



URBAN AND REGIONAL PLANNING REVIEW

VOL. 1 NO. 1

MARCH, 2006

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QUALITY, TIME AND COST PERFORMANCE OF LABOUR ONLY CONTRACT IN SOME SELECTED CITIES IN NIGERIA

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ABSTRACT

Labour only contract is one of the methods of project procurement. In this method, the client provides all the building materials while the contractor, who is responsible for the work is charged with the provision of the labour force (skilled and unskilled). This study focuses on the performance of this method of project procurement in terms of the time taken to deliver a project, the quality of the project and its cost. The review of literature on this study revealed that the system has grown in popularity over the years because it affords the client the opportunity of buying the building materials himself and so, ensuring that quality materials are bought. Usually most of the projects involved are small and medium in scale. It ensures close monitoring of the project by the clients. The study however discovered that time is not saved nor cost drastically reduced as perceived by the client unless certain checks and provisions are put in place. The study suggests that professional knowledge of materials and construction should be at the disposal of the client for him to reap the full benefit of this method. The result of the three hypotheses propounded for the study shows that:

- (a) *There is no time saved in project delivery by the method.*
- (b) *There is no cost reduction.*
- (c) *There is a negative correlation between the level of satisfaction with the quality of the project by client and the satisfaction level of the contractor.*

INTRODUCTION

Labour only contract is one of the several methods of project procurement in the construction industry. It is a method involving principally, the client and the contractor. The contractor is tasked with direct execution of the project using his own labour force while the client provides the materials needed for the project. The primary aim of the users (client) of this method of project procurement is to maximise the application of scarce resources for perceived optimum benefit especially reduction in the overall cost of a project.

Labour only contract has been in use for long; but its application had been restricted to piecemeals, (Broughton 1965). The economic recession experienced over the years has however led to its application in the procurement of bigger projects by individuals and companies. It has since been developed to a level where the client employs professionals to do the design,

procure needed materials and even supervise the contractor whose responsibility is only for the employment of the labour force required for the execution of the project.

This procurement method has been put to great use by the Nigerian Army Housing Scheme (NAHS) and the result are cheap and quality housing units (estates) located in major cities in Nigeria around for serving and retired personnel as well as some members of the general public (Iyagba and Idoro, 1995). An evaluation of the performance of this method of project procurement in terms of quality of project, delivery period and reduction in overall cost is the thrust of this study.

STATEMENT OF THE PROBLEM

This study is directed at evaluating the performance of labour only contract as a procurement method. The major attributes of performance considered are quality of the end product, the reasonableness of its

overall cost and delivery period. These attributes were considered and analysed from the point of view of the client and the contractor in order to ascertain whether it is worth the effort to both parties.

In order that a better understanding of the problem of this study is achieved, the problem is sub divided into three parts (sub problems) as done below:

- a. To assess the time factor (duration) of a project by considering the planned project time and the actual time taken to complete the project. The impact of a significant variation of this factor in a project cannot be over emphasised.
- b. The total cost incurred by the client and the profit expectation of the contractor is another factor considered. Should be project cost go out of the reach of the client, and should the contractor be unable to break even, talk less of making any profit, then the procurement method would no doubt become obsolete as it would most likely lead to project abandonment.
- c. The quality of project procured using this method as viewed by the client and the contractor is also considered to know whether the expected satisfaction as anticipated by the client is ever achieved.

OBJECTIVE

The study evaluates the performance of labour only contract as it concerns cost, delivery period (time of completion) and the quality of the project. The study subjected variables that make up these three determinants (costs, quality and time) of the end value of a project to statistical analysis used to make useful inferences about how these determinants have performed.

STATEMENT OF HYPOTHESES

Three hypotheses as stated below were employed to test the validity of data obtained:

Hypothesis I

That; labour only contract as a method of project procurement does not reduce the duration (time) of execution of a project.

Hypothesis II

That; labour only contract does not reduce the cost of a project.

Hypothesis III

That; there exists no relationship between the level of satisfaction with quality of a project as perceived by the client and the contractor.

SIGNIFICANCE OF THE STUDY

One of the primary motives for employing the labour only contract method of project procurement is the perceived reduction in cost by the client. Since the cost of materials is a major determinant of the total cost of a project, if cost can be effectively controlled, there is every likelihood that the overall cost of a project can be kept at bay.

This study is therefore directed at finding out whether it is actually cheaper using the labour only contract option without compromising quality and standards as well as delivery within acceptable time limit without incurring economic loss that delay in delivery may bring about.

