

DEFECT LIABILITY PERIOD IN THE CONSTRUCTION



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CONTRACT: LESSONS LEARNT FROM AN

INSTITUTION OF HIGHER EDUCATION (IOHE)

BUILDING PROJECT

FAIT BIN HANAPI



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**RESEARCH REPORT SUBMITTED TO THE FACULTY
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Abstract

Construction projects are often given serious attention at early stage, but less emphasize on the Defect Liability Period (DLP). Most parties consider the defect liability period are things that are not important and does not affect the overall performance of the project. Defect liability period (DLP) that has been provided in the contract completely and clearly enough how it is governed. The weakness in the governing DLP will give negative impact on the users of the building and would be detrimental to the government and causes an additional cost to make good the rectification of defective work. This study aims to establish a good management practice to manage defect during defect liability period (DLP). This study consists of three main objective covered about the defect management, problem in managing of defect and the occurrence of defect. The methodology of the study is to conduct semi-structured interviews with the parties involved with the IOHE building project. The analysis found that the knowledge and understanding about the contract related to DLP provision should be emphasized. Through training and learning, the level of understanding about the defect management increase among the project team and also defect management team. Workmanship is the most important element to ensure the building construction quality. The bad workmanship can affect the whole process of building construction is usually difficult to control.



Abstrak

Projek pembinaan sering diberi perhatian serius pada peringkat awal, tetapi kurang diberi penekanan semasa tempoh tanggungan kecacatan (DLP). Kebanyakan pihak menganggap bahawa tempoh tanggungan kecacatan adalah perkara-perkara yang tidak penting dan tidak menjejaskan prestasi keseluruhan projek. Tempoh tanggungan kecacatan (DLP) yang telah diperuntukan dalam kontrak sepenuhnya dan cukup jelas bagaimana ianya ditadbir. Kelemahan dalam pengurusan DLP akan memberi kesan negatif kepada pengguna bangunan dan akan merugikan pihak kerajaan dan menyebabkan kos tambahan untuk memperbaiki kecacatan bangunan IOHE. Kajian ini bertujuan untuk mewujudkan satu amalan pengurusan yang baik untuk menguruskan kecacatan dalam tempoh tanggungan kecacatan (DLP) . Kajian ini terdiri daripada tiga objektif utama meliputi kira-kira pengurusan kecacatan , masalah dalam pengurusan kecacatan dan berlakunya kecacatan. Metodologi kajian ini adalah untuk menjalankan temu bual separa berstruktur dengan pihak-pihak yang terlibat dengan projek bangunan IOHE dan daripada analisis, didapati bahawa pengetahuan dan pemahaman tentang kontrak yang perlu difokuskan terutamanya pada peruntukan tanggungan kecacatan di dalam kontrak. Melalui latihan dan pembelajaran , tahap kefahaman mengenai pengurusan kecacatan dapat dipertingkatkan antara pasukan projek dan juga pengurusan pasukan tanggungan kecacatan. Mutu kerja adalah elemen yang paling penting untuk memastikan kualiti pembinaan bangunan. Mutu kerja yang kurang memuaskan boleh menjejaskan keseluruhan proses pembinaan bangunan biasanya sukar untuk dikawal.

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List of Abbreviations

CPC	Completion Practical Certificate
CIDB	Construction Industry Development Board
DLP	Defect Liability Period
FIDIC	International Federation of Consulting Engineer
H.V.A.C	Heating Ventilation Air Conditioning
IEM	Institute of Engineers Malaysia
ICE	Institution of Civil Engineer
IOHE	Institute of Higher Learning
JCT	Joint Contracts Tribunal
RMK	Rancangan Malaysia
RMK-7	Rancangan Malaysia Ke-7
RMK-8	Rancangan Malaysia Ke-8
RMK-9	Rancangan Malaysia ke-9
PAM	Pertubuhan Akitek Malaysia
P.W.D	Public Works Department
P.D	Project Director
QS	Quantity Surveyor
S.O	Superintending Officer
SON	Statement of Needs
TNB	Tenaga Nasional Berhad



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CHAPTER ONE



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INTRODUCTION

1.1 Background of Study

According to Webster's Dictionary, defect is defined as lack of something necessary for completeness; shortcoming. It is also defined as an imperfection; fault; blemish. Another term for defect is deficiency. Webster's Dictionary defines the word deficiency as a state or quality of being deficient or a shortage; deficit. As for deficient, it is defined as to be wanting, lacking in some quality necessary for completeness; defective and one that is deficient. Defect is the "the nonconformity of a component with a standard of specific characteristic (Robert, 2005).



