DOI: https://doi.org/10.68128/jocrebe.2017.mra1vwgx

Journal of Contemporary Research in the Built Environment
Volume 1, Number 1, March 2017 © Department of Building, University of Uyo

A COMPARATIVE EVALUATION OF LABOUR PRODUCTIVITY OF FLOOR SCREED ACTIVITY IN SOUTH-SOUTH ZONE OF NIGERIA

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ABSTRACT

Purpose: Improving labour productivity for sustainable practice in a recessed economy cannot be overemphasised. This study aimed at determining productivity of building craftsmen in floor screed activity with a view to promoting accurate estimation of manpower requirements for projects executed in South-South Geo-Political Zone of Nigeria.

Design/methodology/approach: A descriptive survey research design approach was adopted using continuous observation method in work measurement study. Project work study manual served as the research instrument to collect data on selected building sites for 30 working days across six states in the zone. Data collected were analysed using descriptive statistics and ANOVA.

Findings: The results revealed that there is no significant variation in construction labour productivity of floor screed activity across the states in the zone. Average construction labour productivity of floor screed activity in the zone based on a gang comprising an artisan and mate was 1.90m^2/hr. There was also significant variation in nonworking time of construction labour engaged in floor screed activity in the Zone.

Originality/value: It was concluded that a common productivity norm for floor screed activity in South-South Geo-Political Zone of Nigeria is feasible and that potentials for productivity improvement vary across the states in the Zone based on the variation existing in the nonworking time of construction labour. The study recommended that while common productivity norm could be adopted for estimating labour resource requirements for floor screed activity in the Zone cognisance should be made of peculiar business environmental factors in planning labour productivity improvement strategies.

Keywords: Construction; floor screed; labour; productivity norm; work study

1. INTRODUCTION

The concept of productivity has found application in almost every sphere of human endeavours because of its relationship with profitability. In view of this, ways and methods of improving productivity have continued to be of immense concern to industries and the

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academia more so that human needs are insatiable amidst very scarce resources. Furthermore, the doctrine of productivity cannot be overemphasised especially in a recessed economy like the one Nigeria is presently faced with. According to Noko (2017) the National Bureau of Economic Research (NBER) defined a recession as 'a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in a real gross domestic product (GDP), real income, employment, industrial production and wholesale-retail sales'. The author added that "Economic recession can also be defined as a negative real GDP growth rate for two consecutive quarters (say first and second quarters)". Arising from this, Noko (2017) asserted that Nigeria is experiencing economic recession currently, since her first and second quarters growth in 2016 are -0.36% and -1.5%.

The construction industry has been recognised has playing vital role in the economy of many nations as it is said to serve as a barometer for the assessment of the performance of the economy. In a recessed economy, therefore, improving the productivity of the industry could serve as a veritable coping strategy before the recession is surmounted. Unfortunately, the productivity of the construction industry has been decried to be low globally when compared with other industries (Veiseth, Rostad & Andersen, 2003). Nevertheless, poor productivity of craftsmen was identified as one of the problems confronting the industry especially in developing countries (Kaming, Olomolaiye, Holt & Harris, 1997). Odesola, Okolie and Nnametu (2015) observed that "understanding the productivity of building craftsmen is complex because several factors influence it and therefore cause differences from place to place and from individual to individual". This explains why despite many research efforts on productivity studies further research efforts will still be needed to accommodate differences that may arise from place to place in addition to the differences in productivity norms for different activities required for a construction project. From the foregoing, the aim of this study is to determine productivity of building craftsmen in floor screed activity with a view to establishing productivity norm for accurate estimation of manpower requirements for projects executed in South-South Geo-Political Zone of Nigeria.

1.1 Objectives of the Study

The objectives of the study were to:

i. assess the productivity of craftsmen in floor screed activity,
ii. compare their productivities across the States in South-South Geo-Political Zone of Nigeria, and
iii. establish productivity norms for floor screed activity in the Zone.

