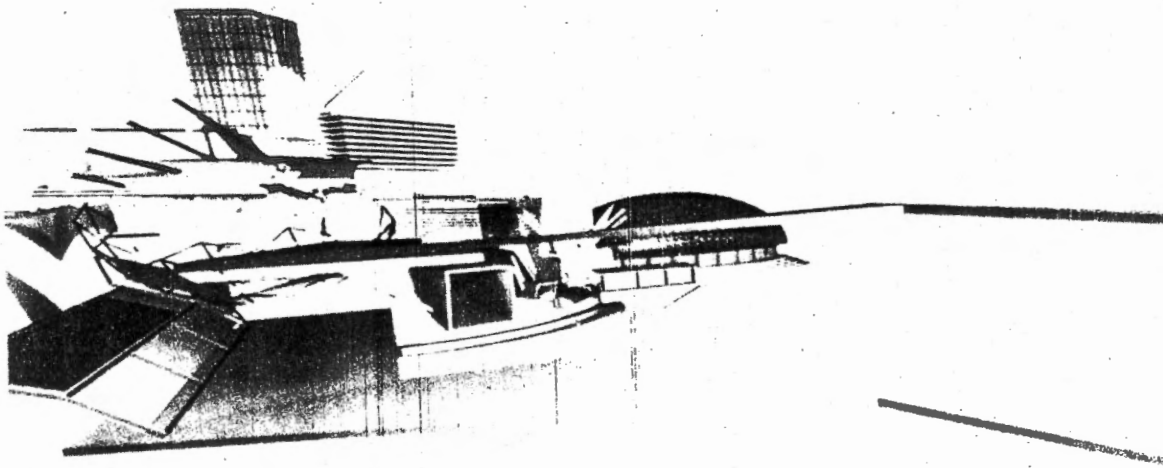


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An Evaluation of the Cost Effectiveness of Direct Labour System on Housing Project Execution in Lagos State, Nigeria

Aderemi Y. Adeyemi and Stephen O.Ojo

Department of Building,
Obafemi Awolowo University, Ile-Ife, Nigeria.
e-mail: yadeyemi@oauife.edu.ng; sojo@oauife.edu.ng

Henry A. Odeyinka

Department of Quantity Surveying,
Obafemi Awolowo University, Ile-Ife, Nigeria.
e-mail: hodeyinka@oauife.edu.ng

Olabosipo I. Fagbenle

Department of Building
Osun State College of Technology, Esa-Oke, Nigeria.

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Abstract

At the peak of economic recession in 1985, the Federal Government of Nigeria started to advocate for a revisit of the direct labour system typified of project execution during the colonial era through the 1960s. This method was completely abandoned for traditional contract method at the instance of oil boom in early 1970s. At the dawn of recession, the traditional contract method was faulted as being replete with cost overrun and hence the need to go back to the direct labour system to salvage the situation. Lagos State with an estimated population of about 10 million people and insatiable need for housing and social infrastructures launched large scale direct labour construction projects in 1996. Since then the Lagos State Direct Labour Agency (LSDLA) has executed 2,772 housing units spread over 21 housing estates in Lagos metropolis. The object of this paper was to determine whether the direct labour system was significantly more cost effective than the traditional contract method on these housing units. Cost comparison between the two procurement methods showed a saving of 26.86% when direct labour was used in preference to the traditional contract method. Chi-square analysis also showed that there was significant difference in cost between these two procurement methods.

The choice between the use of direct labour system and contract method for executing government projects in Nigeria appeared to be borne out of economic theory - the allocation of scarce resources to satisfy competing needs. The use of direct labour for the provision of infrastructural needs of the country can be traced back to the period of colonial rule from 1930 to the decade of independence in the 1960s. During this period there were low level of economic activities in the country and consequently low level of infrastructural development. The first direct labour outfit manifested as Public Works Department (PWD), an organ through which government projects such as construction of motor roads, railroads, offices and residential buildings were being executed. This arm of government was solely responsible for planning, designing and supervising projects using highly trained and motivated skilled workforce, standard equipment, up-to-date soil and materials laboratory, cheap unskilled labour and close supervision. According to Olugbekan [1] construction during this period was limited in scope to warrant the use of contractual procedures.

Four events occurred in quick successions between 1970 and 1976 which changed the scope of infrastructural requirements in the country and which resulted in the shift of emphasis from direct labour system to contractual methods. The first of these events was the fratricidal war which started in 1967 and ended in 1970. After the war, there was needs for rehabilitation and reconstruction work, the magnitude of which direct labour workforce could not cope with. Simultaneously after the war, there was phenomenal increase in government's earning capacity due to oil boom facilitated by the Arab-Israeli war. Thirdly in 1976, seven additional states were created from the existing twelve states, thereby requiring infrastructural facilities. The fourth event, which in essence was people's response to the first three events, was rural-urban drift in search for work.

