building.

Many first Malayan developers have chosen IBS over the conventional methods for of import undertakings such as the Petronas Twin Towers, Putrajaya, KL Sentral, and KLIA. (IBS Roadmap, 2003 -2010)Even so, the usage degree of IBS in edifice is still low. From a study conducted by CIDB Malaysia, the usage degree of IBS in the local building industry stands at merely 15 % (IBS Survey 2003) . The early attempts of the Government to promote the usage of IBS in the building sector has yet to earn a good response, and this sector is still practicing conventional building methods that have proven clip and once more to be uneconomical, unsafe and mussy. Relatively, the low labor cost in this state is the root cause of the industry neglecting to reform and being complacent with the current degree of productiveness, quality and safety. (IBS Roadmap, 2003 - 2010)Furthermore, harmonizing to the newspaper the star 2009 stated that Jamilus explained that IBS was a building technique in which constituents were manufactured in a controlled environment (on-site, off-site) ,

transported, positioned and assembled into a construction with minimum extra site work. Beside that, out of 1, 400 contractors in Johor, there merely 4 % of it are utilizing this systems. Furthermore, he said that since twelvemonth 2008, there merely 51 contractors in the province have been reported to utilize the IBS system in their edifice undertakings and the figure were expected better in clip.

(The star, 2009)

2. 6 Malaysia ‘ s Experiences in IBS

The use of IBS is non new in the Malaysia building industry. The thought utilizing IBS in Malaysia was first intent during the early 60 ‘ s when the Minister lodging and Local Government visited several European states and evaluated their edifice system public presentation. At the clip, the authorities makes a large determination to give a attempt on a two pilot undertakings utilizing IBS construct. The first undertaking, Pekeliling Flat was constructed along Jalan Pekeliling with building of 7 blocks of 17 floor flats, and 4 blocks of 4 storey flats consisting about 3, 000 units of low cost flats and 40 floor store batch and this undertaking utilizing big panel industrialized prefabricated systems. On the other manus, the 2nd undertaking was built in Penang with the building of 6 blocks of 17 floor flats and 3 blocks of 18 storey flats consisting 3, 699 units and 66 store tonss along the Jalan Rifle Range and this undertaking was utilizing the Gallic Estiot System (Din, 1984) .

Even though the first execution IBS was non successful due to the failure to maintain within cost appraisal but there are some successful acceptance excessively. Among the important undertakings that implement IBS are including KL Sentral, KL Convention Centre, KLIA, etc. Following is the Successful implemented of IBS throughout Malaysia (CIDB Malaysia, 2003)

Year 2007 - Stormwater Management and Road Tunnel (SMART Tunnel) , Kuala Lumpur- The Spring Shopping Mall, Kuching, Sarawak

Year 2006 - Kuching International Airport, Kuching, Sarawak- Persada Johor International Convention Centre, Johor Bahru

Year 2005 - Serdang Hospital, Serdang, Selangor- The Curve, Mutiara Damansara, Selangor

Year 2001 - Kuala Lumpur Sentral (KL Sentral) , Kuala Lumpur- Likas Stadium, Kota Kinabalu, Sabah

Year 1998 - Kuala Lumpur International Airport (KLIA) , Sepang, Selangor- Malawati Indoor Stadium, Bukit Jalil, Selangor

Year 1997 - Petronas Twin Tower, Kuala Lumpur- Bukit Jalil, Bukit Jalil, Selangor

Year 1984 - Day Bumi Complex, Kuala Lumpur

Year 1981 - High terminal cottages and low cost houses throughout Selangor

2. 7 The Advantages for IBS acceptance in Construction Industry

There are some several advantages utilizing IBS (MCRJ, 2009)

1.

Reduce Remittances by foreign worker:

The Government aimed to accomplish 100 percent use of IBS and to cut down to 15 per centum or about 50, 000 of foreign workers in the building

industry by 2010. With the current foreign workers numbering 227, 000, the remittals of the foreign workers amounted to about 7. 5 billion. It is expected that the Government would be able to cut down the remittals with the full execution of IBS. (Bernama.

com, 2006)

2. Enhance Efficiency of Construction Process and Higher Productiveness:

IBS is a methodological analysis whereby a local building industry is driven towards the acceptance of an integrated and encouraging key participants in the building industry to bring forth and use pre-fabricated and aggregate production of the edifice at their work sites. This will assist to heighten the efficiency of building procedure, letting a higher productiveness, quality, clip and cost economy. (CIDB, 2004)

3. Produce Better Merchandise:

IBS promises elevated degrees of expertness throughout the industry, from makers, installers, applied scientists, contrivers, interior decorators, and developers. The benefits of IBS will finally bring forth better merchandises for the population (CIDB, 2003)

4.