1.2. Research Hypothesis

To achieve the objectives of the study two hypotheses were postulated which states that:

H_1: Construction labour productivities of floor screed activity do not vary significantly across the states in South-South Geo-Political Zone of Nigeria.

H_2: The non-productive time of construction labour in floor screed activity does not vary significantly across the states in South-South Geo-Political Zone of Nigeria.

2. LITERATURE REVIEW

Previous studies have investigated factors affecting construction labour productivity. Odesola, Okolie and Nnametu (2015) observed that "while some factors have significant effects, others may not be significant but their relative effects, generally, could differ from place to place". Odesola and Oladokun (2015a) undertook a comparative evaluation of factors affecting construction labour productivity in South-South, Nigeria and reported that geographical demarcations did not have significant influence on construction labour productivity in the zone. Apart from the studies of factors affecting construction labour productivity, some productivity studies have examined the productivity of construction labour for selected construction activities. Odesola and Oladokun (2015b) carried out a labour productivity of blockwork activity in selected public building projects in Akwa Ibom State, Nigeria. The study reported that the average and baseline construction labour productivities of blockwork activity are 0.83 m^2/hr and 1.07m^2/hr respectively. In the same vein, Odesola and Ulaeto (2016) developed labour productivity indices for floor screed activity for sustainable built environment in Delta State, Nigeria. The study show that the average and baseline productivities of floor screed activity are 2.11m^2/hr and 2.70m^2/hr respectively.

Alinaitwe, Mwakali and Hansson (2007) observed the possibility of variation existing in construction labour productivity across different places. Consequently, some productivity studies have focused on comparative analysis of construction labour productivities across different places with the objective of establishing the influence of location on the productivity of building craftsmen. Arising from this, Odesola and Idoro (2014) carried out a comparative study of construction labour productivity for blockwork activity across the states in South-South, Nigeria using data from projects' records. The findings of the study showed that there is no significant variation in construction labour productivities of blockwork activity across the states in South-South, Nigeria. Based on the argument that the result of such comparison could only be justified by the fulfilment of certain assumptions made, Odesola and Okwuashi (2016) carried out a comparative study on labour productivity of blockwork activity in South-South, Nigeria using work study approach. The outcome of the study confirmed that there is no significant variation in construction labour productivity of blockwork activity in the zone. Similar studies have been carried out for wall plastering activity by Odesola (2015) and Odesola, Okolie and Nnametu (2015). The results showed that while there is no significant variation in labour productivity of wall plastering activity across the states in South-South, Nigeria using the work study approach there is however, significant variation using data from projects' records. Consequently, even though Odesola and Wilson (2015) undertook a comparative study of construction labour productivity of floor screed activity using data from projects' records it is therefore needful to examine same using the work study approach for clarity.

Singh (2013) noted that work study is the earliest effectiveness and efficiency technique which even to date remains the basis of other techniques developed later and had its roots in Industrial Engineering. According to the author, "work study is defined as the systematic examination of the methods of carrying on activities so as to improve the effective use of resources and to set up standards of performance for the activities being carried out". Sequel to this definition, work study consists of two parts namely, method study or motion study and work measurement or time study. Thomas, Maloney, Horner, Smith, Handa, & Sanders (1990) differentiated between the two categories of work study by stating that work-methods study involves finding the preferred method of doing the work while work-measurement or time study is used to determine the standard time to perform a

given task. Singh (2013) identified the objectives of method study to include improvement in use of all the inputs which include men, machines, material, money, time and information; economy in human effort and reduction of unnecessary fatigue; layout improvements; improvement in design of plant and equipment; improvement in safety standards and procedures and; development of better working environment.

