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EXPLORING DELAY FACTORS ON ROAD CONSTRUCTION

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Abstract- All contractors are started the job to complete the construction project on the signing contract with owners. But time delay is the main problem in construction project almost over all in this industry. The construction process is affected by different unexpected factors for instance lack of resources availability, external factors, parties' proficiency and the type of project. This study is based on reviewing literatures' mainly on developing countries within similar economic backgrounds. The main purpose of this project is to find out the delay factors from different literature reviews during ongoing road construction phase and to prepare time overrun control measurement control in the project. The most identified delay factors which are commonly found in most of the reviewed literatures are shortage of funds for financing the project, row material issue, poor coordination, external factor, labour factor, not supervise on time and changes in drawing. The output of this project is to prepare the measurements to overcome delay in the project during all construction phases.
Keywords- Delay Factors, Causes of delay

1. INTRODUCTION

Many literatures' are written all over the world regarding to identify the delay factor of the construction project. In addition to this they are also studied the reason of the delay and to prepare the solution mechanisms to minimize/avoid the reason of delay during the construction process by using some schedule analysis tools. In this literature review delay factors are identifying by different researchers within their reasons. According to (S. Binil Sundar, J. Renuga (April 2016), the main objective of construction management is planning and control of resources within the gien contract agreement on the project. They are also used the resources wisely during the construction activities. In construction work all type of work in office is the first part and the site work is the second work. In the first work that in construction phases included planning work, in designing estimating work, negotiating work, purchasing work, scheduling work, controlling work, accounting and etc. before the site work started the office work should be complete or done. In this study during preconstruction works some delay are happen from the beginning idea of the work to the signing of contract agreement among the owner and contractor. In construction project by its nature project schedules are dynamic and often uncertain. The scheduling work categorised in four phases those are Planning, Scheduling, Monitoring and Controlling. Most of the time schedules can be done in weekly basis. According to the author the significant challenges for owners and contractors can be caused. The scheduling is updated by using the Daily Progress report & Daily Activity reports and the baseline schedule is compared with the ongoing schedule and the results are found. (Braimah, 2013) also studied that beside of all the stakeholders the benefit of the construction project is affected by the duration of contract performance. The owners can be lost the benefits while the contractor do not able to completion on the given date, this can lead to extra costs. Most of the time the contractor is excused the composition for any delay occurs. He also explains delay means when the project is generally behind the planned schedule. Therefore, detailed schedule analysis work is very important to find the causes factors of the time and cost overrun. The purpose of the project is to find out the delay factor, to rank, the level of delay, to find the tools to analysis in the construction building.

2. LITERATURE REVIEW

According to (Rauzana, 2016) In this literature stated for every construction work it needs its own implementation, the project includes how to begin, how to solve and how to provide the resource. In this study the following methodologies are used to identify and analysis the problem: Data Collection is from 20 respondents contractors, Design of Questionnaire, Research Data Processing after all data is obtained through questionnaires, according to the survey The material factors, Labor factor (manpower), Equipment factors, Financial factors, Environmental factors and Factors of change are the main delay found in this study. According to (Amare, Quezon and Busier, 2017) methodology was used the Study Design, Research Population and Sample Size and Data Processing and Analysis methodologies to identify and analysis. In this research from sixty five (65) causes of delay fifty-one (51) valid questionnaires are received back from Contractors, Consultants, and Employer (AACRA). The results shows, the contractors have the highest percentage of responsibility area that causes the delay of about 40%, and then Employer 26.15%, consultant 23.08% taking the rank respectively.(Syuki and Ombui, 2018) describes the purpose of the project was PMIS (project management software, access to project reports, Influence of documentation management and complexity of the system. The four independent variables (the system, quality report, the documentation and complexity) were found to have a good and encouraged much with the project performance.