LITERATURE REVIEW

The early man, knowing the importance of shelter had taken refuge in caves for his comfort and safety. He had gone further then to scratch, albeit, labouriously at the walls of these caves to make more rooms to meet his needs. With the passage of time, man began to seek shelter outside the caves using such building materials like bamboo, trees palm fronds, grasses and clay soil.

To build his shelter (house) in the early times, man worked on his own house himself assisted by members of his family. This practice was further developed to a stage where other members of the community like age groups would join the hands with a member to erect his own building while providing only food and drink.

As time went by, and the need for bigger and more complex shelter arose, other methods other than the communal one described earlier had to be adopted. Construction of buildings was then given out to contractors who take the responsibility of building such houses for a fee.

The need by man to cope with economic recession has however challenged his thinking into finding various means of achieving his objective with due considerations to the resources at his disposal and the complexity of the construction work. Several methods of procuring projects have therefore evolved over the years.

PROCUREMENT METHODS

Simply put, a procurement method is that method employed in acquiring a project. According to Odusami (1987); a procurement method can be described as the process of the management of the design and construction of a building from inception to the completion stage.

Omotosho (1999) in his work stated that it is more or less a concept rather than an absolute way of realising projects. It is one of the several stages of project delivery chain, which must not be confused with tendering procedures or types of contract. From the mid 1960s to date, many procurement methods have emerged and are in use in the construction industry the peculiar situation, need and resources available to the client informing each choice.

Mojekwu (1998), El Rufai (1992), Ogunsanmi and Bamisile (1997) identified five methods of project procurement commonly used in Nigeria as:

1. The traditional method.
2. The Direct labour method.
3. The labour only method.
4. Management contracting method.
5. Design and build method.

The Traditional Method

The traditional method of project procurement is a system whereby the client (owner) enters into separate contractual agreement with a team of consultants (Architects, Engineers, Quantity Surveyor, etc) and the contractor.

Usually, the consultants are responsible for the design and supervision of the contractor at the site. They (consultants) in fact, represent the client's interest at the site. The contractor on the other hand is responsible for the actual construction work at the site.

The present traditional procurement method (for building projects) according to Goni-Anagu (1992) involved usually, the following:

- i. The Client
- ii. The Architect
- iii. The Quantity Surveyor
- iv. The Engineer
- v. The Building Contractor

The Architect, Engineer, Quantity Surveyors were individual consultants working in their separate firms but usually come together under an umbrella on the request of the client to offer their services for an agreed sum of money. It is possible under this system to fix the lump sum of a contract even before commencement and using any of the standard forms of contract with bills of quantities as basis for being able to do this. Kettle (1975) enumerated the advantages of this method as follows:

1. An accepted historically supported system with legal and contract precedents well established.
2. Provision of good checks and balances between the client (owner) consultants and contractors.
3. Determination of project cost before construction contracts are let.

Griffith (1983) on the other hand, criticized the traditional method of project procurement thus:

1. That, teamwork was non-existent in times of trouble as individuals have individual contracts.

2. That, contractors were not involved until start of construction. This does not allow advantage to be taken of the contractor experience.
3. That, design changes were often brought in after construction had started.
4. That there exists a poor definition of over-lap of roles.
5. That, contractors, having got on low tender may result to frivolous variations in order to make profit.
6. It is observed that clients usually have no contractual relationship with sub-contractors.
7. That the appointment of sub-contractor often took place after the construction had started.

THE DIRECTOR LABOUR METHOD

As the name implies, direct labour method of project procurement is system whereby the client uses his in-house resources to execute a project. Opadiran (1987) did define direct labour system as:

- (a) The process through which a project is executed by workers of an organization instead of it being contracted out.
- (b) A do it yourself approach to project procurement and
- (c) A system where the client not only buys the materials but also employs tradesmen where necessary to augment those in his holdings to carry out new construction projects or maintenance works.

This system (direct labour) of project procurement is common with small-scale projects and maintenance works especially by government departments.

The direct labour method of project procurement is put to use in the construction industry for the following advantages:

- a. Delay, usually caused by the whole process of tendering and negotiating with contractors is eliminated and so, the procedure for initiating the execution of work is simplified.

- b. Because of its in-house nature, security risk projects are better executed through this method.
- c. Control of workers and labour harmony is better maintained as the operatives are mostly familiar with each other.

