Comparative Study of Local and Migrant Labour For Productivity Enhancement in Construction Field

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Abstract
Development work administration can make or break the benefit of that work. By recognizing the issues that each labourer faces and finding suitable sporting activities to defeat those problems, which can pass forward the abdicate to a tall extent. Right presently, plan is installation to think nearly the features of neighbourhood and temporal works. Different parameters for illustration, Asset utilization, Communicative capacity, Work Quality, Work data, Benefit affectability, fetched affectability and Security mindfulness and so on, are utilized to see at neighbourhood and moved works. Issues are distinguished depending on the agenda, and by contrasting the work and cost and time in various kinds of works we can set up certain tables in like manner we can become acquainted with that the exhibition of work in that works. By applying appropriate answers for recognized issues will improve efficiency.

1. Introduction
Development movement represents more than 50 per cent of the National arrangement expenses. These are identified with a wide range of development, be it lodging, other structure development, streets, framework, dams, trenches, railroads, and so on. The work is taken care of by manufacturers from the private area, little contractual workers or insignificant temporary workers (Chotta Thekkedars) and development bunches with various degrees of abilities from the small scale to full-scale level activities. [1,2] The current situation with the craft of development industry capacities with suitable polished methodology, specialization, money related and conveyance abilities come up short, considering by far most of the offices adding to different kinds of administrations in the development division. [3,4] A solid need has been felt for the expert, administrative, specialized and monetary up-degree of the development organizations working in the development field.[5]

The development business is the second-biggest monetary movement in India and assumes a significant job in the country's economy.[6] It is a vanguard action of a few other key areas of the economy whose exhibition is reliant on the agreeable execution of this industry. An adjustment in the degree of development movement influences the GDP and producing, and the general work and earnings of individuals.[7] The development has represented around 40 per cent of the interest in the nation during the most recent 45 years. Around 16 per cent of the country's working populace relies upon it for their vocation. During the eighth Five Year Plan (1992-97), the yearly capital cost on development was around Rs. 3, 30,000 million at 1991-92 costs. An expected 14.6 million people were legitimately utilized in development work in 1995-96. It contributes 5 per cent to GDP every year and records for 78 per cent of the gross capital arrangement. Streets, dams, water system works, schools, houses, medical clinics, industrial facilities, and other development works give the basic foundation to the advancement and add to better expectations for everyday comforts.[8]

The development business comprises of various divide firms. Engineers draw in fundamental temporary workers who deal with insignificant overheads, subcontract the majority of the
improvement undertakings to litter, non-enrolled gatherings of labourers. Even though these subcontracted labourers have some specialization in their particular exchanges, practically none of them give genuinely proficient and specific administrations to development firms. The business at that point is comprised of engineers, contractual workers, subcontractors, and labourers.

1.1 Client Management

Government organizations like metropolitan enterprises are the significant customers in any city for different ventures like business edifices, push houses plans, government quarters, and institutional structures, and so on they fund and counsel for such tasks and at last the end-clients of the undertaking. [1,5]

Contractors Fundamental contractual workers, for the most part, little enrolled organizations, are at risk for development chip away at the area. After accepting the agreement from the engineer, the principal contractual workers regularly subcontract all development work and consider top-level supervision and material acquirement. inside the instance of exclusively assembled houses, the temporary worker's capacity is generally attempted by the house proprietor. Labor subcontractors Work subcontractors, for the most part, individual, non-enrolled substances, straightforwardly secure and have collaboration with the work required in the area.

Work subcontractors are regularly development labourers who have set up themselves by upgrading their notoriety in their neighbourhood by following the premier temporary worker from site to site. Even though work subcontractors are sorted out in terms of professional career, high work turnover and absence of formal preparation seriously limit their capacity to supply genuinely particular administrations. Workers Labourers are regularly enrolled straightforwardly from towns by work subcontractors who encourage their movement to urban areas by giving account and guaranteeing business. These labourers frequently leave their families and little landholdings behind and come back to their towns during the storm to take an interest in rural exercises. The owner may sometimes change his tastes and hence it is needed to change some designs and therefore delay occurs. [2,5]

2. Methodology

In this project, mainly we are going to increase the productivity because in the construction field, time and money are wasted because of the labour. We can’t increase the productivity directly. By using appropriate methods and implementing them, we can make sure that productivity can be increased. The labour relations are more than a static interpretation of the contract between an employee and an employer. Means a sum of connections between skills, abilities, values and opportunities at work. But in the current scenario no one is concentrating on these aspects and not using the labour in the right way. So by using the labour efficiently we can yield more results in terms of time and money.

