

# Improvising Construction Crew Productivity on Construction site by Lean Method

Sneha P. Sawant<sup>1</sup>, Pravin J. Gorde<sup>2</sup>, Sachin Nalawade<sup>3</sup>

<sup>1</sup> Asst. Professor, Civil Engineering Department, Dr. D.Y. Patil Institute of Engineering Management & Research, Pune, India

<sup>2</sup> Asst. Professor, Civil Engineering Department, Dr. D.Y. Patil Institute of Engineering Management & Research, Pune, India

<sup>3</sup> Asst. Professor, Civil Engineering Department, Dr. D.Y. Patil Institute of Engineering Management & Research, Pune, India

## ABSTRACT

Construction is the world's largest and most challenging industry. The output of the construction industry constitutes one half of the gross capital and is 3 to 8% of the Gross Domestic Product (GDP) in most countries. Nevertheless, poor performance of the industry has been a cause of great concern among practitioners and academics. Construction projects worldwide have been experiencing significant cost and time overruns, with low labor productivity identified as a major reason for project delays and cost overruns. Improvement of construction labour productivity is therefore critical. The first step in improving construction productivity is to identify the influencing factors. After productivity factors are identified, management can take actions to mitigate these issues. In this paper we will study various methods used to evaluate 'Construction Crew Productivity' for various activities like masonry work, plastering work and flooring work and find reasons affecting the productivity of labour and reduce them.

**Keyword:** - Crew productivity<sup>1</sup>, VA<sup>2</sup>, NVA<sup>3</sup>, and NVAN<sup>4</sup>

## 1. INTRODUCTION

Construction is the world's largest and most challenging industry. The output of the construction industry constitutes one half of the gross capital and is 3 to 8% of the Gross Domestic Product (GDP) in most countries. Nevertheless, poor performance of the industry has been a cause of great concern among practitioners and academics. Construction projects worldwide have been experiencing significant cost and time overruns, with low labor productivity identified as a major reason for project delays and cost overruns. Improvement of construction labour productivity is therefore critical. The first step in improving construction productivity is to identify the influencing factors. After productivity factors are identified, management can take actions to mitigate these issues.

Therefore, the objective of this research is to identify and rank factors influencing productivity that are applicable to the Indian construction industry. To achieve this objective, a questionnaire survey of project managers, site engineers, supervisors and craftsmen working on construction sites was conducted. The rationale behind obtaining the responses from all project participants was to understand the differences in their perceptions of factors influencing productivity.

As per Anu . V. Thomas and J. Sudhakumar<sup>[1]</sup> a regression equation was developed to quantify the impact of the disruptions and overtime on labour productivity. The productivity problems observed on the project arise as a result of managerial inefficiencies, and emphasize the need for the management to improve to achieve productivity enhancement.

Shashank .K, Dr. Sutapa Hazra, Kabindra Nath Pal<sup>[2]</sup> analyzed 53 questionnaires and the result of this analysis shows that, there are six main groups which have significant impact on the labour productivity variation in the construction projects. They are Manpower group, Managerial group, Motivation group, Material/Equipment group, Safety group and Quality group.

### 1.1 PROBLEM STATEMENT:

To increase Labour Productivity by studying the working methods of different crew such as masonry, plastering and flooring work. Analyze the collected data and find out ways to increase productivity of labour, to decrease the cost of project, to increase the quality of work and to reduce the time of project completion.

### 1.2 OBJECTIVE:

- To identify the factors affecting the variation of labour productivity in the construction projects.
- To assess the impact of influenced factors on the variation of labour productivity.
- To suggest recommendations in order to reduce variation of labour productivity in the construction projects.

## 2. METHODOLOGY

For carrying out the research work selection of site is done on the basis of present working state of site where RCC work is almost done and the finishing work is in progress. Daily observations were made for about 10 days and work sampling is done.

The various activities were of brickwork were identified and differentiated as Value Added (VA), Non Value Added but Necessary (NVAN), Non Value Added (NVA).

Value is the starting point in Lean thinking. It is important to know who defines value, what is value-add and non-value add?