These four events resulted in upsurge in the demand for construction in terms of roads to facilitate the movement of people and transportation of goods; residential housing units to cope with migration to the urban centers; large scale buildings to accommodate industrial, commercial and administrative activities and recreational facilities for the relaxation of the people. Government, the major client of the construction industry in Nigeria like any other developing countries as noted by Hillebrandt [2], was quick to opt for the contract methods to cope with the new demands.

The adoption of contract system by government and pressing demand for social infrastructures led to the influx of multinational contractors into the country and the emergence of a large number of indigenous contractors many of whom did not have the wherewithal to execute construction projects. While the multinational contractors were executing large scale constructions, the indigenous contractors were handling small-scale housing and school projects. The construction explosion was such that some of the contractors were handling more than two projects at a time; a phenomenon that resulted in work overload for many of them.

As at 1982, the glut in the international oil market which started in 1977 had manifested in the Nigerian economy. An inflection point appeared on the sinusoidal business cycle of Nigeria signalling a change from boom to recession. In that year, government declared a state of economic emergency and as Adeyemi [3] reported, the construction industry was used as an economic regulator when government embarked on delaying payment of interim valuations to contractors. Consequently, many projects were abandoned. The housing sector was worst hit by this scenario. At the conception stage of the structural adjustment programme aimed at revitalizing the Nigerian economy, housing experts started to fault the traditional contract method being adopted by government as inappropriate for mass housing projects. Statistics showed that,

202,000 housing units with 50,000 units earmarked for Lagos State and the rest 152,000 units to be shared equally by the rest of the states. At the end of the plan period, less than 15% of the houses were completed [4]. This failure was a direct reflection of problems associated with contract award system in Nigeria. Some of these problems were:

1. Non-use of competitive tendering which created room for indiscriminate award of contracts to relations of government officials. In order to maximize their personal gains, many of these contractors either abandoned the project totally as soon as mobilization fees were collected or executed shoddy jobs.
2. Overpricing of contractor's profit and overhead cost.
3. Preference for the use of imported construction materials by contractors; a practice through which government was parting with huge foreign exchange earnings.

What appeared to be a policy shift to the nostalgic PWD direct labour system occurred during the 4th Development Plan (1980 - 85) when government mandated the Federal Housing Authority to construct houses for the medium and high income people on commercial basis. The production cost of these houses compared favourably with that of contract methods and besides, this type of direct labour practice was plagued with wastage, pilferage and a general lack of close supervision. Despite these flaws, analyst still believed that the direct labour system could be a better cost saving device if the way it was being practiced was completely rationalized. The forgoing analysis examined the appropriateness of direct labour system in relation to that of the contract methods and used empirical data from Lagos State Direct Labour Agency to determine whether there are significant cost differences between the two procurement methods.

2 Selecting Appropriate Procurement Method for Mass Housing Delivery in Nigeria

Procurement methods have been linked with project success in terms of cost and time overrun and project size. Pioneering research efforts in this area showed that an exponential relationship exists between the duration of a building contract and the actual cost of construction [5, 6]. Subsequently a number of researchers have compared the performance of traditional contract method with other procurement methods such as management contracting [7, 8, 9] and design and build [10, 11]. Each of these works indicated that the traditional procurement method lagged behind in time and cost performance occasioned by separation of design from construction. In traditional contract approach the design stage is usually the responsibility of an architect who after completion of the design assists client to appoint a contractor for the construction phase. This arrangement often creates problem for the contractor who had not been involved in the project during the conception and design phases. Also, the arrangement is rather too sequential to permit 'fast tracking' approach to construction and causes inter-professional conflict. Nonetheless, the traditional procurement methods remain the most popular procurement form in the developing countries and most especially Nigeria [12]. The application of traditional procurement method in Nigeria for government projects involves the use of lump-sum contracts. In this case the contractor determines the actual cost of the project and adds certain percentage of actual cost to cover his overheads and profits. It is these overheads and profits that are usually over priced.

Direct labour is a procurement system that is associated with the execution of small and non-complex projects. It involves the use of in-house personnel (professionals, skilled and unskilled workforce) by the client for project realization. While the traditional contract method separates the design phase from the construction phase and hence breaking continuity, there is integrated input to both design and construction by the architects, engineers, quantity surveyors and the builders in direct labour system. The continuity of construction processes makes direct labour bear resemblance to procurement methods such as management contracting, design and build and project management. A survey conducted by Ojo et al [13] on some construction projects in Nigeria showed that direct labour also perform better than traditional contract method in terms of time and cost overrun.

The economic advantage of direct labour system over traditional procurement can be found in the following illustrations. Supposing a state government is considering developing an estate with a prescribed number of low rise, walk-up apartment buildings. If the design is contracted to private firms about 12 to 15% of the estimated cost of the project will be paid as professional fees for the inputs of planners, architects, engineers and quantity surveyors. If the design, preparation of bill of quantities and costs estimates is done in-house, government pays nothing outside the workers' salary plus, perhaps, a small financial incentive. Before the commencement of construction, a cost estimate has to be prepared. The contractor's major cost heads are materials, labour, plants, profit and contingency. The pricing practice of construction contractors is such that the trade discount that will be obtained from bulk purchase of building materials is not reflected on the contractors figure for materials.