Reduce Wastage, Less Site Materials, Costs, Cleaner and Neater Environment:

The IBS, which enables on-site prefabricated or pre-cast edifice constituents manufactured at mills offers minimum wastage, less site stuffs, cleaner and

neater environment, controlled quality, and lower entire building cost (CIDB, 2003) . For illustration, the insistent usage of system formwork made up of steel, aluminum, etc and scaffolding provides considerable cost nest eggs (Bing et al. 2001) .

5. Higher Quality of Component:

An industrialized edifice system constituent produces higher quality of constituents come-at-able through careful choice of stuffs, usage of advanced engineering and rigorous quality confidence control (Din, 1984)

6. Reduce Labour at Site:

Prefabrication takes topographic point at a centralized mill, therefore cut downing labour demand at site. This is true particularly when high grade of mechanization is involved (Warszawski, 1999)

7.

Faster Completion:

An industrialized edifice system allows for faster building clip because casting of precast component at mill and foundation work at site can happen at the same time. This provides earlier business of the edifice, therefore cut downing involvement payment or capital spendings (Waleed et al. , 2003)

8. Not Affected by Adverse Weather Condition:

Construction operation is non affected by inauspicious conditions status because prefabricated constituent is done in a mill controlled environment (Waleed et al. , 2003)

9. Flexible Design:

An industrialized edifice system allows flexibility in architectural design in order to understate the humdrum of insistent frontages (Warszawski, 1999) . An industrialized edifice system provides flexibleness in the design of precast component every bit good as in building so that different systems may bring forth their ain alone prefabrication building methods (Zaini, 2000)

2.

8 Barriers of Adoption in Malaysia Construction Industry

IBS can replace the conventional edifice system which is labour oriented However, since the first undertaking of IBS non good accepted by building parties because of fail to cover with the hazards such failure of support within the cost estimation. For illustration, the first undertaking incurred 8. 1 % higher costs than a similar edifice that utilizing conventional building method, while the 2nd undertaking was 2. 6 % lower than the cost. Both undertakings besides completed in 27 months in term of comparison to the building velocity but are inclusive the clip of set up the rewording mills excessively. When semen to the quality, the conventional method seems have better quality than IBS.

In decision, there is a competitory with conventional building method. Even though IBS is good to implement due to its advantages but the execution of usage degree is still really low. Harmonizing to Waleed et. Al. (2003) , the common consensus of all the stakeholders of building in Malaysia is that, the

IBS execution in Malayan edifice building industry is still really low compared to the conventional methods. This is due to several grounds (MCRJ, 2009) :

1. Costss and Return Investment:

Wide swings in houses demand, high involvement rate and cheap labor cost, make it hard to warrant big capital investing. At present there is an copiousness of inexpensive foreign workers in Malaysia and contractors prefer to utilize labour intensive conventional edifice system because it is far easier to put off workers during loose period.

The economic benefits of IBS are non good documented in Malaysia and the past experiences indicated IBS is more expensive due to fierce competition from conventional edifice system.

2. Lack of skilled and knowing work force:

Fully prefabricated building system requires high building preciseness. Malayan labor force still deficiency of skilled workers in IBS execution.

3.

The Practices:

The building industry is really disconnected, diverse and involves many parties. Consensus is required in the usage of IBS during be aftering phase.

4.

Knowledge based:

Lack of Research & A ; Development (R & A ; D) in the country of novel edifice system that uses local stuffs. Majorities of IBS in Malaysia are

imported from developed states, therefore driving up the building cost.

Engineering grades in local universities rarely teach about the design and building of IBS.

5. Low Quality:

The usage of IBS in Japan and Sweden are so successful due to high quality and high productiveness but it is the antonym in Malaysia. Previous undertakings constructed with IBS construct were of low quality and high building cost.

6. Lack of Incentive and Awareness:

Due to the deficiency of inducement and publicity from authorities in the usage of IBS, many many designers and applied scientists are still incognizant of the basic elements of IBS such as modular co-ordination.

7. Lack of Scientific Information:

An IBS system can merely be acceptable to practitioners if its major advantages are valuable compared to the conventional system. However, up to day of the month, there is unequal collateral grounds to confirm the benefits of IBS system.

It is hence, arguable that the execution of IBS is peculiarly hindered by deficiency of scientific information (Badir et al. , 2002)

8. Wastage of Material:

Standardization of edifice elements faces opposition from the building industry due to aesthetic reserve and economic ground. One good

illustration of this is when a 300mm mid-st modular standardised floor slab has to be used although a 260mm thick floor slab can accomplish the similar structural public presentation. This consequences wastage of stuff (Waleed et al. , 2003)

Issue that related to IBS and contractor

1. IBS first clip usage by DBKL in substructure undertaking of construct a span Jalan Dewan Bahasa-Jalan Hang Tuah because of clip salvaging and cut down traffic jam. This besides can give benefit for those pupils that around the school country.

