

Construction Labor Requirements in Developing Countries

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Abstract

The nature of construction in developing countries differs from that in developed regions. In developing areas the industry is less reliant on equipment and more dependent on unskilled manual labor. Here, strong management-labor techniques are required to assist and motivate workers to perform quality work.

This paper analyzes the utilization of labor in developing countries, by comparison with statistics from developed regions. It is shown that labor-intensive methods may require extremely large crews if no equipment is used for specific activities. Items involving the growth of the construction industry in terms of productivity, worker welfare, and health and safety issues are considered. Factors that must be changed in order to reform and update the construction industry in developing countries are discussed.

Introduction

The situation of the construction industry throughout the globe is not identical. There is a large difference between firms in developed and developing regions. For example, in developing countries, contractors and construction firms tend to use labor intensive construction methods and employ a large number of unskilled workers. The firms also utilize poor construction management techniques and lack the knowledge of technical supervision for large-scale projects. These may be some of the reasons the construction industry in developing regions experiences high accident and fatality rates, and their quality of work tends to be inferior compared to that of developed countries¹⁷.

Construction Industry in the Developing Countries

The construction industry in developing countries encounters numerous difficulties, such as the shortage of semi-skilled and skilled labor, inadequate production of construction materials, lack of capital, and poor people management skills. In these regions important projects, especially those of national significance are constructed by international contractors from developed countries¹⁸.

Currently, most developing countries have access to inexpensive unskilled labor. However, they may lack a supply of skilled construction workers. Adequate training of construction crafts is also not common. Another factor is the variable nature of construction projects. Once the task at hand is completed, the workers are generally laid off, before move to another project¹⁸. Due to this instability, and the indifferent attitude shown by contractors, the workers do not have a good relationship with their employees. This often interferes with the quality of work at the construction site, and may also result in delays.

The construction sector, the world over is considered by many to be the basic industry on which the development of the country depends. The growth of a region and its status of development is generally determined by the quality of its construction companies. This is due, in part, to the labor-intensive nature of the construction industry, and consequently, its ability to provide a large number of jobs¹⁸. It is quite common to see abandoned projects in developing countries. This is due not only to insufficient funding, but also to a lack of an adequate amount of skilled labor.

Another factor affecting the construction industry in developing countries is that most of the work is accomplished in the informal sector as compared to the formal sector of the economy. The formal sector may be defined as the sector where firms execute their projects through formal designs, planning, contracts, permits, and approvals. The informal sectors do not follow this formality, and do not utilize the necessary design and construction documents. Informal construction mostly occurs in rural areas and the outskirts of urban areas¹⁸. Both of these sectors face low productivity because of frequent shortages of important construction resources. Moreover, the informal construction sector can't attract skilled labor. Overall these factors tend to decrease the nation's total productivity.

Productivity Studies

The main concern of many contractors involves increasing productivity. Although a great deal of research has not been conducted into the area of increasing productivity of the construction worker, people management may be an effective tool.

It is assumed that the worker should possess the necessary abilities to successfully perform a given task¹⁸. To this, the management can provide a good working environment with access to the necessary technology including equipment, material, tools and good technical instructions. In this regard, performance of workers depends, in part, upon four factors:

- Willingness to put in the effort for the duration of the task
- Intensity of effort
- Effectiveness of effort combined with technology and resources
- Efficiency of effort

The duration of the worker's effort is defined as the ratio of the time engaged in productive work to the total number of working hours. This ratio is influenced by motivation and the availability of resources. The assessment of the productive potential of technology and resources is indicated by the effectiveness of using these items. The efficiency of worker's effort is a measurement of the quantity of acceptable quality output at the expense of the effort expended¹⁸. For example, if the worker produces a high quality product but not enough quantity with respect to the time spent, efficiency and performance measures are low.

The above paragraph signifies that the management has an impact on these factors. By the effective planning and scheduling of construction activities, supervision can decrease the duration of workers effort and minimize delays¹⁸. Delay in the resources will lead to delay in the project completion and an increase in the unproductive work by the worker. The quantity and quality of acceptable work also influences worker efficiency. In essence, if the management eliminates the physical factors responsible for decreasing worker performance, differences are related to individual performance. The assumption that units of labor are interchangeable is a basic flaw in engineering analysis of productivity. According to the principle of interchangeability, all workers are equal¹⁸. But basically this does not occur because all humans are different. Some are more adept due to innate abilities, training and motivation, and hence, can produce quality work. Considering the differences in humans, the principle of interchangeability, which is acceptable for analysis, may fall short from the engineering point of view.

Table 1. Output and Crew Size

| Item | Output (m3) | Developing Countries (India) | | Developed Country (USA) | |
|-----------------------------------|-------------|------------------------------|--------------|-------------------------|---------------|
| | | Workers in Crew | \$/Unit | Workers in Crew | \$/Unit |
| Excavation | | | | | |
| Excavation in open sites | 523m3 | 350 | \$ 1.63/m3 | 1.5 | \$ 1.71/m3 |
| Excavation in foundation trenches | 261m3 | 210 | \$ 1.67/m3 | 1.5 | \$ 4.27/m3 |
| Earth Backfill | 1176m3 | 295 | \$ 4.83/m3 | 1.5 | \$ 1.55/m3 |
| Chemical emulsion | 3.75 liter | 2.66 | \$ 2.7/liter | 1 | \$ 7.24/liter |
| Flooring | | | | | |
| Marble | 645 m2 | 130 | \$ 55.04/m2 | 2 | \$ 167.37/m2 |
| Glass Mosaic | 785 m2 | 6280 | \$ 12.32/m2 | 2 | \$ 223.88/m2 |
| Tile | 1969 m2 | 394 | \$ 11.08/m2 | 2 | \$ 62.86/m2 |
| Stone | 1937 m2 | 194 | \$ 11.84/m2 | 2 | \$ 68.88/m2 |
| Masonry | | | | | |
| Brick | 2637m2 | 1758 | \$31.91/m2 | 5 | \$85.89/m2 |
| Stone | 1399m2 | 1748 | \$35.13/m2 | 4 | \$328.51/m2 |
| Roofing | 10,764m2 | 861 | \$10.25/m2 | 4 | \$34.29/m2 |
| Finishing | | | | | |
| Cement plaster | 75 m2 | 5.64 | \$0.9333/m2 | 5 | \$29.49/m2 |
| Gypsum plaster | 125m2 | 73 | 1.018 | 5 | \$16.47/m2 |
| Painting | 215m2 | 369 | \$45.69/m2 | 1 | \$121.63/m2 |