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Construction defect is a deficiency in the design or construction of a building resulting from a failure to design or construct in a reasonably workmanlike manner and/or in accordance with a buyer reasonable expectation. Construction defect are common phenomena in construction industry, and it gives negative impact on the image of the construction industry. Construction defect is also relatively related with the quality of the material used or the workmanship employed during the construction stage.

Construction defect occurring when the parties involved misconduct him or herself during the construction process or procedure. Thus knowledge and understanding of the nature of defects that have happen is important. With the knowledge and understanding of that defect, effective action can be taken to improve the process. One of the key success

criteria in defect management is a continuous development and improvement. Common types of construction defect are (Ahzahar et al. 2011):

1. Not functioning of electrical system such as wiring, lighting, etc.
2. Not functioning mechanical ventilation, cooling or heating system (HVAC), fire protection system;
3. Inadequate insulation or sound proofing,
4. Structural defect resulting in cracks or collapse

1.2 Statement of The Problem

IOHE buildings in Malaysia to create a suitable, conducive and adequate environment that can encourage, stimulate and support learning system, teaching and innovation and research activities. IOHE building contain unique and complex functions that are used to perform various type of activities. It is in these university building that future leaders, captains of industry, entrepreneurs, professional and scientists are produced (Mat et al., 2009). Therefore, if any uncomfortable or inadequacy with that building and the facilities, the main objective of the IOHE is difficult to achieve. A failure in the supply of the required services is a loss in value to the IOHE, surrounding community, students, academic staff, non-academic staff and other stakeholders. However, as soon a building is completed and issuing the CPC, DLP and maintenance that building begins.

Building end-users are the group of individuals or department, who are interested in adequate functioning of that building. They are affected by the performance of the building and the building is also affected by the activities of its end-user itself. To the extent that the building is capable of allowing the users to perform their functions, then the building can be said to be a source of value creation to the required service of accommodating, learning, teaching and doing research. (Olanrewaju, et al. 2010)

Defect Liability Period (DLP) is a period where the contractor must rectify any defect, shrinkage or other fault as directed by the S.O after a particular works has duly completed. All expenses to rectify the defect shall be borne by the contractor and no additional costs charged to the government or End-user. Table 1.1 shows the DLP provisions that are found under the local standard forms of construction contracts:

Standard Forms Of Construction Contract	The Relevant Clauses
<p>CIDB Standard Form of Contract 2000</p>	<p>“Clause 27.1 Completion of Outstanding Work and Remedying Defects; “</p> <p>“Clause 27.1(a) the Contractor shall, during the defect Liability Period complete with due expedition or within such time as may be specified by the Superintending Officer, any work outstanding at the Date of Practical Completion (whether or not the Contractor has undertaken to do so)”</p> <p>“Clause 27.1(b) the Superintending Officer may at any time during the Defects Liability Period or within 14 Days after its expiration instruct the Contractor to execute all works of reconstruction and remedying of any Defects. The Contractor shall complete all such works with due expedition or within such time as may be specified by the Superintending Officer.”</p> <p>“Clause 27.1(c)The obligation of the Contractor to comply with this Clause 27 shall not in any way prejudice the Employer’s right under the provisions of any guarantees and/or warranties relating to the Works or any section of the Works provided in accordance with the Contract including those provided by sub-contractor and suppliers, whether nominated or otherwise.”</p>
<p>PAM Contract 2006</p>	<p>“Clause 15.4 Any defect in the Works which appear within the Defects Liability Period shall be specified by the Architect in a schedule of defects which he shall deliver to the Contractor not later than fourteen (14) Days after the expiration of the Defects Liability Period. The Contractor shall make good the Defects specified within twenty eight (28) Days after receipt of the schedule of defects (or within such longer period as may be agreed in writing by the Architect) at the Contractor’s cost. If the Contractor fails to attend to the Defects, the Employer may, without prejudice to any other rights and remedies which he may possess under the Contract, employ and pay other Person to rectify the Defects and all costs incurred shall be set-off by the Employer under Clause 30.4. If the Architect with the consent of the Employer, instruct the Contractor to leave the</p>