Beside that, about 75 % of IBS have been usage to forestall any job that non complete harmonizing to the agenda. Ibs besides can salvage clip, cut down labor and site really clean, tidy and have quality. Mostly IBS is usage for edifice. This undertaking is the first substructure undertaking utilizing IBS. Furthermore, the remainder of the undertaking will be utilizing IBS. 2. 2. 9 Summary of the ChapterPresents in Malaysia, IBS still being developed and applied in new edifice.

Mean while, the execution degree is still really low what has anticipate by the authorities. The intent of IBS is really clear as an option for conventional method and besides reduces the dependence of labor, and increase the public presentation in clip, cost, and quality. The Government of Malaysia promote IBS constituent to the building industrials. In the literature reappraisal have proved that there are many benefits of IBS but still is low

use among contractors and the execution of utilizing IBS degree is still really low.

Chapter 3 Research Methodology

3. 1 Introduction

Research methodological analysis explains methods that used in the research survey, what informations have been collected, what method is adopted, why peculiar technique of analysing informations used ; all of these will be answered in this chapter. The quantitative attack will be carried out in this research and the questionnaire study method will be used in this research. This subdivision of survey will concentrate on the method of the survey to accomplish the aim of this research.

The questionnaire has been chosen to study the factors, and grade of credence, use, advantages and remark of acceptance in IBS. This method is salvaging in footings of clip and cost every bit good every bit convenient as it can distributes to big sum of respondent but the possible besides did non acquire receive any respond from respondent and the quality of the information gather from questionnaire might inconsistent and inaccurate and besides necessitate to be carefully analysis.

3. 2 Method of Research

Figure 3. 1 shows the methods that be carried out in order to accomplish the aim of this survey and followed by the account of each measure.

Constructing Questionnaire

Distribute Questionnaire

Consequences Gathering and Analysing

Decision

Figure Method of Research

3. 2.

1 Construct the Questionnaire

For the intent of planing the inquiry, the research aims and literature reappraisal had been taken into history to take to distinguish assorted issues, subjects and thoughts to make the inquiries in the questionnaire. The quantitative questionnaire will be use in this survey. Before questionnaire to be produce out, there should be required to reexamine exhaustively to the literature reappraisal and the research purpose and aims.

This is to do certain that there will non be out of subject from the research, this is the initial phase for explicating inquiry. Second, bring forth inquiry that can accomplish purpose and aims and related to literature reappraisal. The 3rd phase is to do the questionnaire easy to understand and suited with comprehensive but short plenty, no taking inquiry and dual inquiry. This will do respondents can make full up easy and faster due to the possibility that the respondents are busy.

3.

2. 1. 1 The Rationale of Questionnaire Design

The first portion is ask about the background or experiences and some general information about respondent and the administration due to do the consequences more cogency and accurate. For questionnaire signifier demand to be designed every bit simple as possible and many evaluation term in the inquiry to minimal the clip of respondent. This questionnaire consists of 3 parts as followers:

1. Separate A – Respondent ‘ s Particular

(a) Name of respondent(B) Position in organisation(degree Celsius) Year of experience in the building industry(vitamin D) Highest instruction making(vitamin E) Organization class or sector in building(degree Fahrenheit) Contact Number(g) Company reference(H) Company cast(I) What is IBS(J) How to cognize cognition and information of IBS

2. Part B – History of implement IBS and degree of use

(a) Number of undertaking implementing IBS over 5 old ages(B) Types of IBS that are utilizing(degree Celsius) Types of undertaking usage IBS.

3.

Part C – Awareness, sentiment and recommendation for IBS

(a) Image of IBS(B) Implementation degree of IBS(degree Celsius) Opinion of IBS promote by authorities(vitamin D) Handiness of IBS merchandise(vitamin E) James barriers of implement IBS(degree Fahrenheit) Possitive consequence of implement IBS(g) Factors that

encourage Contractor implement IBS(H) Others factors motivate Contractor implement IBS(I) Others barrier restricting IBS(J) Factors cause low use of IBS

Part A is aim to acquire general information of the respondent such as name, station, twelvemonth of experience and his/her basic company profile. From this subdivision, the research worker may cognize the position from contractor. The twelvemonth represents their experience of the respondent, so there will be more accurate of the reply given by respondent that have more experiences. While Part B and C is aim to acquire the background of the undertaking that have experienced by the respondent such as types of IBS being adopted ad degree IBS. Furthermore, this subdivision besides aim to cognize about the benefits and restriction of implementing IBS and the chief critical factor that affect for those did non implement IBS in the building undertakings. Below is the inquiry and each inquiry in the questionnaire has its intent and it besides can obtain the aims of the research.