On the other hand, the objectives of work measurement study include finding ineffective time in an activity or a process (series of activities); setting standard (norms) for output level; evaluating workers' performance; assessing and planning manpower needs; determining available capacity; comparing various work methods; facilitating operations scheduling and; establishing wage incentive schemes (Singh, 2013). Rathod, Jadhav and Babar (2016) classified the techniques used for method study into two namely, techniques used for the time relationship between parts which consists of Multiple Activity Charts and Simo Charts and, techniques for recording the movements which comprise mainly Outline Process Charts, Flow Process Charts and two Handed Process Chart. Work measurement or time study techniques that are available for productivity measurement and obtaining information about the time spent on productive and non-productive activities by workers include; work samplings, five minute ratings, craftsmen questionnaires, foreman delay surveys, time-lapse photography or video recordings, and group timing techniques (Mojaheed, 2005). In the processes of undertaking work study, the productivity of construction labour could be determined using appropriate productivity metrics.

According to Hornby (2006) and Ghanem and Abdelrazig (2006), productivity can be defined as the rate at which a worker, a company or a country produces goods, and the amount produced, compared with how much time, work and money is needed to produce them. Ghanem and Abdelrazig (2006) considered productivity as production rate per unit input where production rate is defined as amount of production per unit time. That is, productivity is related to the concept of efficiency, because efficiency is the value of outputs compared to the cost of inputs. Similarly, productivity has been presented as the ratio of output to input(s) (Lindsay, 2004; Schreyer, 2005). Conversely, productivity has also been reported in terms of the ratio of the quantity of input to the quantity of output (Choi & Minchin, 2006; Song & AbouRizk, 2008). Huang, Chapman and Butry (2009) stated that task-level productivity metrics are widely used in the construction industry, in addition, most task-level productivity metrics are single factor measures that focus on labour productivity. Attar, Gupta and Desai (2012) revealed that at project sites, contractors are often interested in labour productivity which can be defined in one of the following two ways:

$$Labour\ Productivity = \frac{Output\ (Installed\ Unit)}{Labour\ Cost} \quad (1)$$

$$Labour\ Productivity\ = \frac{Output\ (installed\ Unit)}{workhour} \quad (2)$$

3. METHODOLOGY

Descriptive survey research design approach was adopted using continuous observation technique for work measurement study. The productivity data collection manual which served as the research instrument, number of trained research assistants and, the procedure adopted in the study were as described in Odesola and Okwuashi (2016). Data for the study were collected on separate days within a period ranging from 5 September, 2011 to 8 October, 2011 across the States in South-South Geo-Political Zone

of Nigeria namely, Akwa Ibom, Bayelsa, Cross River, Delta Edo and Rivers States. On-going public building projects involving the same specification of 25mm thick cement-sand (1:4) floated bed to Building and Engineering Standard Method of Measurement 3 (Building and Engineering Standard Method of Measurement 3, 2008) were selected for the study across six states comprising the South-South Geo-Political Zone of Nigeria. The floor screed activities considered were primarily in terms of the bed or backing to a final floor finishes. Projects investigated in the study were not more than two storey heights and the complexity of work which was to be in terms of the storey heights for floor screed activity as reported by Odesola and Ulaeto (2016) was not considered necessary, because observed productivities were not distinctly different. The study adopted equation 2 to compute productivities of the craftsmen for ease of use by contractors for estimation purposes. Descriptive statistics and Analysis of Variance were used for data analysis.

4. PRESENTATION AND DISCUSSION OF RESULTS

Data obtained in the study as shown in the Appendix were collated and productivities of construction labour computed as described in the research methodology. Results of the statistical analysis carried out are presented hereunder.