	<p>Defects in the Works, then an appropriate deduction for such Defects not made good by the Contractor shall be set-off by the Employer under Clause 30.4”</p>
<p>05-4506832 pustaka.ipsi.edu.my Perustakaan Tuanku Bainun PustakaTBainun ptbupsi</p> <p>P.W.D Form 203A (Rev.1/2010)</p>	<p>“Clause 48.0 Defect after Completion”</p> <p>“Clause 48.1 Completion of Outstanding Work and Remedying Defects”</p> <p>“Clause 48.1(a) At any time during the Defect Liability Period as stated in Appendix hereto (or if none stated the period is twelve (12) months from the date of practical completion of the Works), any defects, imperfection, shrinkage or any other fault whatsoever which may appear and which are due to materials or goods or workmanship not in accordance with this Contract, the S.O shall issues written instruction to the Contractor to make good such defects, imperfection, shrinkages or any other fault whatsoever at the Contractor’s own cost. The Contractor shall complete all such works with due expedition or within such time as may be specified by the S.O.”</p> <p>“Clause 48.1(b) Without prejudice to sub-clause (a), any defect, imperfection, shrinkage or any other fault whatsoever which may appear during the Defects Liability Period to be made good by the Contractor, shall be specified by the S.O. in the Schedule of Defects which he shall deliver to the Contractor not later than fourteen (14) days after the expiration of the Defect Liability Period. The defects, imperfections, shrinkages or any other fault whatsoever specified in the Schedule of Defects shall be make good by the Contractor at his own costs and to be completed within a reasonable time but in any case not later than three (3) months after the receipt of the said Schedule. PROVIDE THAT the S.O shall not be allowed to issue any further instruction requiring the Contractor to make good of any defect, imperfection, shrinkage or any other fault whatsoever after the issuance of said Schedule of Defects or after fourteen (14) days from the expiration of the said Defects Liability Period, whichever is the later.”</p>
<p>05-4506832 pustaka.ipsi.edu.my Perustakaan Tuanku Bainun PustakaTBainun ptbupsi</p> <p>P.W.D Form DB (Rev.1/2010)</p>	<p>“Clause 47.0 Defects after Completion”</p> <p>“Clause 47.1 The Contractor shall, during the Defect Liability Period complete with due expedition or within such time as may be specified by the P.D, any work outstanding at the Date of Practical Completion (whether or not the Contractor has undertaken to do so)”</p> <p>“Clause 47.2 The Contractor shall, at any time during the Defect Liability Period as stated in Appendix 1 hereto (or if none stated the period is twenty-four (24) month from the date of practical completion of the Works) make good any</p>



<div>  05-4506832  pustaka.upsi.edu.my </div>	<p>defect, imperfection, shrinkage or any other fault whatsoever which may appear and which are due to design, material, goods, workmanship or equipment not in accordance with this Contract, as specified by the P.D in a written instruction to the Contractor.”</p> <p>“Clause 47.3 Notwithstanding sub-clause 47.1 above, any defect, imperfection, shrinkage or any other fault whatsoever which may appear during the Defects Liability Period to be made good by the Contractor, shall be specified by the P.D in the Schedules of Defects of which the first schedule shall be delivered to the Contractor within fourteen (14) days and the final schedule shall be delivered not later than twenty-eight (28) days after expiration of the Defects Liability Period. The defects, imperfections, shrinkages or any other fault whatsoever specified in the Schedule of Defects shall be made good by the Contractor at his own costs and to be completed within a reasonable time but in any case not later than three (3) months after the receipt of the final schedule. Provide that the P.D shall not be allowed to issues any further instruction requiring the Contractor to make good any defect, imperfection, shrinkage or any other fault whatsoever after the issuance of the said Schedule of Defect or after twenty eight (28) days from the expiration of the said Defects Liability Period, whichever is the later.”</p>
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Table 1.1: DLP Provisions in the Local Standard Forms of Construction Contracts



Table 1.2 show the other provision in standard form of contract related with the defect management during DLP

