

# Enhancement of Labour Productivity in Pre-cast Industry using Work Study Method

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**Abstract**— Profitability remains a charming subject and a prevailing issue in the development area, promising cost reserve funds and productive utilization of assets. Efficiency is a standout amongst the most critical issues in both created and creating nations. The created nations know about the significance of financial development and social welfare. The creating nations which confront unemployment issues, swelling and asset shortage look to use assets and so as to accomplish financial development and enhance subjects lives. The point of this venture work is to distinguish factors influencing work profitability and furthermore to think about causes i.e. work issues nearby and its consequences for the development ventures. A portion of the essential variables influencing work efficiency are nature of site administration, material lack, opportune installment of wages, work understanding, false impressions amongst work and administrator and so forth. Here issues confronted by the work on Indian development destinations are managed in detail. Issues like non-accessibility of legitimate settlement, fundamental enhancements, low wages, wellbeing related issues, security and so on, exists in all Indian development locales. This work focuses on work efficiency proportions that are decreasing step by step, which thus hurts association's benefit. In this examination an endeavor has been made to relate the evil impacts of falling work profitability with the efficiency of different assets, for example, material, hardware and capital. Examination of the information gathered was finished utilizing distinctive factual techniques. This report incorporates clarifications on work profitability, efficiency change utilizing work examine, factors influencing work efficiency and the solutions for the same.

**Key words:** Labour, Productivity, Efficiency, Pre-cast, Data collection, Profitability

## I. INTRODUCTION

Modernization and industrialization have assisted the development business with growing by a wide margin. Residential areas and urban communities have turned out to be more urbanized and, the development part too has a lift. Regardless of periodic droops in the economy or in development works, the division is experiencing a quicker development. Aside from old/customary urban/modern focuses, new mechanical/urban focuses have showed up on the guide where development works are going on. Extending and quickly developing development area, by and large, has drawn substantial number of specialists because of absence of more prominent work opportunity somewhere else. There are more than 20 million of development specialists in India at show. Urban areas, similar to Delhi alone have around more than 600 thousand of them. Aside from metros different urban communities, similar to Jamnagar in Gujarat, Guwahati and Shillong in the Northeast are additionally growing at quick rate.

Movement from various states to different states in India has now turned out to be rampant to the point that its effect is felt in each part of life. Movement turns into a lifestyle to numerous, who are untalented and semi-gifted and think that its hard to show signs of improvement employments inside their local and area. These vagrant specialists are spread over the width and length of the nation. The greater part of the development works have moved from various locales and states leaving their local towns looking for work. These individuals as a rule are itinerant in their life and generally don't come back to their origination or locals. They go from one zone of work to other range alongside their families and live in a place, which is either given by the proprietor of the development organization or someplace close-by, building impermanent havens. They have most extreme portability in light of the idea of their work. These works are occupied with enormous modern developments, private level developments, city beautification works. These development workers, involving the disorderly work constrain remain the most abused ones even following five many years of autonomy. In the current past the pattern demonstrates that all enormous urban areas in the nation have turned into the focuses to enroll easygoing workers as development works to urban communities and urban territories. The greater part of the development works move to urban communities and metros are from poor families and are uneducated. Their absence of instruction and ability settle on their decisions exceptionally constrained. When they come to huge urban communities, they need to confront various issues in light of their inability and absence of aptitude. They turn out to be simple casualties of misuse and need to work for their everyday sustenance. The development business is blasting empowered by the work versatility of business class individuals, hands on officers, IT representatives, understudies and so forth. Since need of settlement is fundamental, the development business is additionally finding.

## II. OBJECTIVE

The Objectives of this investigation are as follows:

- To decide issues confronted by work and suggest measures to decrease the issues and to improve productivity
- To recognize central point influencing efficiency and show impact of work profitability
- To decide issues confronted by work and propose measures to lessen the issues and to enhance efficiency
- To build up their capabilities.

Past examinations were focused on the issues of work, material and hardware independently. For instance, one discovers contemplates on work efficiency and profitability in development. The work on work efficiency and its synchronous effect on different assets of development, for

example, material, hardware, and capital are practically non-existent. This investigation is centered around essential data search by getting sees from works and also temporary workers/proprietors/supervisors.