4.1 Construction Labour Productivity of Floor Screed Activity in Selected Public Building Projects

Descriptive results of the measures of variation in the daily labour productivity of floor screed activity across the six states in South-South zone of Nigeria are shown in Table 1. The result in Table 1 indicates that Delta State has the highest average construction labour productivity of 2.11m^2/hr while Bayelsa State has the least. The minimum construction labour productivity in the South-South Geo-Political Zone of Nigeria is 1.08m^2/hr and was recorded in Delta, Rivers and Bayelsa States. On the other hand, the maximum construction labour productivity in the Zone is 3.24m^2/hr and it occurred in Akwa Ibom State. Minimum, maximum and average construction labour productivities of floor screed activity across the states in the zone are depicted in Table 1. Edo State recorded the highest range of construction labour productivity within the period of the work study and is depicted by 2.24m^2/hr. This depicts the magnitude of the influence of situations or factors affecting construction labour productivity of floor screed activity in Edo state. In the same vein, the variability of construction labour productivity for floor screed activity in the state is indicated by sample standard deviation and variance values of 0.810 and 0.656 respectively. Similarly, the range, standard deviation and variances indicating variability of construction labour productivities in floor screed activity across other states in the zone are shown in Table 1.

4.2 ANOVA Test of Difference in Construction Labour Productivities across the States in South-South Geo-Political Zone of Nigeria

The primary objective of the study was to compare construction labour productivities of building craftsmen in floor screed activity across the States in South-South Geo-Political Zone of Nigeria. The essence of this is to explore the possibility of adopting a common productivity norm for floor screed activity in the Zone or that it should be considered

separately for the states to enhance accuracy of labour resource requirements. Analysis of Variance test was carried out to investigate if significant variation exists in construction labour productivities of floor screed activity based on total working time and the actual working time of building craftsmen across the States in South-South Geo-Political Zone of Nigeria. The result of the test is presented in Table 2.

Table 1: Descriptive results of measures of variation in the daily labour productivity of floor screed activity for the six states in South-South zone of Nigeria

Parameters Tested	N	Range	Min (m^2/hr)	Max (m^2/hr)	Mean (m^2/hr)	Std. Dev.	Variance	Rank
Daily Labour Productivity of Floor Screed Activity in Delta State	30	1.96	1.08	3.04	2.11	.684	.468	1
Daily Labour Productivity of Floor Screed Activity in Cross State	30	1.66	1.22	2.88	2.03	.558	.311	2
Daily Labour Productivity of Floor Screed Activity in Edo State	30	2.24	0.88	3.12	1.98	.810	.656	3
Daily Labour Productivity of Floor Screed Activity in Rivers State	30	1.92	1.08	3.00	1.81	.457	.209	4
Daily Labour Productivity of Floor Screed Activity in Akwa Ibom State	30	2.06	1.18	3.24	1.77	.675	.456	5
Daily Labour Productivity of Floor Screed Activity in Bayelsa State	30	1.74	1.08	2.82	1.72	.598	.357	6

*N = Number, Min = Minimum, Max = Maximum, Std. Dev. = Standard Deviation

Table 2: ANOVA test of difference in daily construction labour productivities of floor screed activity across the states in South-South of Nigeria

Parameter Tested	N Total	Mean	F-value	df	p-value	Levene's (p-value)	Welch (p-value)	BF Test (p-value)
Variation in construction labour productivities of floor screed activity based on total working time across States in the Zone	180	1.90	1.855	5	0.105	0.000	0.102	0.105
Variation in construction labour productivities of floor screed activity based on total working time across States in the Zone	180	3.07	2.030	5	0.077	0.739	0.081	0.077

*N = Number, Std Dev = Standard deviation, BF = Brown-Forsythe

For construction labour productivities based on total 8 working hours in a day, the result indicates that p-value (0.000) for Levene's test is less than the critical p-value (0.05) indicating a violation of the assumption of homogeneity of variance. Notwithstanding, considering that the sizes of the groups were reasonably similar (i.e. largest/smallest = 1 which is less than 1.5) analysis of variance could be considered robust enough to

accommodate this violation (Odesola, Okolie and Nnametu, 2015). Alternatively, to be assured that the result of the analysis of variance was reliable, the robust tests of equality of means were considered. In this case, the p-values (0.102 and 0.105) for both Welch and Brown-Forsythe tests were greater than the critical p-value (0.05) which indicates that there is no significant variation and confirms that the ANOVA results was reliable. Consequent upon this the results of the test of difference in the daily productivities of construction labour engaged in floor screed in Table 2 shows that p-value (0.197) is greater than the critical p-value (0.05) therefore; the test fails to reject the hypothesis. This result indicates that construction labour productivity of floor screed does not vary significantly across the six states that constituted the study area. Average construction labour productivity of floor screed activity in the zone was 1.90m^2/hr which represents approximately 15.2m^2 per day (i.e. 1.90 x 8 working hours).