Standard Forms Of Construction Contract	The Relevant Clauses
<p>CIDB Standard Form of Contract 2000</p>	<p>“Clause 8 Notice”</p> <p>“Sub-clause 8.1 Serving of Notices”</p> <p>a) “Unless otherwise stipulated elsewhere in the Contract, notices to be given under the terms of the Contract shall be in writing and shall be deemed to have been served by either party upon the other if it shall have been sent to the address of such party as set out in the Articles of Agreement.”</p> <p>i) “By hand delivery or courier and an acknowledgement of receipt obtained; or”</p> <p>ii) “By post in which case it shall be deemed to have been served 7 Days after posting”</p> <p>b) “Either party may change the address set out in the Articles of Agreement by giving 14-Day notice to the other party and the Superintending Officer and in the case of the Superintending Officer by giving 14-Day notice to both parties.”</p> <p>“Clause 42 Payment”</p> <p>“Sub-clause 42.7 Final Claim Statement”</p> <p>a) “Within 30 Days of the issues of the Certificates of Making Good Defects (or the Certificate of Making Good Defect in respect of the last section of the Works, in the case of completion in sections), the Contractor shall submit in writing to the Superintending Officer a statement (hereinafter referred to as the “Final Claim Statement”) in such form as the Superintending Officer may prescribe.”</p>
<p>PAM Contract 2006</p>	<p>“Clause 30.0 Certificate and Payment”</p> <p>“Sub-clause 30.14 The Final Certificates shall be issued:”</p> <p>a) “Within twenty one (21) Days after the Period of Honoring Certificates for the payment of Penultimate Certificate; or”</p> <p>b) “Within twenty eight (28) Days after the Certificate of Making Good Defects has been issued, in the event no Penultimate Certificate has been issued.”</p> <p>“Clause 36.0 Notice”</p>

<p>05-4506832</p> <p>pustaka.upsi.edu.my</p> <p>05-4506832</p> <p>pustaka.upsi.edu.my</p>	<p>“Sub-clause 36.1 Any written notice or other document to be given under the Contract shall be given or sent by:”</p> <ul style="list-style-type: none">a) “hand;”b) “ordinary mail or registered post; or”c) “facsimile transmission” <p>“Sub-clause 36.2 Any written notice or other document shall be deemed to have been duly served upon and received by the addressee:”</p> <ul style="list-style-type: none">a) “if delivery by hand, at the time of delivery”b) “if sent by ordinary mail or registered post, after three (3) Days of posting;”c) “If transmitted by way of facsimile transmission, at time of transmission.” <p>“Sub-clause 36.3 In proving the giving of a written notice or any other document under or in respect of the Contract, it shall be sufficient to show:”</p> <ul style="list-style-type: none">a) “in the case of hand delivery, a signed acknowledgement of receipt;”b) “in the case of registered post, a receipt of posting from the Post Office; or”c) “in the case of facsimile transmission, that the facsimile transmission was duly transmitted from the dispatching terminal, as evidenced by a transmission report generated by the transmitting equipment.” <p>“Sub-clause 36.4 All written communication shall be sent to the address stated in the Article of Agreement unless otherwise notified in writing.”</p>
<p>P.W.D Form 203A (Rev.1/2010)</p>	<p>“Clause 31.0 Final Account and Payment Certificate”</p> <p>“Sub-clause 31.1 As soon as is practicable but not later than three (3) months after the issuance of the Certificate of Practical Completion, the Contractor shall submit full particular complete with the receipts, vouchers records that would substantiate the Contractor’s claim under clause 44 together with any document, supporting vouchers and any explanation and calculations including documents relating to the accounts of Nominated Sub-Contractors or Nominated Suppliers, which may be necessary to enable the Final Account to be prepared by the S.O PROVIDE ALWAYS the contractor had given the notice of claim in writing within the stipulated time or times in the said provisions.”</p> <p>“Sub-clause 31.2 if the Contractor fails to submit full particulars of all claim within the stipulated period, the S.O. shall forthwith make the assessment based on the available documents submitted by the Contractor for the purpose of the Final Account. The Government shall be</p>

discharged from all liabilities in connection with the claims.”

“Sub-clause 31.3 Within three (3) months after the expiry of the Defect Liability Period for the whole of the Works or three (3) months after the issues of the Certificate of Completion of Making Good Defects under clause 48 hereof, whichever is the later, the S.O. shall issues the Final Certificate.”