THE LABOUR ONLY METHOD

Labour only contract method of project procurement as stated earlier in the introduction to this study is a procurement method involving mainly the client and the contractor. Whereas the client buys the materials needed for the project, the contractor employs the labour and is directly responsible for the execution of the project. Broughton (1965), described labour only contract as contract for piece works which are prevalent in the smaller building types. In this method he averred, the owner (client) of the proposed projects opts to buy all the building materials needed for the project and a nominated group of consultants (if necessary) are mainly charged with the responsibility of supervising on the client's behalf and the contractor is charged with the task of executing the project on site. Labour only contract method of project procurement has the following attractions amongst others.

- a. It guarantees an appreciable level of cost saving if properly monitored and executed.
- b. It may lead to a saving of time.
- c. The contractor may not need to have a permanent labour force in his employ.

Management Contracting

Maton (1987) stated that management contracting is a situation where one party (the management contractor) enters into a contractual agreement with another party (the employer) for the management and execution of a project. The contractor's skill in the management of the contract process took primary dominance over the physical execution process to such a degree that he is permitted, required even to sublet the entirety of the projects' latter processes. However, he remains none the less a

contractor in a commercial and partisan role. In this method, the role of independent overseer may be undertaken by the consultants or may be sub-sued in the client's representative function.

Franks (1984) went further to say that this method of project procurement was developed in response to demands for better management of exceptionally large and complex construction projects.

Design and Build Method

This is a procurement method where design and construction is done under one roof. The problems inherent in the separation of the design and construction function as obtainable under the Traditional procurement method informed the adaptation of this method. Grieson (1988) noted that the essence of a Design and Build method is that a single company takes responsibility for both the design and construction of a project. This, apart from giving a one-point accountability to the client, also gives the contractor full control of both major facets of the project.

Ellis (1990), stated that with design and site work (construction) under one roof, the contractor's knowledge of the building process is released to the design process. It follows that where those responsible for design and construction are able to see themselves as members of the same team, then the mutual suspicion and acrimony inherent in the Traditional method of procurement is reduced to the bare minimum if not completely eliminated. Being members of the same team, they become goal oriented rather than being defensive and protective as they relate with each other free from the shadow of claims and disputes.

METHODOLOGY

A questionnaire focused on contractors and clients around five major Nigerian cities of Lagos, Ibadan, Abuja, Makurdi and Benin was designed to obtain the data required to test the hypotheses postulated for the study. It contained twenty-one items, such as the name of the respondent, number of projects executed in recent past, the task allocation, planned and actual time, planned and actual cost, levels of satisfaction. The respondent is to evaluate the level of satisfaction by both the contractor and the client with 1 for Dissatisfied, 2 for low level of satisfaction, 3 for Average level of satisfaction, 4 for high level of satisfaction, and 5 for very high level of satisfaction.

ANALYSIS OF DATA

The respondent who participated in the questionnaire survey were contractors involved in wide application of this method of project procurement and the client (NAHS) who has been involved in the application of this method for over ten years. The contractors and projects are scattered around five major Nigerian cities of Lagos, Ibadan, Abuja Makurdi and Benin. At each of these sites, there were minimum of five contractors constructing a minimum of four units of houses using the labour only option. Two contractors were randomly chosen at every of the five sites. The work of two of such contractors with over five projects executed in recent past were considered for analysis even though, all of them at the sites were given questionnaires to complete. The quality of their product, the time it took them to deliver and the overall cost of production were considered for this study.

Table 1: Performance in respect of time of labour only contract.

Project	Planned (estimated) project time	Actual (observed) project time	Time Overrun	% Time Overrun
A	12 weeks	13 weeks	+1 week	8.3
B	12 weeks	14 weeks	+2 weeks	16.7
C	18 weeks	21 weeks	+3 weeks	16.7
D	18 weeks	20 weeks	+2 weeks	11.1
E	14 weeks	15 weeks	+1 week	7.1
F	14 weeks	16 weeks	+2 weeks	14.3
G	16 weeks	19 weeks	+3 weeks	18.8
H	16 weeks	18 weeks	+2 weeks	12.5
I	20 weeks	23 weeks	+3 weeks	15.0
J	20 weeks	24 weeks	+4 weeks	20.0

Source: Field Survey, 2003.

Table 1 shows the planned time, actual time, time overrun and the percentage of time overrun for ten projects executed by ten different contractors at five different sites. Note that two identical projects with equal planned time were randomly selected from each site. Note also that:

Time Overrun = Actual time – Planned time.
And % time Overrun = $\frac{\text{Time Overrun}}{\text{Planned time}} \times 100\%$

Planned time

From table 1, it was discovered that project E had the lowest time overrun of 1 week and a percentage overrun of 7.1.