In this project, first of all, we have to study the previous work done on this type of projects to get data or references. After that, we have to compare the characteristics of local and migrant labour by preparing a checklist. so some works are selected and survey is done on the works to compare the productivity, cost and schedule for both labours. From the construction field, we can identify the problems. So as we can generate some new ideas to rectify the identified problems and provide some suggestions facilities. The different estimates that might be taken to improve the physical work limit or to persuade the labourers won't be powerful if site the board is unacceptable. The labourers need to believe in their directors. In the event that the labourers see that site the board is poor, out of line or degenerate, their resolve, inspiration and resulting profitability will be decreased. [2]
2.1. Instances of the board deficiencies which lessen proficiency and profitability right now.
   i. Delayed, hazy or deficient guidelines
   ii. Delays in conveyance of materials, instruments or hardware
   iii. Provision of poor instruments and hardware
   iv. Unbalanced work posses
   v. Use of wrong strategies
   vi. Bad arranging or designation of work undertakings.

3. Labour Productivity

Labour productivity can be defined in many ways. In construction, productivity is usually taken to mean labour productivity, that is, units of work placed or produced per man-hour. The inverse of labour productivity, man-hours per unit (unit rate), is also commonly used. Productivity is the ratio of output to all or some of the resources used to produce that output. Output can be homogenous or heterogeneous. Resources comprise: labour, capital, energy, raw materials, etc. Productivity may then be defined as the ratio of earned to actual hours. The problem with this concept is in establishing reliable, for setting standards. It also depends on the method used to measure productivity, and on the extent to which account is taken of all the factors which affect it.

At a project site, contractors are often interested in labour productivity. It can be defined in one of the following ways

\[ \text{Labour Productivity} = \frac{\text{Output}}{\text{Labour Cost}} \]

Productivity measures can broadly be placed into two categories. Single factor, or partial, productivity measures relate a particular measure of output to a single measure of input, such as labour or capital. Multi-factor or total productivity measures (MFP) relate a particular measure of output to a group of inputs, or total inputs used. Productivity measures can also be distinguished by whether they rely on a particular measure of gross output or on a value-added concept that attempts to capture the movement of output. Of the most frequently used MFP measures, capital-labour MFP relies on a value-added concept of output while capital-labour-energy-materials MFP relies on a particular measure of gross output. [1,2,4]

The five most widely used productivity concepts are

3.1 Labour productivity, based on gross output: This productivity measurement traces the labour requirement per unit of output. It reflects the change in the input coefficient of labour by industry and is useful for the analysis of specific industry labour requirements. Its main advantage as a productivity measure is its ease of measurement and readability; particularly, the gross output measure requires only price indices on gross output. However, since labour productivity is a partial productivity measure, output typically reflects the joint influence of many different factors.

3.1.1 Productivity and Labour

On any construction site the contractor’s financial gain is dependent, amongst other things, on completion of the work in good time and at the least cost, and the productivity of labour has a direct bearing on this being achieved. The factors affecting the performance of labour generally fall into three categories
i. The human capacity for work  
ii. The competence of site management  
iii. The motivation of the workers

4. Results And Discussions

Method statement for Brick Masonry
1. Ensure to have information regarding specifications of cement mortar. 
2. Soak the bricks before starting the brickwork. 
3. Mixing of mortar must be done properly and thoroughly with a specified proportion of ingredients on an impervious platform. 
4. Keep the frog up, while placing the brick. 
5. Fill the joints between the bricks properly. Ensure to carry out "RADO" at every 4th layer. Supervise line, level and plumb from time to time during the day’s progress. 
6. The joints must be raked to an average depth of 10 mm when mortar is green. If plaster or pointing is not to be done, the joints should be struck flush. 
7. Proper hacking of RCC surface in contact with brick masonry must be done for a proper bond. 
8. Courses must be truly horizontal with a suitable bond pattern to break the vertical joints. 
9. Suitable toothing or grooves or stepping to be provided for the continuation of brickwork. 
10. The thickness of the joint must be uniform and not more than 13mm. 
11. Disallow vertical joint filling by spreading mortar. 
12. Masonry may be raised up to 150 cm in a day. Raising with all connected brickwork be carried out at one level. 
13. For 230 mm thick wall, maintain one face in line. This face can be preplanned to take all kinds of single coat plasters. For higher thickness walls both faces should be in line. 
14. The first mark up a layer of brickwork needs to be laid indirect supervision for door/window / any other openings to be kept accurately as per the drawings or layout. 
15. Curing must be done for at least seven days or as laid down in the specification. Old or dry surface must be thoroughly cleaned and wetted. The joints should be raked before starting new construction.