“Clause 49.0 Unfulfilled Obligations”

“Notwithstanding the issue of the Certificate of Completion of Making Goods Defects under clause 48.4 hereof the Contractor and the Government shall remain liable for the fulfilment of any obligation incurred under the provisions of the Contract, prior to the issues of the said certificate, which remains unfulfilled at the time such certificates is issued, and for the purpose of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the Parties hereto.”

“Clause 67.0 Notice, ETC.”

“Sub-clause 67.1 Any notice, approval, consent, request or other communication required or permitted to be given or made under this Contract shall be in writing in Bahasa Malaysia or English Language.”

“Sub-clause 67.2 Such notice shall be effected by:”

- i) “Hand delivery or courier and an acknowledgement of receipt obtained;”
- ii) “Leaving the notice at the registered office or site office of the Contractor in which case it shall be deemed to have been duly delivered; or”
- iii) “Registered post in which case be deemed to have been received seven (7) days after the date of posting”

“Sub-clause 67.3 The address of the Government and the Contractor is as shown below or such other address as either party may have notified the sender”









“to The Government:”

“Address:”

“To The Contractor”

“Address:”

“Sub-clause 67.4 It shall be the duty of the parties to notify the other if there is a change of address or entity by giving a written notice within fourteen (14) days. In the event of the Contractor failing to notify the S.O. of such

 05-4506832  pustaka.upsi.edu.my  PustakaTBainun  ptbupsi	<p>an address or any change in his address, such written notices and instruction shall be deemed to have been served upon the Contractor if they are sent in the manner stated above to the address stated in this Contract or to the Contractor's site office."</p> <p>"Clause 81.0 Time"</p> <p>"Time whenever mentioned shall be of the essence of this Agreement."</p>
<p>P.W.D Form DB (Rev.1/2010)</p>  05-4506832  pustaka.upsi.edu.my  PustakaTBainun  ptbupsi	<p>"Clause 48.0 Unfulfilled Obligations"</p> <p>"Notwithstanding the issues of the Certificate of Completion of making Good Defect under clause 47.6, the Contractor and the Government shall remain liable for the fulfillment of any obligation arising under the provisions of the Contract, prior to the issuance of the said certificate, which remain unfulfilled at the time such certificate is issued. For the purpose of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the Parties."</p> <p>"Clause 54.0 Final Account and Final Certificate"</p> <p>"Sub-clause 54.1 Within three (3) months after issuance of the Certificate of Completion of Making Good Defects or the Certificate of Completion of Maintenance (if any) whichever is the later, the Contractor shall submit to the P.D a statement of the final account showing in detail the value in accordance with the Contract, of the Works carried out together with all further sums which the Contractor consider to be due to him after giving credit to the Government for all amounts previously paid by the Government and for all sums to which the Government is entitled under the Contract up to the date of the Certificate of Completion of Making Good Defects or the Certificate of Completion of Maintenance, as the case may be. The Final Account shall be supported by all documentation substantiating the values of the same."</p> <p>"Clause 77.0 Notice"</p> <p>"Sub-clause 77.1 Any notice, approval, consent, request or other communication required or permitted to be given or made under this Contract shall be in writing in Bahasa Malaysia or English Language."</p> <p>"Sub-clause 77.2 Such notice shall be effected by:"</p> <p>"Hand delivery or courier and an acknowledgement of receipt obtained;"</p> <p>"Leaving the notice at the registered office or site office of the Contractor in which case it shall be deemed to have been duly delivered; or"</p>



 05-4506832  pustaka.upsi.edu.my	<p>“Registered post in which case be deemed to have been received seven (7) days after the date of posting”</p> <p>“Sub-clause 77.3 The address of the Government and the Contractor is as shown below or such other address as either party may have notified the sender”</p> <p>“to The Government.”</p> <p>“Address:”</p> <p>“To The Contractor”</p> <p>“Address:”</p> <p>“Sub-clause 77.4 it shall be the duty of the parties to notify the other if there is a chance of address or entity by giving a written notice within fourteen (14) days. In the event of the Contractor failing to notify the P.D of such an address or any change in his address, such written notices and instruction shall be deemed to have been served upon the Contractor if they are sent in the manner stated above.”</p> <p>“Clause 78.0 Time”</p> <p>“Time whenever mentioned shall be of the essence of this contract”</p>
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Table 1.2: Other Provision in Standard Form of Contract