The client (Nigerian Army Housing Scheme) has a well-articulated programme and requisite technical manpower for

effective planning, monitoring and control of their projects at the sites. This may have been responsible for the apparently low time overruns. Enquiries on the cause of these time overruns revealed that sometimes, materials supplied to site, fall short of requirements at the site due to short fall in supply from the factory where the client does bulk purchasing of materials from. The four projects that recorded time overrun above the mean time overrun of 2.3 weeks were so affected by this unforeseen development amongst others. Figure 1 shows the Histogram of the planned time and the actual time for the completion of the projects while figure 2 shows its graphical representation.

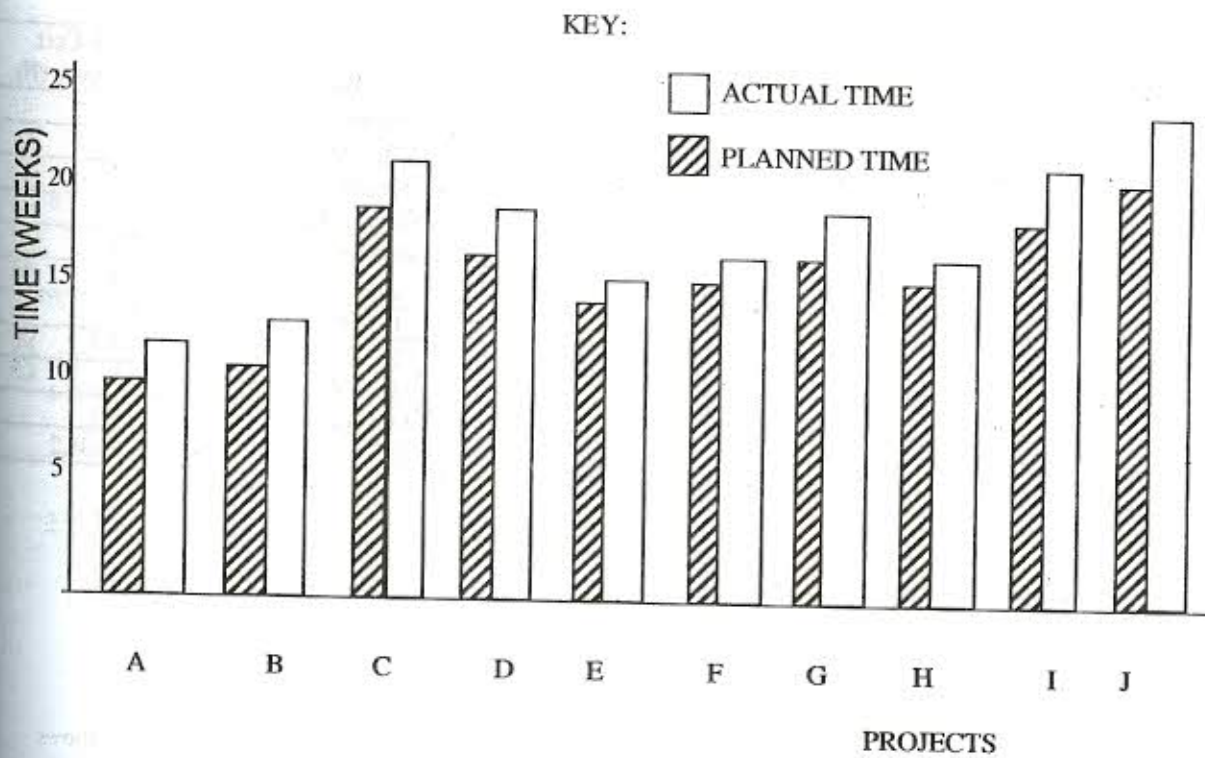


Figure 1: Histogram Showing Planned Actual Time of the Projects

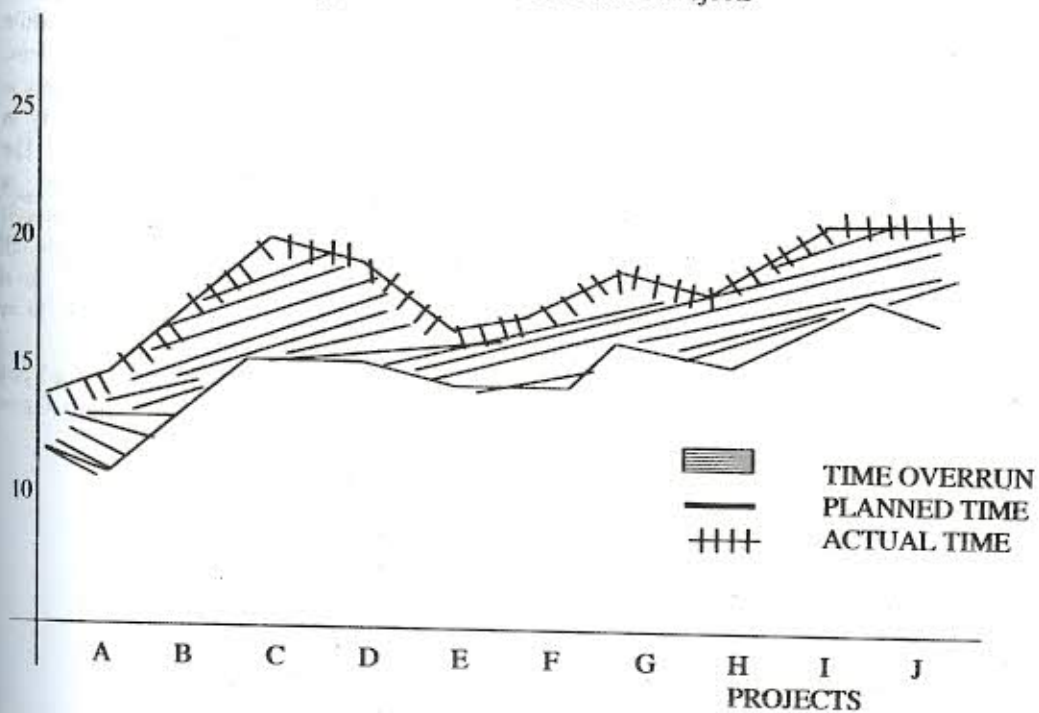


Figure 2: Graphical Presentation of Planned Time and Actual Time of the Projects.

Table 2: Performance in Respect of Cost

Project	Planned (Estimated) Project Cost (N)	Actual (observed) Project cost (N)	Cost Overrun (N)	% Cost overrun (N)
A	3,600,000.00	3,700,400.00	100,400.00	2.8
B	3,600,000.00	3,722,400.00	122,400.00	3.4
C	5,800,000.00	5,985,600.00	185,600.00	3.2
D	5,800,000.00	5,920,800.00	120,800.00	2.1
E	4,200,000.00	54,250,400.00	50,400.00	1.2
F	4,200,000.00	4,342,800.00	142,800.00	3.4
G	5,200,000.00	5,470,400.00	218,400.00	4.2
H	5,200,000.00	5,397,600.00	197,600.00	3.8
I	6,400,000.00	6,713,000.00	313,600.00	4.9
J	6,400,000.00	6,732,800.00	332,800.00	5.2