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According to (Ar. Meena. V and Ar. K. Suresh Babu, 2015) to find the delay cause of delay questionnaire survey are used, where as to analysis the delay factors CPM and PERT are used. The following delay factors are ranked on their level of causes external factor is consider in the top, then financial difficulties are on the second level, the third is shortage of man power, insufficient performance of man power is levelled on the fourth, then next is owner interference and then improper planning. Contractors are shows high contribution when we compared to the client and to consultant and others. According to (Aziz and Abdel-Hakam, 2016) construction delay can be categorised according to its type, country, period and numbers of delay causes and groups. In this study the researcher find out 293 delay factors by using questionnaire and by using personal interviews to whom my concern. And to rank the delay cause Relative Importance Index (RII) are used. The identified delay factors are equipment unavailability, designer's error, variation in the prices or ability or quality, non- adherence to contract condition. According to (Ram and Paul, 2015) delay can form the worst effect to despite among owners and contractors, cost wastage like increase cost due to delay, loss of benefits and productivities and contract agreement can be terminate. (RII) Relative Importance Index, literature review and questioner survey are use to provide, collect and analysis the study. As the author finding from his analysis the following delays are ranked; land acquisition in the first level, in second environmental issues is levelled, payment issue third level, problems during planning and scheduling fourth level, in fifth level also insufficient site management and poor supervision. (Braimah, 2013) study for the contracting stockholders that are incredibly helpful in order to analysis the project delay and to give the actual solution on the suitable time and cost of completing claims. various delay analysis methods are used to indicate the cause of delay this are as-planned compared with as-build, impacted as-planned, collapsed compared as-built, as-planned compared as for, and window analysis etc. After using the indicated and comparing mechanism three main delay factors are found Excusable No excusable– No compensable, Non-compensable and Excusable Compensable. (Ikediashi et al., 2014) also study 67 respondents are collected from the city of Jeddah, by online questionnaire survey. In addition to this, literature review, questionnaire, Demographic Survey and from LinkedIn registered online professional members of the Association of Project Managers in Saudi Arabia (APMSA) on internet 678 Email were collected. this study identifies top ten construction delay factors; lack sufficient risk management, improper of budget use, lack of good communication management among parties, backward from the given schedule, incorrect estimation, improper cash flow, lack of computability of the design, unstable managing system , poor project structure and lack of teamwork among the parties. According to (Mohamed Babikir, 2015) in Sudan delay can be occurred due to the geographical platform, political issue, social issue and financial circumstances of the country. The researcher also used different methodologies such as collecting the literatures, Literature review, providing questionnaire, questionnaire survey and data analysis. This study identifies top ranked causes of delay were; cost variation of construction materials, insufficient supply materials, poor calculation of time estimation, and mistakes during construction. According to (Anil Upadhyay, Vaishant Gupta, 2016) the construction delay is defined when the construction project is completed lately as compared to the actual schedule. In this study the researchers are used to the methodologies' to identify and analysis the delay factors questionnaire survey, relative importance index (RII). Regarding to the value of RII the top ten most significant factors of affecting schedule are improper planning and scheduling, shortage of construction knowledge by the owners, materials not deliver on time, unavailable of workers, shortage of skilled man in design, lack of experienced contractors, unstable in subcontractors hiring and not getting service on time. According to (Tadewos and Patel, 2018) the main objective of this paper is to assess the mechanism they used and to extract the delay causes that makes late for compilation the road project in constraints of time and cost in Addis Ababa. In this study literature review are used to find out the problems. Shortage of finance, bad planning, land compensation, delay during construction activities, unstable design, insufficient material and shortage of equipment are the main delay factors. Identifying the problem is helping to find out the solution to complete the project on time and to estimated cost. (Hamzah et al., 2012) studied on the purpose of the paper is to find out the delay factors by establishing the previous research's in Malaysia. Two methodologies are used to identify and causes of delay, pilot survey are used to examine the delay cause and Rasch analysis software are used. The known delay factors in these projects are as follows poor effectiveness of labour, during material delivering to site, inflation price, and poor quality and insufficient of equipment, financial problems by owner and contractor, lack of ability by contractors, unable to mange in site work and plan problem and mistakes occurs in work. This result is helped to the next studies in higher institution of the country. A(Masood et al., 2015) In this study delay factors can be identified and analysis using Sampling, Survey Instrument-Questionnaire, data collection and Data Analysis using statistical tool. Top ten delay causes are as follows payment problem, bad weather, shortage of quality machines, problem during planning and scheduling, mistakes during construction, delay by the cause of subcontractors, bad site circumstance, bad relationship among stakeholders, delay in approval of design and unclear design. Some of the negative effects of the project are in terms of time overrun, cost overrun; settle a dispute, loss of benefits of parties. According to (Chen et al., 2019), construction delay is known that a common project and get a big attention from the sector and academia. This researcher used a literature, structured interviews carried out with 15 who are active for long time in construction sector. From this literature review top ten delay factors are inexactness, mistakes in design, bad communication among the parties, finance problem by clients, disagreement among the stakeholders, delay by improper payment, insufficient labour result, lack of experience of the contractor, lack of experience of the design team and bad site management. (Almohammad and Jamaludin, 2018) described that construction projects contribute to economy growth significantly in any country. However, these projects are faced by delays frequently, especially for roads. In this study literatures review are used to identify and analysis the road construction delay causes. According to different literatures the