It is a duty as a Contractor to rectify the defect that appear during DLP period. So that, the obligation of Contractor to make rectification of defect within a reasonable period during DLP. In order to manage the defect systematically, the Contractor is advisable to implement proper management system during DLP to avoid potential extra cost or dispute matter in fulfilling contractual obligation to rectify all the defects. Lack of knowledge and understanding of construction contract and defect may lead to dispute in the contract. It is simply because the parties could not meet their contractual expectations (Harmon, 2003).



1.3 Aim and Objective of Study

This study aims to establish a good management practice to manage defect appears during DLP.

The objectives set to attain the aim of the study are:

- (a) to study the management of defect during DLP;
- (b) to identify the problem in managing defect;
- (c) to examine the occurrence of defect during and after the defect liability period.

1.4 Research Questions

How to establish a good management practice during defect liability period (DLP)?

In this study, we have focusing two sub-questions which need to be specified:

- (a) Do the person who in charge of defect has a knowledge and understanding on the DLP provision in the contract?
- (b) What are the problem faces by all parties during DLP?

1.5 Scope of Study

Understanding or knowledge about the DLP in the contract is very important to the person who in-charge of the building operation or managing the post-construction works. Lack of knowledge about the DLP provisions contribute to mismanagement of the defective works and may cause additional cost to Contractor or End-user. This study focuses on the management of defect during DLP and investigates how best defects can be managed.

1.6 Significance of Study

Construction defect is common phenomena in construction industry, and it gives negative impact on the image of the construction industry. Construction defect is also relatively

related with the quality of the material used or the workmanship employed during the construction stage. Expenditure to rectify defect works in Malaysia it involved a big amount of money and unabated. The fact in Malaysia, in 2001, 238 maintenance contracts were awarded whereas this figure increased to 272 in 2002 (CIDB Malaysia, 2003). This figure an increase of 14.3 per cent in the number of maintenance contracts awarded. In term financial value, expenditure on maintenance amounted to about RM2 billion in 2 years (CIDB Malaysia, 2003).

1.7 Structure of Thesis

This thesis report are divided into six (6) chapter whereby CHAPTER 1 (one) starts with an introduction about the research objective and as well addresses the research question and the scope and the significance of study. The next CHAPTER 2 (two) collects information in form of a literature review in which part one informs about the findings regarding understanding and knowledge about the DLP provision in the contract and also to investigate how best defects can be managed and the lesson learned from that defects. The finding from this chapter will serve as basis to construct a theoretical framework. CHAPTER 3 (three) describes the chosen methodology and the strategy applied and informs how the data is collected. In CHAPTER 4 (four) the results of the conducted surveys, observation and interviews will be shown and a more detailed discussion of the findings is shown in CHAPTER 5 (five). The last CHAPTER 6 (six) provides the summary of the research with an overall conclusion for the research topic.

CHAPTER TWO



LITERATURE REVIEW

2.1 Introduction

This chapter provides a theoretical framework in terms how to establish a good management practice during defect liability period (DLP). After a careful review, the literature has been segmented into several categories such as the understanding of the DLP provision in the contract, how the management translate the DLP provision into the procedural management. The next categories is to know and understand the nature of the defects and the manifestation of defects occurring in IOHE building. Others categories is to discuss the problem occurrence during and after DLP.



Defect can be described among others as a deficiency, default and damage deterioration. According Watt (1999) defect are defined as a failing or disruption in the performance, functioning of the requirement of a building operation. Watt (1999) also said, a defect can manifest itself within the structure, services and other facilities of the defective building. Thus, a defect is an inadequate or undesirable condition in the IOHE building that affect the performance of building services, appearance of the building, uncomfortable condition to the end-user or the building owner.