			$\Sigma = 1,784,800$	$\Sigma = 34.2$

Source: Field Survey, 2003.

$$\begin{aligned}
 * \quad \text{Mean Cost Overrun} &= \frac{1,784,800.00}{10} = \text{N}178,480.00 \\
 * \quad \text{Mean \% Cost Overrun} &= \frac{34.2}{10} = 3.42\%
 \end{aligned}$$

PERFORMANCE IN RESPECT OF COST

Table 2 shows the planned cost, actual cost, cost overrun and the percentage of cost overrun for the ten projects that time characteristics were treated earlier. It is also apt, to state here that:

$$\begin{aligned}
 \text{Cost Overrun} &= \text{Actual Cost} - \text{Planned Cost} \\
 \text{And \% Cost Overrun} &= \frac{\text{Cost Overrun}}{\text{Planned Cost}} \times 100\%
 \end{aligned}$$

PLANNED COST

From Table 2, it is apparent that project E has the lowest cost overrun of N50,400 and a percentage cost overrun of 1.2.

The highest cost overrun was recorded in project J, which is N332,800 and a percentage cost overrun of 5.2.

Enquiries on the cause of this overrun shows that there were variation in some of the projects occasioned by the irregular topography of the land at the site while constructing the foundation of the buildings, especially in the last four projects. This is also in addition to the reason of delay in supply of materials as earlier stated. The mean cost overrun for the project is N178,480 and from the table, five of the cost overrun are above this value while five fall below it. It is an indication of good performance, which is to be ascertained by the chi-square test later in this study.

Figure 3 is the Histogram of planned cost and actual cost for the projects while Figure 6 is the graphical representation.