### III. LITERATURE SURVEY

Pre-cast concrete establishment handle is broke down in this for development by the utilization of profitability defer demonstrate (MPDM). The MPDM system is a change of the conventional time and movement think about idea (Adrian, 1974)[1]. The procedure was created to give the development firm a methods for measuring generation, foreseeing defer causes and enhancing efficiency by means of situations and moderation of underlying drivers. The MPDM was utilized as often as possible in demonstrating development operations, i.e., solid situation with a crane and basin, arrangement of solid utilizing a solid pump and hand mining of a delicate ground burrow. The information accumulation and investigation for these cases was finished by Bradshaw in 1978 (Halpin and Riggs, 1992)[2]. Abu Hammad et al (2002 a&b) and Koskella (1999) demonstrated that industrial facility generation lines are compelled by the blended model assembling that includes the creation of various unit sizes and shapes at a similar generation line. Keeping in mind the end goal to streamline the execution, it is imperative to adjust the work inconstancy per lean generation theory[3]. The arrangement of assault of this examination is to break down the probabilistic idea of process durations in help to the use of the MPDM. Deterministic models do exclude dynamic associations existing in the framework. Another exploration concentrated on distinguishing the suitable approach for outlining and dealing with the stockyard design that guarantees effective capacity and dispatch of pre-thrown items. Also, the exploration proposed a reenactment model to assess and help oversee stockyard space (Marasini et al., 2001)[4]. Stop (2006) played out a broad writing audit on efficiency in development to help the method of reasoning of a proposed profitability estimation display in light of venture condition and administration exertion factors[5]. Late writing concentrated on pre-thrown solid research meant to help pre-thrown providers in inspecting if temporary workers are prepared to embrace JIT in getting and introducing pre-thrown (Pheng, 2001)[6]. Just industrial facility producing can't guarantee in-time work finishing. What's more, just by keeping assets occupied both on location and plant, one can't enhance profitability or lessen the time cycle. For that, we need to isolate action in straightforward activities and attempt to do them with least endeavors and inside least time with appropriate arranging and management[7].

### IV. METHODOLOGY

The preparatory understanding of the subject information for this investigation has been gathered through a writing audit taken after by the utilization of research overview focused at contractual workers, subcontractors and labors. The review was done utilizing advantageous irregular testing. Information were gathered from medium to substantial size industry of Chennai and Mumbai. Diverse enterprises are gone to get assortment of information.

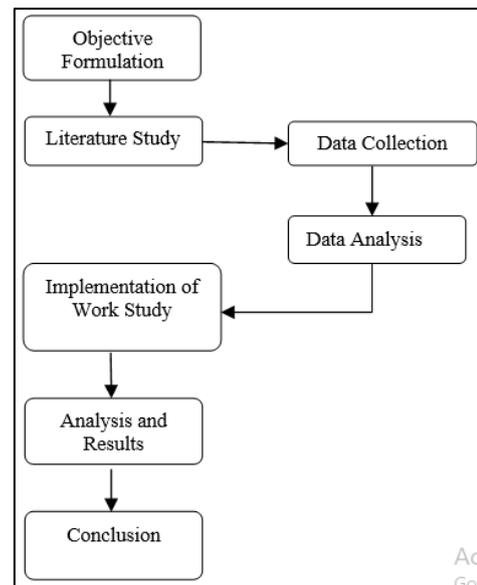


Fig. 1: Flowchart of Methodology

#### A. Data Collection

Information accumulation is the most basic piece of the investigation since the exactness of the information will decide the achievement or disappointment of the examination.

The information's are acquired through writing considers and diverse enterprises that are broke down utilizing suitable scientific procedures keeping in mind the end goal to depict an unmistakable point of view on the exploration.

#### B. Data Analysis

Reactions from information gathering are then assembled and dissected. Subsequent to gathering required number of tests, information investigation is done to touch base at various variables which bring down the efficiency. These elements are then dissected to locate the fly powder block including different fixings in various proportions.