Defect can be detected or identified by the building owner through the physical inspection of that building facilities. The technical person have a expertise and capability to identify the defect that are not yet obvious. According Watt (1999), the defect is usually undertake through a sequence of procedure that provide the necessary information on which to make

an assessment as to the condition and fitness for the purposes for which the facility is acquired



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According Watt (1999), defect is a deficiency, damage, default, deterioration and decay are often used to describe defects. Defect is defined as a failing or shortcoming in the function, performance, statutory or user requirement of a building in the building operation. As a general, construction defect can be described as a deficiency during the design stage or the construction stage resulting the financial issues to the contractor and government. Construction defects can be categorized in two types, latent defect and patent defect. Latent defect are usually unseen defect and often are not obvious and readily observed upon reasonable inspection. Sometimes latent defect are still unnoticed, unknown and undiscoverable even the on-site inspection are done comprehensively. Latent defect mostly appear after the several period time. Example of latent defect are:



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- (a) Soil problem, not properly compacted,
- (b) Footing, wall and slab problem, improperly of reinforcing in structural concrete,
- (c) Weather proofing system problem, wrong procedure or method during installation,
- (d) Concrete structure problem, reinforcement not fully embedded,
- (e) Brick veneer wall problem, lack of brick ties and reinforcement.
- (f) Building envelope assembly problem; improperly install flashing.

Patent defects are those defects that are known or would be readily obvious upon reasonable inspection. Examples of patent defect are;



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- (a) Expansion joint missing or broken,
- (b) Building envelope cracking or distress sign happen,
- (c) Weep holes not installed in brick veneer walls.
- (d) Roof drainage and roof slope crack,

- (e) Handrails in stairways broken,
- (f) Roof and ventilation crack.



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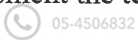
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2.2 Management of Defect During DLP

Construction industry is the process from the initial planning to the end of the project within time limitation and budget constraint. It touches the whole element of legal disciplines ranging from the contractual, commercial, civil etc. A construction contract is a contract under the two or more parties agreed to carry out work such a design, fabrication, erection, alteration, repair or demolition of the structure. It covers a whole range of contract, from a simple oral agreement to repair a house to a mega construction contracts. For the project related with building, the term are usually used for the contract is a building contract while the project related with the infrastructure, installation of equipment the term called engineering contract. The differential of these term is no legal significance and indeed construction contract as a class a regarded by Malaysian law, not as a separate category of contracts but a part of the general law of contract.



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There are four institutions and organization in Malaysia has been issued and published their standard forms for the construction contract:

- a) The Institution of Engineers, Malaysia (IEM)
- b) Pertubuhan Arkitek Malaysia (PAM)
- c) Construction Industry Development Board (CIDB)
- d) Public Works Department (PWD)

IEM has been issued three type standard form of construction contract:



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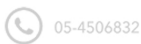
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- a) IEM Conditions of Contract (Civil Works)
- b) IEM Standard Condition (Sub-Contract for Civil Works)

c) IEM Condition of Contract (M&E Works)

IEM standards form essentially follow the corresponding FIDIC standard form except the IEM Condition of Contract for M&E Works. The IEM Condition of Contract mostly practices in private sector engineer works in Malaysia. PAM standards form is PAM 2006 Form has been published in two version, with quantities and without quantities. PAM 2006 as new version of the standards form which is essentially for most practical purposes. CIDB also has issued two standard form, CIDB Standard Form of Contract for Building Works 2000 and CIDB Standard Form of Sub-Contractor for Nominated Sub-Contractor. PWD has produced their own standard form for use in public work project, both for building works and civil engineering works. PWD standard form also are used for the private sector project.

Defect Liability Period (DLP) Provision in Contract



Defect liability period is a period stated in the construction contract document agreement.

During this period, the occurrence of defects shall be called upon to return to the site to rectify the defect as necessary. In order to attain conformity with the contract, the usual measure of damages for defective work is the cost of rectifying the defect. (C. Holmes et al, 2010). Defect liability period clause sets out the duration of the defects liability period and also the situations under which the defects liability period may be prolonged. Sub-clause 27.1 of Construction Industry Development Board (CIDB 2000) form and clause 15.4 of Pertubuhan Akitek Malaysia (PAM 2006) form allow the superintending officer or architect to ascertain in the schedule of defects, shrinkage, imperfection or any other fault showing during the defect liability period which occurred due to workmanship and materials not in accordance with the contract. Clause 35.1 of Public Works Departments (PWD 203A) 2007 and clause 6.1 of PAM (2006) require the workmanship of the contractor and materials to be of specified qualities, kinds and standard of workmanship