INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume6, Issue1)
Available online at: www.ijariit.com

Causes of defects in building costruction projects and its recommended remedial measures: A case study in Tepi Town, Southern Ethiopia

Wondimagegn Tadesse Borku
wondetade@gmail.com
Mizan-Tepi University, Tertiary institution in Tepi, Ethiopia

ABSTRACT

Building defect is one of the major components of building problems that significantly needed attention. Minor defects can develop into serious ones, causing failure or sudden collapse, endangering lives and becoming more costly to rectify. As the researcher observed, most defects presented on the Tepi town buildings, due to absence of a serious follow-up and maintenance are: cracking, peeling of paint, defects on plastered structures, defects of roof, defects of rainwater goods (downpipes, gutters, and eaves), defects of stair, dampness penetration and vegetable growth on building.

Based on the questioners and interview results the most dominant causes of defects in Tepi town is poor quality of materials with the highest mean rank value 4.21 and also other causes are poor workmanship with mean score value 4.05, inadequate supervision 3.73, poor maintenance during defects occurred 3.70, poor construction practices 3.72, Mix design problems 3.66, poor management system 3.68 and dampness problems 3.61

The methodologies would be applied to achieve the objective of the research, data had been taken literature survey, problem identification by field surveying, design of data collection methods observation, interview & questioner), organized data, data-analyzed and the conclusion drawn from the result of data analysis. The researcher concluded that defective in building construction is mostly a result of poor quality of materials, poor workmanship, inadequate supervision, poor maintenance, poor construction practices, and poor management system and most of it can be attributed to poor building materials and poor workmanship. The rate of defective construction can be minimized by the use of quality building materials, competent workmen, proper management system and adequate supervision.

Keywords— *Defects of building construction, Cause of defects in building construction, Remedial*

1. INTRODUCTION

The construction industry in Ethiopia has many problems and complex issues related to defects in building construction. Defects in construction are problems which occur in the construction of a building and can happen during and after the building finished. Construction defects usually include any deficiency in the performing or furnishing of the design, planning, supervision, inspection, construction or observation of construction to any new home or building. Building defect occurs to either the new building or the old ones. Defects and deterioration are common problems in any built structures [1-5].

Construction defects are deficiency arising out of, the design, specifications, surveying, planning, supervision, observation of construction, or construction repair, alteration, or re-modelling of real property" caused by failure to meet workmanship standards, inadequate design, violation of building codes, and defective materials [6-7].

A defect is a physical problem that causes something to be less valuable, effective, healthy, and something that causes weakness. Defects create hazards, leading to series or fatal injuries. Most defects can at their early stages, be discovered through visible or detectable symptoms. If not promptly rectified, minor defects can develop into serious ones, causing failure or sudden collapse, endangering lives and becoming more costly to rectify [8-9].

Building defect is one of the major components of a building that needed attention. When a building fails to perform as it should, we immediately look for answers. Is the problem is the result of someone's failure to assemble it properly? Is the problem an act of nature? Was the proper maintenance of the building not performed as it should have been? The answers often depend upon a number of factors: the age of the affected building component, the exact nature of the problem, the presence or absence of human error, or some combination of all three [8].

Building defects would result from Defective building material or components-materials: i.e., inferior material such as most buildings use building materials which are easily available locally, Such Building materials include timber, stone, cement, roofing material, brick and plaster. In the materials management of buildings, understanding the nature of the building materials and accurate diagnosis of defects is most important. This is because buildings are, like older people, vulnerable to all sorts of diseases. Therefore, in order to tackle the diseases, architects, contractors, engineers and those involved in building management should be familiar with the building materials in common use and have deeper understanding into the proper techniques of preservation of the materials and structures, A violation of Building Codes at the time of construction, Failure to meet professional standards for design at the time plans were approved Design: i.e., faulty roofing design contributes to water intrusion[9-11].

Defects are more common in an old structure and as in BS 3811 (Code of Practice, British Standard 1984) defects are defined as the deterioration of building features and services to unsatisfactory quality levels of the requirement of the users. Defects in construction project could also be seen as in compliance or lack of conformity with contract agreement which includes; working drawing, specification, quality of workmanship, and any other condition not expressly stated such as "durability, aesthetic, performance or design". The problem of defective construction witnessed in the construction sector was tackled by the introduction of Quality Assurance techniques which was initiated by other industries, however, the technique is still being improved on to be suitable in the construction companies. Defects in the building can, therefore, arise from either or a combination of the occurrence of the following situation; error in design by the Architect, mistakes (imperfection) from the manufacturer, defects in materials, poor workmanship and poor management [11-17].

1.1 OBJECTIVES OF THE STUDY

Objectives of the study are:

To determine the causes of defects which affects the quality of building projects in tepi town and to suggest its remedial measures in building construction in Tepi town.

2. RESEARCH METHODOLOGY

2.1 STRUCTURE OF QUESTIONNAIRE

The questions were constructed using the Likert scale and questionnaires distributed to contractor, consultant, site engineers, urban engineer, site supervisor and foreman. The respondents were asked to rank on a scale of 1-5 factors that cause defects in building construction in Tepi town. Causes of defects on construction sites where, 5 = Very high causes, 4 = high causes, 3= moderate causes, 2 = low causes, 1= not causes at all.