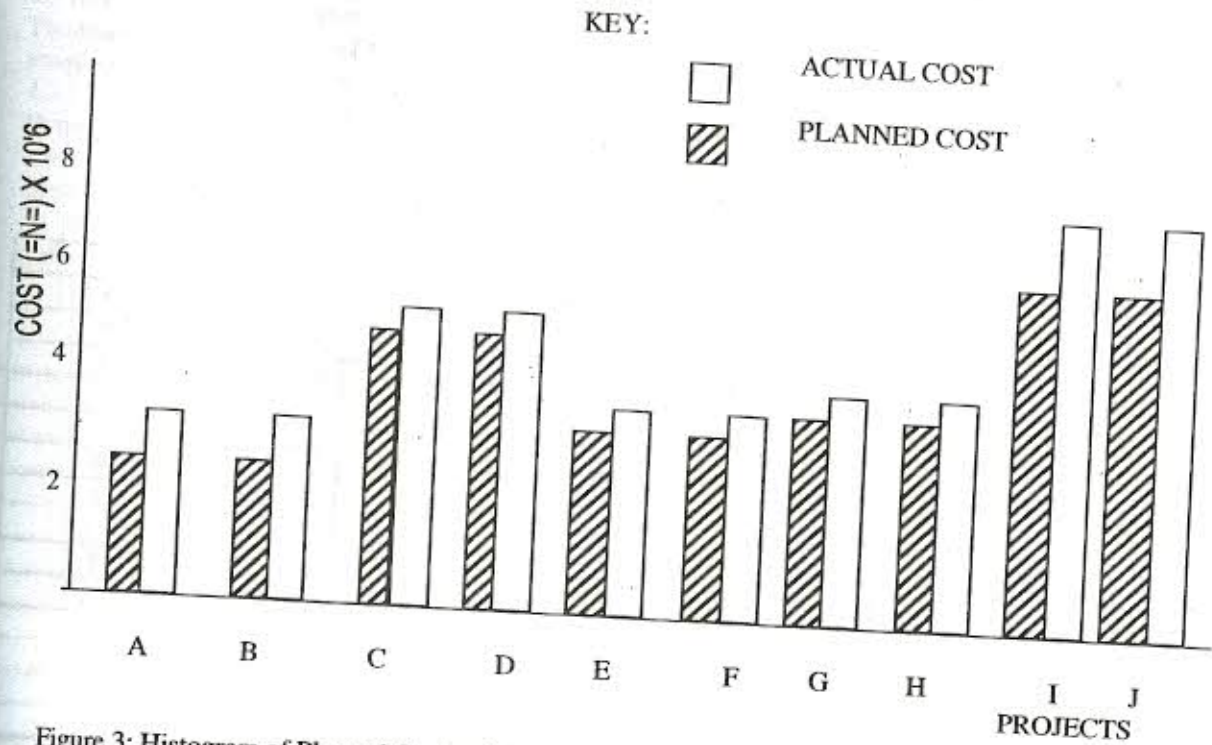


Figure 3: Histogram of Planned Cost and Actual Cost of the Projects

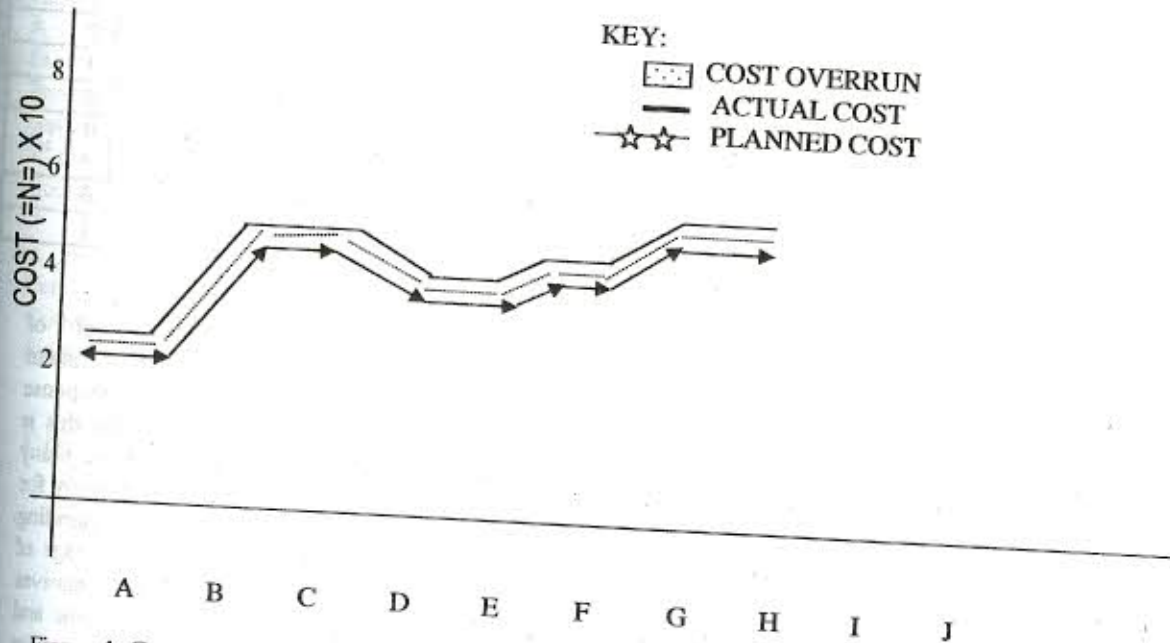


Figure 4: Graphical Presentation of Planned Cost and Actual Cost of the Projects .

4.3 PERFORMANCE IN RESPECT OF QUALITY

To assess the performance of labour only contract in terms of quality, the level of satisfaction as perceived by the client and

the contractor is compared using the Likert scale to rate some key variables that impacts on the quality of a project to assess their rank order (Spearman's) correlation.

4.3.1 Client response to level of satisfaction

Table 3: CLIENT'S RESPONSE TO LEVEL OF SATISFACTION

Variables	Item	Level of satisfaction				
		5	4	3	2	1
A	Workmanship	5	3	2	0	0
B	Quality of materials	8	2	0	0	0
C	Control of materials	6	3	1	0	0
D	Wastage of materials	3	2	4	1	0
E	Adequate supervision	2	4	2	2	0
F	Conformity with work schedule/specification	0	2	5	2	1
G	Labour Harmony	3	2	1	3	1
	Total for all projects (X)	27	18	15	8	2

Source: Field Survey, 2003.

Table 4: CONTRACTOR'S RESPONSE TO LEVEL OF SATISFACTION

Variables	Item	Level of satisfaction				
		5	4	3	2	1
A	Workmanship	7	2	1	0	0
B	Quality of materials	1	2	3	3	1
C	Control of materials	2	4	2	2	0
D	Wastage of materials	0	1	5	4	0
E	Adequate supervision	7	2	1	0	0
F	Conformity with work schedule/specification	6	3	0	1	0
G	Labour Harmony	7	2	0	1	0
	Total for all projects (X)	30	16	12	11	1

Source: Field Survey, 2003.

In the responses from the client on the various projects considered as tabulated in table 3, it is observed that quality of materials ranked higher than other factors. This is partly because the client purchased the materials and the bulk of these were purchased direct from the factory. The client also has the advantage of having in his employ, qualified professionals. Conformity with work schedule ranked lowest as the client has limited control over the workmen who are on the employ of the contractor.