3. 2. 2 Distribute Questionnaire

The study is a one month long research study affecting informations aggregation through questionnaire signifiers that were sent to the selected contractors from Class A to Class F listed under the “ xanthous pages ” and Construction Industry development Board of Malaysia (CIDB) enrollment list which can be obtain from CIDB web page. Contractor Class A and Class B is might involves in widely building undertaking such as high rise edifice and span.

Inside this questionnaire have consists about 11 inquiries which are specifically designed to obtain the utile informations and information from

the respondents. The intent of questionnaires is specifically and good designed is to obtain the decomposable informations and consequences. There are about 200 transcripts of questionnaire had been prepared and need to be sent out to the contractors under list by utilizing station, electronic mail and manus up, posting or mail.

There are about 40 % sets of questionnaire will be posted and 30 % for each of it by subjecting up and mail. Due to the ground of sent 200 transcripts, the writer did non anticipate the all the questionnaire be sent back but at least have 50 transcripts of answer to make analysis. If the sum of satisfaction did non accomplish, so necessitate to direct out more every bit shortly as possible. These respondents are bulk within Klang Valley and Kuala Lumpur country. This study did non concern in the size of house. In the postal questionnaire, there will be supply the envelope with casts for the answer missive of questionnaire, it is to rush up and increase the rate of return of the respondents.

3. 2. 3 Consequences Gathering and Analysing

After the questionnaire that posted out has been collected back, the research worker demand to carefully analysis and tabular array it consequently. Then the research worker will analyse it by utilizing statistical analysis package such as SPSS.

Likert scale/Rating mark

Degree of importance

1Least of import 2Less of import 3Reasonably of import 4Very of import 5Most

of import

Table 3. Rating system for the questionnaire

Relative Index (RI) is used to mensurate the important factors from the positions point of

respondenrs. Relative Index, RI =

3.

3 Decisions

This chapter briefly describes the method and stairss that was used in accomplishing aims of the survey. Statistical consequences from the information analyzing will be discussed and interpreted in order to analyze the success in accomplishing the aims of the survey.

Chapter 4: Datas analysis and consequence treatment

4.

1 Introduction

This chapter analyses all the informations findings and information collected from the study questionnaire distributed. The information findings will be analysed harmonizing to the feedback of respondents around the Klang Valley and Selangor. The information is all about the execution degree of IBS and the ground of why less use of IBS. The analysis will help to accomplish the aims of the survey which have been set as follows: To happen out the execution degree of IBS Determine the barriers for contractor to implement

IBS Measure the positive consequence of utilizing IBS Give factors that would promote contractor to implement IBS

4. 2 Respondents from the study

The questionnaire is designed to accomplish the aims of the survey above.

The respondents of this research consists of assorted place such as Project Architect, Project Manager, Project Director, Quantity Surveyor, Safety, M & A ; E Coordinator and others, those who involve in building industry around the Klang Valley and Selangor. It will be easier for all the respondents to make full up the questionnaire. Therefore, the analysis and determination will more precise and accurate.

Methodology

Questionnaire issued

Questionnaire responses

Measure

%

Measure

%

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Sum**50****100****31****62**

The entire questionnaires distributed to the respondents are 50 (50) through phone calls, mails, electronic mails and by custodies. However, the respond from the respondents merely thirty one (31) which is 60 two per centum (62 %) from the sum distributed. Among the ground why the respondents did non replied the questionnaire are the questionnaire is non received by the right individual or the questionnaire is losing. Due to that state of affairs, the analysis of this research will be based upon the 60 two per centum (62 %) of the respondent feedback.

Table 4. 2 below shows the summarisation on the statistics of the study questionnaire that has been distributed for this research. The experience of respondents involved in building industry was scope from lower limit 1 twelvemonth to the upper limit of 10 old ages, which showin the respondents were either new industry participants or had been involved in this field fro rather a period of clip. From the Figure 4-1, the bulk respondents (23 %) are from the contractor houses follows by developer houses 18 % , QS houses 16 % , technology houses 14 % , architecture houses 11 % , the edifice stuff makers and others are merely 7 % and the building machinery & A ; equipment providers is the lowest which consists of merely 5 % .

The administration background subdivision investigates different classes of building companies, with regard to their sector and figure of employees. This is to place the relationship between the background of the administration and the being status of company. For the intent of this study, the companies were classified merely under three classes to find the size of companies harmonizing to the figure of the employees in the company. The classes are listed as follow: Datas AnalysisPart A- Respondents Information

Position/Profession

Frenquency

Percentage

M & A ; E Coordinator15 %Quantity Surveyor1048 %Contractor00 %Contract Executive629 %Undertaking Manager15 %Site Quantity Surveyor15 %Project Executive15 %Architect15 %Entire21100 %Table 4. 1: Resppondent ' s position/ professionFigure 4. 1: Position/Profession in the edifice industryTable 4. 1 and Figure 4. 1 show that