### V. PROCEDURE

The profitability rate is figured utilizing the information that was procured from coordinate site perception. Work assumes a noteworthy part in development profitability. In this way work profitability can be measured from the equation is Labour Productivity = Work done/No of works.

Perception made on precast yard for the work done in no of Brick. In the following month, the work consider was actualized in the site. An audit of the earlier month's profitability was led so that for future, work study can be talked about and executed at site. In view of the past survey, the accompanying work examine is actualized in the site.

#### A. Implementation of Work Study

- Training should be provided on work to be done.
- Following days work should be planned earlier. (i.e. earlier arrangement of each and every activity)
- Using skilled managers and workers for proper sort of exercises.
- Reduction of distance between material stockyard and workplace.

- Lean construction principles such as reduction of wastage should be adopted.
- For cutting and bending the reinforcement, machines should be used.
- Providing mask for labours.(i.e to provide health protection)

The productivity has been hiked upto some extent by implementing the above work study method.

### B. Productivity Improvement

Legitimate work study ought to be done to upgrade the profitability rate in development; clearly the contractual worker would be profited. On the other hand the wastage of the materials can likewise be avoided on directing famous work examine. Along these lines the contractual worker should deal with profitability and its related issues to render enough benefit.

Efficiency can be enhanced by utilizing two systems to be specific, representative based and undertaking based strategies. From the earliest starting point, there has been a need to perceive that individuals are an essential piece of the work framework.

Profitability change does not simply occur unintentionally. It requires on-going duty from both administration and workers to carry out the occupation right the first run through, at the source, through the utilization of essential abilities, apparatuses and procedures.

A venture is recognized and field work is done on precast yard. The work done and the work class are seen in the site and utilizing that the efficiency rate is computed for consistently. At the time of first month, the advance and the result of the venture identifying with the efficiency is watched. Also, in later month, the work thinks about are executed to enhance efficiency in the precast yard.

Meanwhile the procedure and result of exercises for the second month is additionally watched. In this manner the distinctions in the work effectiveness and profitability rate between two months obviously demonstrate the change of efficiency in extend.

## VI. ANALYSIS AND RESULTS

The work study of a pre-cast industry project was done. Review of the labour productivity and the causes for poor productivity were covered under this study. The list of activities involved in pre-cast industry was studied.

The details of different activities were obtained from different sources and from which, the conclusions were drawn on the productivity levels and causes of the poor productivity.

The Observation was made on precast yard for work done in no of fly ash Brick, solid block, and interlocking bricks. The results are tabulated as follows.

### A. Productivity Chart

Productivity Chart of Fly Ash Bricks					
Day	Quantity of brick manufacture without w.s	Quantity of brick manufacture per day with w.s	variation	cost of 1 brick Rs.p.	Additional profit by implementation of w.s (Rs.p.)
1	4500	5000	500	3.5	1750
2	4574	4900	326	3.5	1141
3	4350	4800	450	3.5	1575
4	4600	4900	300	3.5	1050
5	4555	4850	295	3.5	1032.5
6	4400	4800	400	3.5	1400
7	4459	4900	441	3.5	1543.5
8	4250	4705	455	3.5	1592.5
9	4500	4800	300	3.5	1050
10	4300	4750	450	3.5	1575
11	4350	4800	450	3.5	1575
12	4545	4800	255	3.5	892.5
13	4300	4555	255	3.5	892.5
14	4500	4700	200	3.5	700
15	4450	4650	200	3.5	700
16	4450	4600	150	3.5	525
17	4500	4650	150	3.5	525
18	4400	4880	480	3.5	1680
19	4300	4600	300	3.5	1050
20	4450	4700	250	3.5	875
21	4400	4700	300	3.5	1050
22	4550	4688	138	3.5	483
23	4600	4755	155	3.5	542.5
24	4400	4700	300	3.5	1050
25	4589	4950	361	3.5	1263.5
26	4600	4900	300	3.5	1050
27	4450	4900	450	3.5	1575
28	4300	4600	300	3.5	1050
29	4500	4839	339	3.5	1186.5
30	4400	4800	400	3.5	1400