It is also observed that level of workmanship, supervision and labour harmony ranked highest in the response from the contractor. The reason for this is mainly because, the contractors have many of the skilled labourers on their employ for some time, mutual trust and understanding therefore exists between them. Wastage of materials since the client's representatives were always present at the site to issue and withdraw materials as the situation demanded.

4.3 TESTING OF HYPOTHESES

The three hypotheses propounded were tested thus:

4.3.1 Test of Hypothesis I

Hypothesis I states that there's no time saved using labour only method of project procurement. The test is carried out thus:

- ♦ Null Hypothesis (H_0)

Table 5

Est	Estimated Time (Weeks)	Actual Time (Weeks)	Total Time (Weeks)	Expected Frequency		(actual-Expected) ²
				Estimated (Expected)	Actual (Observed)	
	12	13	25	11.66	13.34	0.24
	12	14	26	12.13	13.87	0.25
	18	21	39	18.19	20.81	0.38
	18	20	38	17.73	20.27	0.36
	14	15	29	13.53	15.47	0.28
	14	16	30	13.99	16.01	0.29
	16	19	35	16.13	18.67	0.34
	16	18	34	15.86	18.14	0.33
	20	23	43	20.06	22.9	0.41
	20	24	44	20.52	23.48	0.43
	$\Sigma = 160$	$\Sigma = 183$	$\Sigma = 343$			$\Sigma = 3.31$

Source: Field Survey, 2003.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where O_i = Observed value or Actual value

E_i = Estimated (Panned) value.

From table 5 (contingency table) as computed.

$$\chi^2 \text{ calculated} = 3.31$$

$$\text{But degree of freedom} = (c - 1)(r - 1) = (10 - 1)(2 - 1)$$

\therefore From chi-square table, at 9 degree of freedom and 5% level of significance, χ^2

Critical = 16.9

Since $\chi^2_{cr} > \chi^2 \text{ calculated}$, i.e. $16.9 > 3.31$

H_0 : Labour only contract does not reduce project duration.