top delay causes are as follows; week financial control of the work, delay in honouring payment certificates by contractor, owner financial problems, delay in payment to contractor by owner, land acquisition, rain effect of construction activities, terrain conditions, political situation and shortage of fuel. (Tesfa, 2016) describes in Ethiopia most of road construction project are caused time and cost overrun or both. In this paper questionnaire survey was used to distribute and gather the data's. The main causes of time overrun were found to be slow site clearance, improper financial flow, money inflation, payment problem by the owner and poor cost estimation. (Abbas M. Abd 2008) studied that at this time to complete a project with list contract agreement is very difficult, but by doing several activities from the beginning to completion of the project it can be achieved. In this paper the researcher used literature review, project investigation and prepared questioners and interview with designers', consultant and staff. According to this literature the main cause of project delay and their rate is finance issue 22 %, building raw materials issue 18.4 % and project management related 14.7 factors and shows that 55.1% from the total delay. According to (Worku, 2011) the researcher investigates the trends, merchandise/goods of achievements and influence of the road network on economic growth in Ethiopia. To extract this information descriptive and econometric analyses are used. From this analysis it shows that an encouraging growing in stock of road network. The government budgeted has increase by tenfold when we compare to the last decades. Time series data extending, augmented cob-Douglas production and two-step efficient GMM estimator are used to determine the econometric analysis, to investigate the impact of roads and to estimate respectively. According to (AHBAB, DANESHVAR and CELIK, 2018) for successful working and effective project management controlling cost and time overrun of a project are very essential. In this study, large road projects that had poor cost and time management were selected. In this study Data Envelopment Analysis (DEA), data aggregation, selection, and preparation are used to identify and analysis the data's. According to result the following delay factors are identified long period of bidding to announce award, Delay during mobilization, bad weather (cold, heat, snow, rain, cyclone), Poor procurement procedure, Design changes, Poor performance of contractor and etc. (Official et al., 2018) this study is organized by collected data from 90 completed or ongoing projects in Ethiopia implemented from 2003 to 2014. In addition to this data are collected by interviewed from stockholders including local and international contractors, consultants and senior managers. The project was about 30% got cost overrun, the main reasons are price different due to rising road construction, differentiate due to increase in number of work, claims due to delay in row clearance, shortage of cement and fuel and shortage of key professional. (On et al., 2008) To identify the obstacles questionnaire based studies and case studies are used. The main delay factors are identified like challenges in winning the tenders, improper in planning, design, and construction, shortage of obtaining essential resources like materials, not obtained equipment and skilled personnel as the project demand - and fluctuating prices, improper estimating and financial planning.

3. IDENTIFIED RESULTS

Table -1 delay factors and the methodologies that are found from literature

No	Authors name and year	Delay factors	Methodologies
1	(Abbas M. Abd 2008)	Project management related, finance issue and building raw materials issue	literature review, project investigation and prepared questioners and interview with designers' ,consultant and staff.
2	(On et al., 2008)	winning the tenders, improper in planning, design, and construction, shortage of getting vital resources like materials, equipment and skilled personnel - and their high and fluctuating prices, poor estimating and financial planning	questionnaire based studies and case studies
3	(Hamzah et al., 2012)	Labour Productivity, Delivering materials on site, Increased material price, Insufficient equipment, Financial difficulties faced by contractor, Financial difficulties faced by owner, Inadequate contractor experience, Poor site management, Improper planning and Construction mistakes and defective work	pilot survey and Rasch Analysis software
4	(Braimah, 2013)	Nonexcusable–Noncompensable, Excusable Compensable, Excusable Non-compensable	Time Impact Analysis
5	(Ikediashi et al., 2014)	Poor estimation practices, cash flow difficulties, design discrepancies, lack of efficient change management, inadequate project structure and lack of teamwork.	literature review, questionnaire, Demographic Survey and APMSA
6	(Ar. Meena. V and Ar. K.Suresh Babu, 2015)	external factors, financial difficulties, shortage of labor, insufficient labor productivity, owner interference and improper planning	Questionnaire survey, CPM and PERT
7	(Masood et al., 2015)	Delay in payments; Poor weather conditions; Less use of highly technology mechanical equipment's;	Sampling, Survey Instrument-Questionnaire, Data Collection