Similarly, for construction labour productivities based on actual working time of building craftsmen in a day, the result shows that p-value (0.739) for Levene's test is greater than the critical p-value (0.05) indicating no violation of the assumption of homogeneity of variance. Consequent upon this the results of the test of difference in the daily productivities of construction labour engaged in floor screed in Table 2 shows that p-value (0.077) is greater than the critical p-value (0.05) therefore; the test fails to reject the hypothesis. This result indicates that construction labour productivity of floor screed based on the actual working time of building craftsmen does not vary significantly across the six states that constituted the study area. Average construction labour productivity of floor screed activity in the zone based on actual working time of building craftsmen was 3.07m^2/hr which is almost $1\,{}^{2}/_{3}$ times greater than for the total working time indicating that less time was actually spent working and that the productivity would have been that much enhanced if the craftsmen had actually worked throughout the day. Although it may not be completely expected that the craftsmen would work continuously for the whole day but it does show that productivity could be enhanced by converting some of the non-productive time into use.

The result of the study reaffirms the conclusion in Odesola and Wilson (2015) that there is no significant variation in construction labour productivity of floor screed activity across the states comprising the South-South Geo-Political Zone of Nigeria. This also implies that unlike for blockwork activity where there was significant variation in labour productivities in the Zone based on data obtained from projects' records (Odesola and Idoro, 2014), the data utilised from projects' records is reliable for floor screed activity. In the same vein, differences in contractual claims opined by Odesola, Okolie and Nnametu (2015) as being responsible for the difference in the outcome of the results from projects' records and workstudy for blockwork activity is not applicable for floor screed activity.

4.3 ANOVA Test of Difference in the non-working time of construction labour across the States in South-South Geo-Political Zone of Nigeria

The study sought to investigate whether variations exists in the nonworking time of construction labour for floor screed activity across the states in the South-South Geo-Political Zone of Nigeria. The purpose of this is to know if location influences the non-productive time exhibited by construction labour in floor screed activity in the Zone. To achieve this, Analysis of Variance Test was conducted and the result of the test is depicted in Table 3.

Table 3: ANOVA test of difference in the nonworking time of construction labour for floor screed activity across the states in South-South of Nigeria

Parameter Tested	N Total	Mean	F-value	df	p-value	Levene's (p-value)	Welch (p-value)	BF Test (p-value)
Variation in nonworking time of construction labour for floor screed activity across the states in the South-South Geo-Political Zone	180	178.16	10.762	5	0.000	0.075	0.000	0.000

*N = Number, BF = Brown-Forsythe

The result indicates that p-value (0.075) for Levene's test is greater than the critical p-value (0.05) indicating no violation of the assumption of homogeneity of variance. Consequent upon this the results of the test of difference in the daily nonworking time of construction labour engaged in floor screed in Table 3 shows that p-value (0.000) is less than the critical p-value (0.05) therefore; the test rejects the null hypothesis. This result indicates that the nonworking time of construction labour for floor screed activity vary significantly across the six states that constituted the study area. Average nonworking time of construction labour engaged in floor screed activity in the zone was 178.16 minutes.