Table 1: Comparative Cost Analysis of Project Execution by Contract and Direct Labour

Cost Heads	Contractor's Estimate x10 ⁶	Contractor's Mark-up [%]	Direct Labour Estimate x10 ⁶
[1]	[2]	[3]	[4]
Materials	112,530	25	84,398
Labour	62,568	35	40,669
Plant	7,107	15	6,040
Profit	27,336	15	None
Contingency	10,460	5	6,555
Project Cost	220,000		137,662

Source: Field Survey, 2000 US\$1.00 = 110Naira

This discount ranges from 25% to 40% and is a source of gain in direct labour systems. About 35% could be gained on contractor's figure for labour since the labour force is made up of the client's regular employee who in addition to their salary earns fringe benefits. The percentage gain on plant and equipment over the contractor's figure is estimated at around 15% since the client owns these items whereas many contractors hire or lease them. The contractor is likely to charge about 15% of the sum of his figures for materials, labour and plant as profit. Since profit is not a cost head in direct labour, this percentage is saved. The contractor calculates his contingency fee by factoring the sum of the estimates for materials, labour, plant and profit by 5%. Although the same percentage is used in direct labour, the sum to be factored does not include profit. If the contractor's tender sum is 220 million naira (two million dollars approximately) the direct labour cost can be obtained by deducting these percentage gains or mark-up as illustrated in Table 1. The table shows that 82,338 million naira could be saved if direct labour is used. This amount represents 37.426% of the contractor's estimate. If the client pays 12% of the contract sum to professionals for design, the gains from direct labour increases to about 50%. Although this example appears hypothetical, it will be validated by field result from the experience of Lagos State Government currently active in direct labour practice.

Table 2: Cost Comparison of Direct Labour and Traditional Contract on Housing Projects in Lagos State

S/NO	Location Of Estate	Number of Housing Units	Number of Bedrooms	Direct Labour Cost x10 ⁶	Projected Contract Cost x10 ⁶	Savings Over Contract Method x10 ⁶
	(1)	(2)	(3)	(4)	(5)	(6)
1	Isolo	614	3	491.00	694.10	203.08
2	Ikorodu	23	3	18.40	25.76	7.36
3	Sobowale Benson	229	2	137.40	201.97	64.57
4	Sobowale Benson	158	3	126.40	179.74	53.34
5	Palm view	44	3	32.70	45.78	13.08
6	Alapere Phase II	32	3	26.70	38.71	12.01
7	Ogba Phase II	56	3	41.20	58.69	17.49
8	Dolphin Phase II	136	3	200.00	252.50	52.50
9	Games Village	12	3	9.12	13.04	3.92
10	Ijaye	44	4	60.51	93.42	32.91
11	Ojokoro	90	2	57.00	89.80	32.80
12	Isolo	54	3	40.00	56.83	16.83
13	Oke-Oba	12	4	7.66	9.26	1.60
14	Ikeja (M.K.O Garden)	72	4	108.02	160.00	51.98
15	Ikeja (M.K.O Garden)	72	3	90.10	133.70	43.60
16	Dolphin Phase II	440	3	378.20	464.96	86.76
17	Raji Rasaki	142	4	300.12	376.31	76.19
18	Ikoyi (Dolphin)	236	4	216.90	276.98	60.08
19	Ikeja (M.K.O Garden)	126	4	184.70	241.18	56.48
20	Ikeja (M.K.O Garden)	80	3	60.30	98.90	38.60
21	Lekki Phase I	100	4	149.30	228.80	79.50
	TOTAL	2,772	-	2,735.75	3,740.43	1,004.68

Source: Field Survey 2000

3 Current Direct Labour Practice in Lagos State

Metropolitan Lagos has since independence in 1960 up to date been the commercial nerve center of Nigeria. The city currently has an estimated population of 10 million people with over stretched accommodation and infrastructural facilities. With township roads becoming impassable and ratio of person per room increasing due to unbridled influx of people from the countryside, the Lagos State government launched large scale direct labour road and drainage rehabilitation work and construction of new housing units in 1996. The use of direct labour was based on the premise that previous housing programmes failed as a result of the use of contract system which resulted in time and cost overrun and in some cases total project abandonment. The two state government organs through which the direct labour projects were to be executed were the Lagos State Direct Labour Agency (LSDLA) newly created in 1996 and the existing Lagos State Property Development Corporation (LSDPC). Since the launching of the direct labour system, 2,772 housing units spread over 21 housing estates in metropolitan Lagos and Ikorodu have been erected. Table [2] shows the spread and number of units constructed with the associated construction cost. In order to determine the cost effectiveness of direct labour system on these housing unit, the projected cost under lump-sum contract are shown in column 5. The gains from direct labour (column 6) were obtained by subtracting corresponding items in column 4 from column 5. For the 2,772 housing units, the actual cost by direct labour was 2.74 billion naira; against a projected cost of 3.74 billion naira if the traditional contract method is used. This resulted in a saving of one billion naira or 26.86% over the projected contract expenditure. Chi-square analysis was carried out

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