		Ineffective project planning and scheduling; Rework resulting from errors during construction; Delay due to subcontractor; Poor site conditions; Coordination problem with other stakeholders; Delay in review and approval of design documents and Unclear design details in drawing.	and Data Analysis using statistical tool.
8	(Ram and Paul, 2015)	land acquisition; Environmental issues; Delay in progress payment; Ineffective project planning and scheduling; Poor site management and supervision; Delay in approving design documents; Poor coordination between owner and other parties; Financial closure; and Change order by clients.	Literature Review, Questionnaire Survey and Relative Importance Index (RII)
9	(Anil Upadhyay, Vaishant Gupta, 2016)	Ineffective planning and scheduling, Errors and late in producing design papers, Late in progress outflows, Less understanding of owner in construction, Late delivery of materials Shortage, Shortage of worker, Nonexistence of skill of design team in construction, Lack of skill of contractor, Changing of subcontractors again and again and Late in giving services.	questionnaire survey, Relative Importance Index (RII)
10	(Aziz and Abdel-Hakam, 2016)	Equipment unavailability, designer's error, fluctuation prices or availability or quality, non- adherence to contract condition.	Gathering the causes, Defining the causes into groups, The questionnaire survey,Data are gathered and analyzed by using an importance index and pro-posed model
11	(Rauzana, 2016)	material factors, Labor factor (manpower), Equipment factors, Financial factors, Environmental factors and Factors of change	questionnaires, SPSS 21.0 for Windows
12	(Tesfa, 2016)	Slow cite clearance, contractors' financial problems, Inflation, progress payments delay by owner, inaccurate cost estimation, and delay in commencement	questionnaire survey
13	(Amare, Quezon and Busier, 2017)	contractors, Employer, consultant	questionnaires, Sample Size
14	(AHBAB et al., 2018)	long period of bidding to announce award, Delay during mobilization, bad weather, Poor procurement procedure, Design changes, Poor performance of contractor	Data Envelopment Analysis (DEA), data aggregation
15	(Almohammad and Jamaludin, 2018)	Poor financial control of the project, delay in honoring payment certificates by contractor, owner financial problems, delay in payment to contractor by owner, land acquisition, rain effect of construction activities, terrain conditions, political situation and shortage of fuel	literatures review
16	(Official et al., 2018)	Rainfall and shortage of construction materials such as cement, shortage of construction engineers, and design problems	collected data from 90 completed or ongoing projects
17	(Tadewos and Patel, 2018)	Financial problems, improper planning, land acquisition and construction delay, design changes, less materials and equipment supply by contractors, incomplete design are the main sources of delay and cost overrun respectively	literature review
18	(Syuki and Ombui, 2018)	budget and quality of work	PMIS
19	(Tadewos and Patel, 2018)	Financial problems, improper planning, land acquisition and construction delay, design changes, less materials and equipment supply by contractors, incomplete design are the main sources of delay and cost overrun respectively	literature review
20	(Chen et al., 2019)	Ambiguities, mistakes and inconsistencies in specification and drawings, Poor communication among contracting parties, Lack of Finance by clients, conflict	literature, structured interviews,

		among contracting parties, Delay in progress of payments by clients, Poor labour productivity, Inadequate contractor experience, Inadequate experience of the design team, Poor site management by contractors, Frequent change orders by clients and Slow land expropriation due to resistance from occupants	

4. CONCLUSION

The objective of this project is to find out the delay factors from various literatures reviews on road construction project and to bring the solution mechanisms for time overrun in the project. In this paper delay factors are found from different researchers that are frequently repeated by the author's for instance material factor, poor coordination, external factor, labour factor, and poor supervision and unstable or frequently change in drawing. The output of this work is to prepare the measurements to avoid or minimize delay during construction cycle. For the construction sectors follow up research's can delivered a great contribution to the knowledge body. Finally the literature review is concluding in the following table.

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