The variation in the nonworking time of construction labour engaged in floor screed activity across the states implies that they have different potentials for productivity improvements. This may be attributed to differences in business environmental factors influencing the organisational culture of the construction companies executing the building projects across the states. The study of Ankrah, Proverbs, Antwi and Debrah (2005) which observes that geographical location can have an influence on the types of clients served and the staff employed by the organisation as well as opportunities for development supports this assertion. In the same vein, the observation that the physical characteristics of the location such as a busy city centre or a rural area are important considerations which can all have a significant influence on culture (Ankrah, Proverbs, Antwi and Debrah, 2005; Mullins, 2005) further lay credence to this assertion. Studies have also shown that organisation culture, which are shared values, beliefs and norms that influence the way employees think, feel and behave, on the other hand, influences employees' performance in the workplace (Aktas, Cicek & Kiyak, 2011; Agwu, 2014).

5. CONCLUSION AND RECOMMENDATIONS

This study concludes that a common productivity norm for floor screed activity in South-South Geo-Political Zone of Nigeria is feasible. Hence, the daily average construction labour productivity of floor screed activity in the zone based on a gang comprising of an artisan and mate is 1.90m^2/hr for 8 hours working day. In addition, potentials for productivity improvement based on the variation existing in the nonworking time of construction labour for floor screed activity vary across the states in the zone. It is opined that possibilities of variation in business environments of the states in the Zone could be responsible for this variation in potentials for productivity improvement in the Zone. Consequently, it is recommended that while common productivity norm could be adopted for estimating labour resource requirements for floor screed activity in the Zone cognisance should be made of peculiar business environmental factors in planning labour productivity improvement strategies.

6. LIMITATION OF THE STUDY

The study is limited to public buildings of not more than two storey heights of which the observed labour productivities were not distinctly different. It is believed that at greater storey heights both the actual working time and non-working time of construction labour productivity could be significantly influenced. In view of this, it is opined that further studies could be conducted to investigate the influence of storey heights on construction labour productivity of floor screed activity at greater storey heights. Furthermore, the study was carried out in the South-South Geo-Political Zone of Nigeria therefore, the results of the study are applicable to the zone. Consequently, further studies could be replicated in other Geo-Political Zone of Nigeria.

7. ACKNOWLEDGEMENT

The authors acknowledge the Nigerian Tertiary Education Trust Fund (TETFUND) for sponsoring the Doctoral Research Work that produced this article.

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APPENDIX: Data on construction labour productivity of floor screed activity

States in South-South, Nigeria	PTYTWT	PTYAWT	TWT(Min)	NWT(Min)	AWT(Min)
1	1.22	1.88	480	169	311
1	1.62	2.1	480	110.5	369.5
1	1.62	2.25	480	134.5	345.5
1	1.22	1.93	480	176.5	303.5
1	2.44	3.24	480	118.5	361.5
1	2.6	4.29	480	189	291
1	1.34	2.26	480	195.5	284.5
1	1.18	1.84	480	172	308
1	1.18	1.87	480	176.5	303.5
1	2.58	4	480	170.5	309.5
1	1.34	2.46	480	219	261
1	1.18	1.88	480	179	301
1	1.12	1.87	480	192.5	287.5
1	1.6	2.98	480	222.5	257.5
1	1.6	3.54	480	263	217
1	1.6	2.91	480	216.5	263.5
1	2.62	4.93	480	225	255
1	2.82	5.43	480	230.5	249.5
1	2.7	4.45	480	189	291
1	2.62	4.26	480	185	295
1	1.22	2.13	480	205	275
1	2.62	4.14	480	176.5	303.5
1	1.12	1.8	480	181	299
1	1.12	1.82	480	184.5	295.5
1	1.62	2.57	480	178	302
1	1.22	2.21	480	214.5	265.5
1	1.12	1.77	480	176.5	303.5
1	1.22	1.64	480	124	356
1	1.58	2.62	480	190	290
1	1.58	2.44	480	169	311
2	1.12	1.87	480	192.5	287.5
2	1.6	2.98	480	222.5	257.5
2	1.6	3.54	480	263	217
2	1.6	2.91	480	216.5	263.5
2	2.62	4.93	480	225	255
2	2.82	5.43	480	230.5	249.5
2	2.7	4.45	480	189	291
2	2.62	4.26	480	185	295
2	1.22	2.13	480	205	275
2	2.62	4.14	480	176.5	303.5
2	1.12	1.8	480	181	299
2	1.12	1.82	480	184.5	295.5
2	1.62	2.57	480	178	302
2	1.22	2.21	480	214.5	265.5
2	1.12	1.77	480	176.5	303.5
2	1.22	1.64	480	124	356
2	1.58	2.62	480	190	290
2	1.58	2.44	480	169	311
2	1.12	1.87	480	192.5	287.5
2	1.6	2.98	480	222.5	257.5
2	1.6	3.54	480	263	217
2	1.6	2.91	480	216.5	263.5
2	2.62	4.93	480	225	255
2	2.82	5.43	480	230.5	249.5
2	2.7	4.45	480	189	291
2	2.62	4.26	480	185	295
2	1.22	2.13	480	205	275
2	2.62	4.14	480	176.5	303.5
2	1.12	1.8	480	181	299
2	1.12	1.82	480	184.5	295.5
2	1.62	2.57	480	178	302
2	1.22	2.21	480	214.5	265.5
2	1.12	1.77	480	176.5	303.5
2	1.22	1.64	480	124	356
2	1.08	1.64	480	163	317
2	1.62	2.06	480	102	378
2	1.62	2.33	480	146.5	333.5