- ♦ Alternative hypothesis (H_A):

H_A : Labour only contract reduces project duration.

Then, accept H_0 and reject H_A i.e. Labour only contract does not reduce (save) project duration.

4.3.2 Test of Hypothesis II

Hypothesis II states that; there's no cost saved using labour only contract method of project procurement. The test is carried out thus:

- Null Hypothesis (H_0):

H_0 : Labour only contract does not reduce project cost.

- Alternative Hypothesis (H_A):

H_A : Labour only contract reduces project cost.

Table 6 is the contingency table for the purpose of calculating the chi-square test value.

Table 6: Contingency Table

Project	Estimated Time (Weeks)	Actual Time (Weeks)	Total Time (Weeks)	Expected Frequency		(actual-Expected)
				Estimated (Expected)	Actual (Observed)	
A	12	13	25	11.66	13.34	0.24
B	12	14	26	12.13	13.87	0.25
C	18	21	39	18.19	20.81	0.38
D	18	20	38	17.73	20.27	0.36
E	14	15	29	13.53	15.47	0.28
F	14	16	30	13.99	16.01	0.29
G	16	19	35	16.13	18.67	0.34
H	16	18	34	15.86	18.14	0.33
I	20	23	43	20.06	22.9	0.41
J	20	24	44	20.52	23.48	0.43
	$\Sigma = 160$	$\Sigma = 183$	$\Sigma = 343$			$\Sigma = 3.31$

Source: Field Survey, 2003.

From table 6 (contingency table);

$X^2_{\text{calculated}} = 6.7$

But $X^2_{\text{critical}} = 16.9$ (from chi-square table)

At 9 degree of freedom and 5% levels of significance

This therefore means that we accept the Null hypothesis (H_0) and reject the alternative hypothesis (H_A).

We therefore conclude that labour only contract does not reduce cost of a project.

Hypothesis III states that; there's no relationship between the client and contractor's level of satisfaction with the quality of projects procured using labour contract. The test is carried out thus:

H_0 : There's no relationship between the client and contractor's perception of quality of a project in labour only contract.

H_A : There's a relationship between client and contractor's perception of quality of project in labour only contract.

4.4.3 Test of Hypothesis III

X	Y	d= X-Y	d ²
27	30	-3	9
18	16	+2	4
15	12	+3	9
8	11	-3	9
2	1	+1	1
		$\Sigma d=0$	$\Sigma d^2 = 32$

Table 7 is derived from tables 3 and 4. The response from clients (X) is compared with the responses from contractor (Y).

The spearman, Rank order correlation is given as:

$$r_s = 1 - \frac{6 \Sigma d^2}{N(N^2 - 1)} = 0.6$$

This result shows that there's a negative correlation between the level of satisfaction of the two parties. It simply means that when the contractor is very happy, it does

not transpose to happiness for the client and vice versa. That is, as the client is getting more satisfied, the contractors are getting less satisfied because the contractor's profit level on the project is being reduced.

CONCLUSION AND RECOMMENDATIONS

At the end of this study, the following conclusion and recommendations were arrived at:

CONCLUSION

- a. At the end of the study, it was discovered that all the projects studied had time overruns. This means that, labour only contract does not save time. It was further proved by the use of the chi-square test to test the null hypothesis for this situation, which stated that labour only method of project procurement does not save time.
- b. It was also discovered that labour only contract method of project procurement does not save or reduce cost of a project. All the projects considered had cost overruns and a test of these costs using the chi-square test and related hypothesis confirmed this.
- c. The relationship between the level of satisfaction with the quality of a project as perceived by the client and the contractor was seen to yield a negative correlation. Spearman's rank order correlation was used to arrive at this. It is evident that the more satisfied the client is, the lower the profit margin of the contractor and vice versa.
- d. It was also discovered that most of the contractor involved in this procurement method are small scale and indigenous.

5.2 RECOMMENDATIONS

In cause of gathering materials, for this study and visits to sites where labour only method of project procurement was in use, some observations were made, making the following recommendations necessary.

- a. There should be adequate security of materials at the site. This is because, the workmen, majority of who are in the employ of the contractor may resort to pilfering of these materials if not checked.
- b. For maximum benefit, it is recommended that a user of this method must be present or have a representative most of the time at the site to oversee activities at the

site and monitor progress of work as well as check wastage of materials.

- c. Persons with requisite knowledge should do material purchase.
- d. Experiences labour (skilled and unskilled) should be sued for this method of project procurement.
- e. The method is most suitable for small projects where eagle eye supervision is possible.

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