4.1 Relative Importance Index

The analysis was done using Relative Important Index (RII) method and found the bottom most factors leading to affect the labour productivity at construction site. The following formula is used to calculate the relative important index.

Formula used in Relative Important Index

\[
RII = \frac{\sum (X_i \ast Y_i)}{(Z_i \ast 5)}
\]
Where,

\( RII = \text{Relative Importance Index} \)

\( X_i = \text{number of responses to the factors} \)

\( Y_i = \text{the value of rating} \)

\( Z_i = \text{total number of responses to the factors} \)

### 4.2 Questionnaire Design

The factors affecting labor productivity were obtained from the various books, literature review and the questionnaire design was undertaken to determine the opinion of owner, contractor, and consultant regarding the causes of labor productivity in construction industry. Questions were made in simple English which can be understood by the entire respondent. Likert scale was used to rank the importance of the importance of each factor as shown in Table 1 [2]

| Table 1 Likert scale |
|----------------------|
| **Item** | Very Bad | Bad | Neither Good Nor Bad | Good | Very Good |
| Scale | 1 | 2 | 3 | 4 | 5 |

### 4.3 Check List For Local And Migrant Labours

**Table 2** Check List for Local and Migrant Labours [2]

| List Of Activities | Very Bad | Bad | Neither Good Nor Bad | Good | Very Good |
|-------------------|---------|-----|----------------------|------|----------|
| Quantity of Work  |         |     |                      |      |          |
| Quality of Work   |         |     |                      |      |          |
| Job Knowledge     |         |     |                      |      |          |
| Judgment          |         |     |                      |      |          |
| Dependability     |         |     |                      |      |          |
|                              |                              |                              |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Safety Consciousness         |                              |                              |                              |                              |                              |
| Leadership quality           |                              |                              |                              |                              |                              |
| Communication               |                              |                              |                              |                              |                              |
| Work performance            |                              |                              |                              |                              |                              |
| Attendance                  |                              |                              |                              |                              |                              |
| Dedication                  |                              |                              |                              |                              |                              |
| Communication with co-worker|                              |                              |                              |                              |                              |
| Communication with higher authority|              |                              |                              |                              |                              |
| Resource utilization        |                              |                              |                              |                              |                              |
| Adaptability                |                              |                              |                              |                              |                              |
| Motivation                  |                              |                              |                              |                              |                              |
| Punctuality                 |                              |                              |                              |                              |                              |
| Cost sensitivity            |                              |                              |                              |                              |                              |

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14. First mark up layer of brickwork needs to be laid in direct supervision for door / window / any other openings to be kept accurately as per the drawings or layout.

15. Curing must be done for atleast seven days or as laid down in specification.

    Old or dry surface must be thoroughly cleaned and wetted. The joints should be raked before starting new construction.

**Table 3.** Local Labour Brick Work (115mm) Work Report

| S.No | No of Mason | No of Helper | Duration (in hours) | Quantity (Sqm) | Mason Productivity (Sqm) | Expected Productivity (Sqm) | Performance Ratio |
|------|-------------|-------------|---------------------|---------------|--------------------------|-----------------------------|------------------|
| Day 1 | 7           | 6           | 8.00                | 40.9          | 5.84                     | 5                           | 1.17             |
| Day 2 | 8           | 6           | 8.00                | 45.67         | 5.71                     | 5                           | 1.14             |
| Day 3 | 2           | 2           | 8.00                | 12.1          | 6.05                     | 5                           | 1.21             |
| Day 4 | 6           | 4           | 8.00                | 28.95         | 4.83                     | 5                           | 0.97             |
| Day 5 | 4           | 3           | 8.00                | 25.6          | 6.40                     | 5                           | 1.28             |
| Day 6 | 5           | 4           | 8.00                | 28.03         | 5.61                     | 5                           | 1.12             |
| Day 7 | 3           | 3           | 8.00                | 16.7          | 5.57                     | 5                           | 1.11             |
| Day 8 | 4           | 4           | 8.00                | 17.98         | 4.50                     | 5                           | 0.90             |
| Day 9 | 6           | 5           | 8.00                | 32.89         | 5.48                     | 5                           | 1.10             |
| **Average** |           |             |                     | **5.80**      |                         | **5**                       | **1.16**         |
| Day 10 | 8          | 6           | 8.00                | 48.98         | 6.12                     | 5                           | 1.22             |
Table 4: Migrant Labour Brick Work (115mm) Work Report