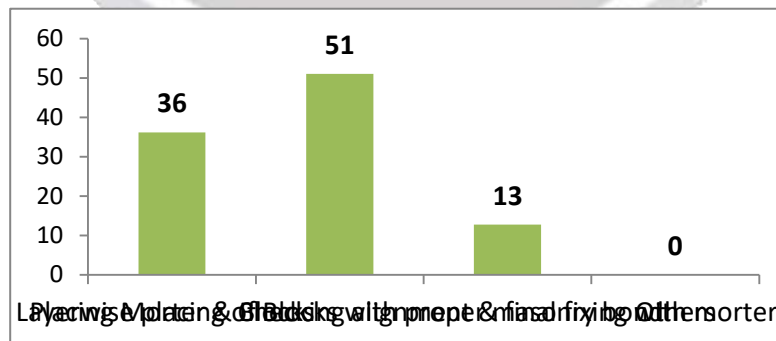
Value is defined by the customer. It could be the quality of product, the price that he pays for or the on time delivery and/or a combination of all three. Any activity that does not change the fit, form and function of product or service is **Non-value added**

NVAN - It signifies the activities carried out in the process that do not add any value to the customer but required for process completion.

NVA - It signifies the activities carried out in the process that do not add value to the customer and not required by the process

**Table 1:** Work sampling for Brickwork

Location	Activity Date	VA				NVAN			NVA		
		Placing Morter & Blocks	Layerwise placing of Blocks & proper masonry bond	Checking alignment & final fixing with mortar	Others	Transportation of Blocks	Dressing or cutting of Blocks	Others	Idle/Personal Breaks	Talking	Others
		Plant 4 Toilet Blockwork	23-Feb-17		2			1	2		
	24-Feb-17	2	2			2	1		2		
	25-Feb-17		3			2			2		
	27-Feb-17	2	2			2	2		2	1	
	28-Feb-17	2	2			1	1		2	1	
	1-Mar-17	2	2				2	2	2		
	2-Mar-17	2		2			2		2	1	
	3-Mar-17	2		1		2			1	1	
	4-Mar-17		2	1		2	2		1	1	
	6-Mar-17		3			2	2		2	1	
	7-Mar-17	1		2			2			1	
	8-Mar-17		2			2	2		2	1	
	9-Mar-17	1	2				3		1	1	
	10-Mar-17	1				2	2	2	2	1	
	11-Mar-17	2	2								
	14-Mar-17								1		
	<b>TOTAL</b>	17	24	6	0	18	23	4	22	10	0
	<b>% Contribution</b>	36	51	13	0	40	51	9	69	31	0
	<b>% VA NVAN NVA</b>	38				36			26		