				<b>Total profit</b>	<b>33775</b>
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Table 1: Fly ash bricks

<b>Productivity Chart of Solid Block</b>					
<b>Day</b>	<b>Quantity of brick manufacture without w.s</b>	<b>Quantity of brick manufacture with w.s</b>	<b>Variation</b>	<b>Cost of 1 brick Rs.p.</b>	<b>Additional profit by implementation of w.s (Rs.p.)</b>
1	967	975	8	40	320
2	966	975	9	40	360
3	955	960	5	40	200
4	940	950	10	40	400
5	955	970	15	40	600
6	965	970	5	40	200
7	977	989	12	40	480
8	975	990	15	40	600
9	966	980	14	40	560
10	988	998	10	40	400
11	956	970	14	40	560
12	954	969	15	40	600
13	945	959	14	40	560
14	935	950	15	40	600
15	940	950	10	40	400
16	976	988	12	40	480
17	938	950	12	40	480
18	965	970	5	40	200
19	954	964	10	40	400
20	965	975	10	40	400
21	967	978	11	40	440
22	950	960	10	40	400
23	977	988	11	40	400
24	965	975	10	40	400
25	970	980	10	40	400
26	966	970	4	40	160
27	975	980	5	40	200
28	955	965	10	40	400
29	939	950	11	40	440
				<b>Total profit</b>	<b>12080</b>

Table 2: Solid block

<b>Productivity Chart of Interlocking Brick</b>					
<b>Day</b>	<b>Quantity of brick manufacture without w.s</b>	<b>Quantity of brick manufacture with w.s</b>	<b>Variation</b>	<b>Cost of 1 brick Rs.p.</b>	<b>Additional profit by implementation of w.s (Rs.p.)</b>
1	240	267	27	20	540
2	250	268	18	20	360
3	245	256	11	20	220
4	250	260	10	20	200
5	248	268	20	20	400
6	243	260	17	20	340
7	233	248	15	20	300
8	249	260	11	20	220
9	250	255	5	20	100
10	243	270	27	20	540
11	248	260	12	20	240
12	250	259	9	20	180
13	255	265	10	20	200
14	239	250	11	20	220
15	248	259	11	20	220
16	247	260	13	20	260
17	239	255	16	20	320
18	254	260	6	20	120
19	252	262	10	20	200

20	248	258	10	20	200
21	249	258	9	20	180
22	244	262	18	20	360
23	255	261	6	20	120
24	249	261	12	20	240
25	243	258	15	20	300
26	245	250	5	20	100
				<b>Total profit</b>	<b>6680</b>

Table 3: Interlocking bricks



Brick size = 230x110x75mm

Fig. 2: Fly ash bricks



Brick size = 115x220x230mm

Fig. 3: Interlocking bricks

## VII. CONCLUSION AND FUTURE WORK

The contextual analysis recommends that distinctions in the minor work efficiency cause vast yield misfortunes. From overview it is discovered that businesses of development work don't consider their work as their representatives. Overall revenue is just the criteria for a large number of the development firms and consequently development firms draw in little in innovation appropriation, have high work turnover and don't put resources into preparing specialists. Less preparing, background and abilities of development works comes about into tremendous wastage of assets. By giving legitimate expected preparing to the exercises, work can work all the more proficiently and gainfully.

The vast majority of the organizations don't think that its sensible as a large portion of the work on the destinations are extend particular or even movement particular. Thus, Indian development industry is confronting issues of disgraceful Planning starts from the day a venture is imagined. Chiefs should attempt to design the venture such that there are no redundancy of work, no crisis and less number of additional time in the venture. For this, director ought to build up a general arrangement giving a general framework dealing with and wasteful use of assets like material and gear's which lessen gainfulness because of low and diminishing work efficiency.

Following are the suggestions drawn out from the study to improve labour productivity in future:

- Use of modern management techniques
- Proper planning
- Provides skills and training
- Motivation through incentives and other programs
- Proper amenities to be provided
- Good supervision
- Safety programs

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