2.2 RESEARCH VARIABLES

The aim of this study was the current situation with regarded to identify the main causes of defects in building projects in Tepi and to come up with a solution for the problems. Dependent variable: Causes of defects in building projects and Independent variables, Poor quality of materials, Poor management system, Inadequate site supervision, Poor construction practices, Dampness problems, Mix Design problems, Poor workmanship and Poor maintenance

3. RESULTS AND DISCUSSIONS

3.1 RANKS OF BUILDING DEFECTS

There were ten (10) major types of defects observed in the study area of Tepi building project. Relative to this, the researcher had organized the possible defect types based on existing and on-going building projects and had been ranked accordingly.

Table1: Different types of defects in Tepi buildings

Observed different types of Defects in Tepi	Number occurrence of defects in different buildings	Percentages of defects
Defects on plastered structure	30	24
Honeycomb	7	5
Roof defects	3	2
Peeling of paint	10	8
Dampness penetration	4	3
stair defects	6	5
Vegetable growth on buildings	10	8
Cracking	40	32
door and window defects	9	7
Defects of Rainwater Goods	7	6
Total observed defects in different buildings	126	100

As table 1, indicated that the most common types of building defects and failures occurred is cracking in with the highest percentage of 32%, defects on plastered structures was 24%, vegetable growth and peeling of paint 8%, door and window defects 7%, defects on rainwater goods 6%, stair defects 5%, dampens penetration 3% and Roof defects 2%.

3.2 RANK OF CAUSES OF DEFECTS BASED ON MEANS SCORE METHOD

Table 2: Rank of causes of defects

Factors	Mean score value	Rank
Poor quality of Construction Materials	4.21	1
Poor Workmanship	4.05	2
Lack of site supervision	3.73	3
Poor Construction practices	3.72	4
Poor maintenance	3.70	5
Poor project management	3.68	6
Mix Design problems	3.66	7
Dampness problem	3.61	8

From the result shown in Table 2, the most common causes of building defects or contributing factors to building defects and failures, the highest-rated factor was construction materials with the highest value 4.21 and others are explained in above table.

3.3 RESEARCHER RECOMMENDED REMEDIAL MEASURES

Based on researcher observation, there were so many defects in building projects of Tepi town and Mizan Tepi University, for these defects the concerned parties take their own amount. These parties are Contractors, owner/client, consultants, supervisors, and others) from these parties tepi town as owner/client should play a role the minimize and reduce such kind of defects by;- Approving poor workmanship, Approving the quality of the materials, Sufficient follow up during construction period, By using properly finished building, During acceptance of the building check each activates done according to design and specification, Set a good maintenance program for occurred defects, Supervisor must be checking the quality of materials, Adequate control on various steps of concrete production such as batching, mixing, transporting, placing, finishing and curing, Proper construction management and quality control measures are required during execution of projects, Strict supervision of building projects must be provided, Proper management system starting up to the end of the project, Proper management of the materials in the store like cement, By taking measurement on the contractor who does not do according to their agreement and By proper communication with stakeholders.

4. CONCLUSION

Based on the findings, the researcher identified the defects depending on observation or field survey, interview and questioner. The Most of the defects found on the study buildings are Cracking, peeling of paint, defects on plastered structure, and defects of the roof, defects of rainwater goods (downpipes, gutters, and eaves), defects of stair, dampness penetration and vegetation's growth on buildings.

Based on this researcher conclude that the causes of defect depend on, field observation result, questioners and interview results the most dominant causes of defects in tepi town is poor quality of materials with the highest mean rank value 4.21 and also other causes are poor workmanship with mean score value 4.05, inadequate supervision 3.73, poor maintenance during defects occurred 3.70, poor construction practices 3.72, Mix design problems 3.66, poor management system 3.68 and dampness problems 3.61.

5 REFERENCES

[1] Chitkara, 2004 "Construction Project Management", Institute construction project management, Gurgaon, Haryana, India.
[2] Consequences of construction defects: (JOSEPH M. JUNFOLA, CPCU, 2013.).
[3] Construction defect (J. Norman Stark, Attorney-At-Law).
[4] Construction material laboratory manual, Addis Ababa University, Abebe Dinku, June 2002. and Jimma university civil engineering construction material manual.
[5] David Hall (1997). Building defect: umpire.ump.edu.my/1269/1/CD4379PDF Formoso, C. et al. (2002). Hand out of Construction Material.
[6] Fowler, D. Cause and cures of cracking in concrete. Paper presented at Foundation Performance Association.2008.
[7] Juran, J. M., ed. (1988). *Juran's quality control handbook*, 4th Ed., McGraw-Hill, New York
[8] Md Kasim N.D. (2009) Building Defect: Case Study at Taman Seri Indah, Permatang
[9] Micheal S. Poles (2013) Construction Defect.
[10] Nur Diyana Binti MD.Kasim, *Building Defect: Case Study at Taman Seri Indah, Pulau Pinang*, Malaysia Pahang University
[11] Porteous, (1992) Improving Maintenance and Reducing Building Defect through ISO 9000, Journal of Quality in Maintenance Engineering, Vol. 7, pp. 6–24.
[12] Richardson, B.A. (2001) Defect and Deterioration in Building.
[13] Tan Wei Cheun, (2008) Building defects on School Building.
[14] Abdul Harman et al.[14] (2006).causes of defects in building construction.
[15] (Joseph M. Junfola, Cpcu, 2013) construction defects.
[16] Burcu Akinci, Frank Boukamp, *Towards automated defect detection: Object-oriented Modeling of Construction Specifications*, Carnegie Mellon University, Pittsburgh, PA 15213, USA Er. R. B. Chapalkar, *My Construction Practice.*
[17] Nima, A.N. (2001).Causes of defects in building construction Malaysian Construction Industry, Faculty of Engineering, UPM, PhD. Thesis.