States in South-South, Nigeria	PTYTWT	PTYAWT	TWT(Min)	NWT(Min)	AWT(Min)
	3	2.84	4.48	480	176	304
	3	1.62	2.92	480	213.5	266.5
	3	1.62	2.3	480	142.5	337.5
	3	2.88	3.59	480	95	385
	3	1.62	2.2	480	126.5	353.5
	3	1.22	2.3	480	225.5	254.5
	3	1.62	2.41	480	158	322
	3	1.62	3.01	480	221.5	258.5
	3	1.62	2.95	480	216.5	263.5
	3	2.7	4.26	480	175.5	304.5
	3	2.7	4.62	480	199.5	280.5
	3	1.5	2.18	480	149	331
	3	2.5	4.01	480	181	299
	3	2.7	6.38	480	277	203
	3	1.62	2.71	480	193.5	286.5
	3	2.84	5.12	480	213.5	266.5
	3	2.5	4.55	480	216.5	263.5
	3	1.62	3.02	480	222.5	257.5
	3	1.5	2.23	480	156.5	323.5
	3	2.5	3.89	480	171.5	308.5
	3	2.44	3.58	480	153	327
	3	1.5	2.33	480	170.5	309.5
	3	2.5	3.8	480	164	316
	3	2.82	3.95	480	137	343
	3	1.62	2.39	480	154.5	325.5
	3	1.5	2.31	480	168	312
	3	1.62	2.38	480	153	327
	3	1.62	2.36	480	151	329
	3	1.62	2.5	480	169	311
	3	2.44	4	480	187	293

States in South-South, Nigeria	PTYTWT	PTYAWT	TWT(Min)	NWT(Min)	AWT(Min)
	4	1.16	1.59	480	129	351
	4	1.16	1.54	480	117.5	362.5
	4	1.62	2.33	480	146	334
	4	1.16	1.87	480	181.5	298.5
	4	2.62	3.96	480	162.5	317.5
	4	3.04	4.48	480	154	326
	4	2.2	3.56	480	183	297
	4	2.2	2.94	480	120.5	359.5
	4	1.62	2.32	480	145	335
	4	1.88	2.63	480	137	343
	4	2.62	4.37	480	192.5	287.5
	4	3.04	4.75	480	173	307
	4	1.62	2.68	480	189.5	290.5
	4	1.22	1.99	480	185	295
	4	1.1	1.71	480	172	308
	4	2.46	3.61	480	153	327
	4	1.88	2.81	480	159	321
	4	3.04	4.67	480	167.5	312.5
	4	2.62	4.05	480	169.5	310.5
	4	1.62	2.85	480	207	273
	4	1.88	2.97	480	176	304
	4	3.04	4.82	480	177	303
	4	2	2.79	480	135.5	344.5
	4	1.08	1.81	480	193.5	286.5
	4	2.62	3.96	480	162.5	317.5
	4	2.18	3.06	480	137.5	342.5
	4	2.82	4.24	480	160.5	319.5
	4	1.88	2.87	480	166	314
	4	3	4.59	480	166	314
	4	3.04	4.89	480	181.5	298.5