| S.No | No of Mason | No of Helper | Duration (in hours) | Quantity (Sqm) | Mason Productivity (Sqm) | Expected Productivity (Sqm) | Performance Ratio |
|------|-------------|-------------|---------------------|----------------|--------------------------|-----------------------------|------------------|
| Day 1 | 9           | 8           | 8.00                | 46.32          | 5.15                     | 5                           | 1.03             |
| Day 2 | 6           | 5           | 8.00                | 25.13          | 4.19                     | 5                           | 0.84             |
| Day 3 | 3           | 3           | 8.00                | 14.89          | 4.96                     | 5                           | 0.99             |
| Day 4 | 6           | 5           | 8.00                | 26.4           | 4.40                     | 5                           | 0.88             |
| Day 5 | 8           | 6           | 8.00                | 30.74          | 3.84                     | 5                           | 0.77             |
| Day 6 | 6           | 4           | 8.00                | 23.85          | 3.98                     | 5                           | 0.80             |
| Day 7 | 8           | 6           | 8.00                | 41.67          | 5.21                     | 5                           | 1.04             |
| Day 8 | 3           | 3           | 8.00                | 15.12          | 5.04                     | 5                           | 1.01             |
| Day 9 | 4           | 3           | 8.00                | 17.8           | 4.45                     | 5                           | 0.89             |
| Day 10| 4           | 4           | 8.00                | 17.64          | 4.41                     | 5                           | 0.88             |
| **Average** |          |             |                     |                | **4.55**                 | 5                           | **0.91**         |

Schedule Calculation for Local and Migrant Labour
No of Days = (Target Area) / (Actual Productivity * No of Gang)

Table 5: Schedule Calculation for Local and Migrant Labour

| S.No | Type of Labour | Target Area | Expected Productivity | Actual Productivity | No of Gang | Total No of Days |
|------|----------------|-------------|-----------------------|--------------------|------------|------------------|
| 1    | Target         | 1000 Sqm    | 5.00 Sqm              | 5.00 Sqm           | 10         | 20               |
| 2    | Local          | 1000 Sqm    | 5.00 Sqm              | 5.80 Sqm           | 10         | 17               |
| 3    | Migrant        | 1000 Sqm    | 5.00 Sqm              | 4.55 Sqm           | 10         | 22               |

Table 6: Cost Calculation for Local and Migrant Labour

| S.No | Type of Labour | Target Cost | No of Gang | No of Days | Total Cost    |
|------|----------------|-------------|------------|------------|---------------|
| 1    | Target         | Rs 850      | 10         | 20         | Rs 1,70,000'  |
| 2    | Local          | Rs 950      | 10         | 17         | Rs 1,61,000   |
| 3    | Migrant        | Rs 700      | 10         | 22         | Rs 1,54,000   |
Using the survey data provided we can see the major differences between migrant and local labours. So similarly for plastering works and shuttering work we can use this method to achieve best results. [2,3,5,6,7]

4. Conclusions

In this thesis from the observation found that in brickwork local labour saves 15% of time for 6.25% additional costs. While migrant labour saves 10.62% of money consuming 10% of excess time. When observing plastering work, I found that local labour saves 25% of time as well as 6.25% of cost for migrant labour saves 2.5% of money for 20% of additional time. For column box fixing work, I found that local labour saves 14.3% of time for 2.85% additional costs. While migrant labour saves 0.95% of money consuming 14.3% of excess time. In migrant labour productivity get reduced because of lack of communication, lack of knowledge, poor leadership and quality, wastage of materials. In local labour productivity degrades due to poor punctuality, poor safety, poor communication with higher authority and co-workers. The expected outcome of the study will reveal the proper solution to the identified problems based on survey and it will also help to control the problems prior to the start of work, which will directly improve the productivity of labours.
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