**Fig 1:** Graph showing percent contribution of VA

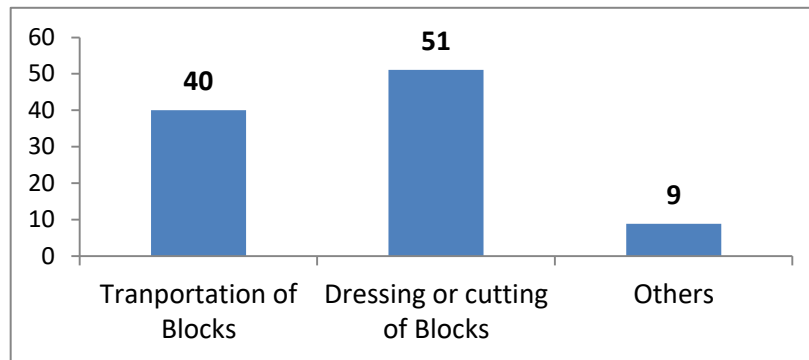


Fig 2: Graph showing percent contribution of NVAN

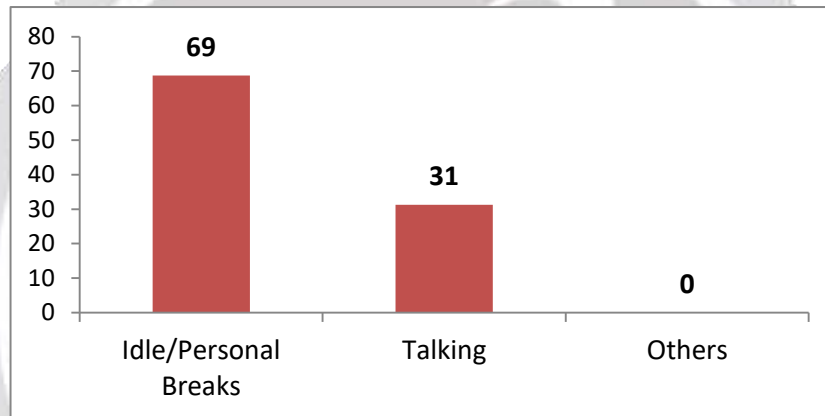


Fig 3 : Graph showing percent contribution of NVA

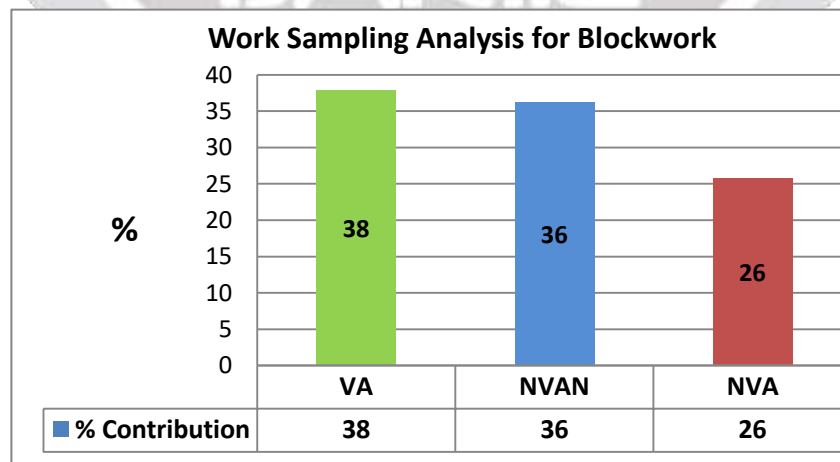
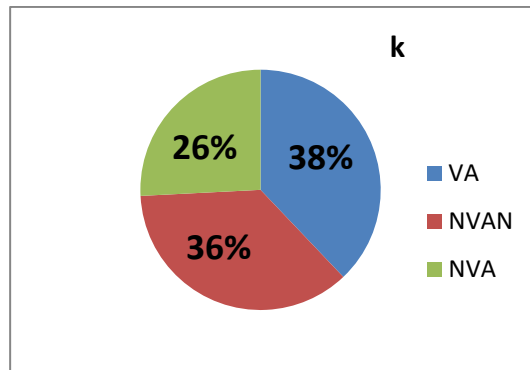


Fig 4: Graph showing percent contribution of VA, NVAN and NVA




**Fig 5 :** Pie chart showing contributions of VA, NVAN and NVA


**4. CONCLUSIONS**

From the above observations it is seen that continuous focus must be made in increasing Value Added Activities and reduce NVA. So the wastage will be reduced and productivity will be increased. Following steps can be taken to reduce NVA activities.

Recommendation	Action Plan
Material staking should be near so that less time will consume for transportation of the same	Identification of upcoming block work activity area and unload the material nearer to the execution work area for main plants and ancillary structures
Proper supervision can reduce considerable waste time	Smart supervision on specific execution activity to improve value adding time with increase in productivity
Limit on personal breaks during the productive working time	Plan to reduce the personal breaks be providing refreshments near to the execution work premises
Proper guidance needs to be provide for awareness of productive time wastage	Productive time wastage impact and importance will be explained I short during the tool box talk everyday as well as Supervisor can guide during everyday's work to create awareness

**BIOGRAPHIES**

	Mrs. Sneha P. Sawant, Asst. Professor, Dr. D.Y.Patil Institute of Engineering Management & Research, Akurdi, Pune - 44
	Mr. Pravin J. Gorde Asst. Professor, Dr. D.Y.Patil Institute of Engineering Management & Research, Akurdi, Pune - 44

	<p>Mr. Sachin Nalawade Asst. Professor, Dr. D.Y.Patil Institute of Engineering Management &amp; Research, Akurdi, Pune – 44</p>
-----------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------