States in South-South, Nigeria	PTYTWT	PTYAWT	TWT(Min)	NWT(Min)	AWT(Min)
5	2.76	3.98	480	147.5	332.5
5	2.42	3.56	480	153.5	326.5
5	3.12	5.38	480	201.5	278.5
5	2.5	3.99	480	179.5	300.5
5	1.22	2.01	480	189	291
5	2.44	3.56	480	151	329
5	1.08	2.11	480	234	246
5	1.62	3.32	480	246	234
5	2.5	3.78	480	162.5	317.5
5	2.5	3.54	480	141	339
5	3.06	4.56	480	158	322
5	1.08	1.81	480	193.5	286.5
5	1.08	1.94	480	213	267
5	1.62	2.34	480	147.5	332.5
5	0.88	1.48	480	195	285
5	2.76	3.95	480	144.5	335.5
5	2.76	4.01	480	149.5	330.5
5	2.44	3.81	480	172.5	307.5
5	2.5	3.83	480	167	313
5	0.9	1.43	480	178	302
5	0.9	1.6	480	210	270
5	0.9	1.43	480	177	303
5	1.08	1.96	480	215.5	264.5
5	2.44	3.14	480	106.5	373.5
5	2.5	3.78	480	162.5	317.5
5	2.5	3.8	480	164	316
5	1.08	1.7	480	175	305
5	0.94	1.47	480	173.5	306.5
5	3	4.42	480	154.5	325.5
5	2.74	4.21	480	167.5	312.5

NB: 1 = Akwa Ibom State, 2 = Bayelsa State, 3 = Cross River State, 4 = Delta State, 5 = Edo State, 6 = Rivers State
PTYTWT = Daily productivity of floor screed activity based on total working hours per day
PTYAWT = Daily productivity of floor screed activity based on actual working hours per day

States in South-South, Nigeria	PTYTWT	PTYAWT	TWT(Min)	NWT(Min)	AWT(Min)
6	1.62	2.56	480	176	304
6	1.62	3.06	480	225.5	254.5
6	1.16	1.73	480	158	322
6	1.62	2.5	480	169	311
6	2.4	4.99	480	249	231
6	1.5	2.74	480	217	263
6	1.5	2.33	480	171	309
6	1.62	2.48	480	166	314
6	1.62	2.63	480	184	296
6	1.8	3.92	480	259.5	220.5
6	2.4	5.03	480	251	229
6	2.5	4.97	480	238.5	241.5
6	2.4	4.98	480	248.5	231.5
6	1.8	3.45	480	229.5	250.5
6	2.4	4.46	480	221.5	258.5
6	1.9	3.46	480	216.5	263.5
6	1.16	2.53	480	260	220
6	1.62	2.83	480	205.5	274.5
6	1.08	1.92	480	210.5	269.5
6	1.62	3.24	480	240	240
6	1.8	3.21	480	211	269
6	1.62	2.94	480	215.5	264.5
6	1.62	3.42	480	252.5	227.5
6	1.9	3.18	480	193	287
6	1.9	3.06	480	181.5	298.5
6	1.8	3.13	480	204	276
6	1.62	3.12	480	230.5	249.5
6	2.44	5.43	480	264.5	215.5
6	1.16	2.15	480	221.5	258.5
6	3	5.27	480	206.5	273.5

TWT = Total working time on selected public building construction sites
NWT = Non-working time of construction labour on floor screed activity
AWT = Actual Working time of construction labour on floor screed activity