Table 1 compares the crew and expense statistics involved for various construction jobs in India (developing country) to those for the same jobs in the United States (developed country). The jobs vary from excavation to finishing work^{3,15}.

The data indicate a huge dependency on labor in the developing countries. For example, the excavation of roughly 523 cubic meters requires a crew of 350 workers in developing countries, whereas the same job in a developed region uses approximately 1.5 workers. This difference is due to the use of large-scale earth moving equipment in developed countries. It must be noted that the reduced requirement for human labor translates into a reduced need for people

management on the site. It also means that the quality of work may dramatically increase, since the human error factor is drastically decreased.

The other statistic that comes to notice is cost per unit. The unit cost in developed countries tends to be greater than the corresponding values in the developing countries. Although the difference is not large in open site excavation, it increases dramatically for stone masonry, where the cost in developed regions is close to ten times that in the developing countries. However, the crew size in developing regions (1748) is much larger than that in developed countries⁹.

This information indicates that the labor-intensive methods of developing countries and the equipment dependent methods of the developed countries, both, have their advantages and disadvantages. Developing countries choose economy over quality, and understandably so, while the developed countries use equipment, in the process ensuring quality work, and lower investment in people management, although overall, it comes at a higher price.

Social Security

There is evidence from many countries (generally from developing regions) that employers do not pay into social security funds on behalf of construction workers who are working on temporary contracts. Hence, the workers who may be most in need receive no social security benefits, no health care, no holiday pay and no protection against loss of pay in periods when they are unable to work due to unemployment, ill health, accidents, or old age.

In India, most of the construction workers are not included in provident fund contributions, although this is mandatory by law. Other provisions required by law but notable by their absence include: compensation for injuries, medical care, potable drinking water, rest rooms for workers and days off with pay¹⁹. In African countries only core workers are covered by social security, and sometimes not all of them are included. For example, permanent workers in large enterprises may receive social security benefits, but in small enterprises it is only the employer and his foreman who is covered¹¹.

This problem does not only occur in developing countries. A recent study in the United States found that those on temporary jobs are far less likely than permanent workers to receive health and retirement benefits. Many involved in the temporary work are also precluded from state and federal worker protection laws because they do not work enough hours to qualify²⁰. Construction workers are also less likely than workers in other industries to be eligible for, or to participate in, pension plans provided by an employer or union. Research by the International Construction Institute has shown that only 35 per cent of wage and salaried workers in the construction industry participated in such schemes in 1995, compared with 65 per cent in mining, 72 per cent in communications and 83 per cent in public administration⁷.

Although there are a number of social security schemes and legislation to support the average construction worker, most of them may not be applicable for those engaged in temporary work. This fact has been exploited by employers, resulting in an increase in the use of temporary workers and labor subcontracting. There are also cases where there are provision for the temporary workers to receive benefits, but are never claimed by them due to the lack of knowledge concerning their availability.

Human Resource View

In the human resource view of workers, each unit of labor is viewed as an individual, and differences between individual workers are important^{12, 13}. When a constructor or a construction firm wishes to hire a mason, it doesn't hire any common mason, but rather hires the best mason available. In the human resource view, a mason is viewed as an investment. Furthermore, the firm can enhance the worker's performance through training programs or informal on-the-job training.

In the human resource view, the worker interacts with the job and attempts to attain some control over the work. There are benefits and costs associated with each job and also places physical and mental requirements on the worker. Psychological factors determine how a worker responds to the job. Due to individual differences, a worker may respond positively in a situation while another will respond negatively. Not only are there differences between workers response to a specific job, but a worker will respond differently to the same job at different times because of the change in the workers needs. The degree of autonomy, significance, skill variety and feed back contained in the job affects how a worker responds. Other factors such as the opportunity to acquire new skills, and on-the-job training will also influence the workers response.

Some dimensions of work will also influence a worker's response to a job. As an example, pay, promotions, recognition, and working conditions are important contextual factors. Pay includes all elements of compensation. The amount of pay, method of payment, and equity will influence the worker. In the same view, the opportunity for promotion, whether it is fair or not, will also influence the individual.

Interpersonal dimensions of the job are important influences. The level of supervision that a worker receives including such factors as the supervisory style, human relations, all influence the response to the job. The influence of co-workers is also important. The competence, helpfulness, and friendliness of co-workers and the policies of the management also impact on the worker. Therefore, based on the human resource view, the individual worker is the primary unit of analysis and what an individual wants from the job is an important question. As a result, psychological factors are important in analyzing and predicting worker performance.

Wages

Today, collective labor agreements have been undermined and apply only to a diminishing core of workers. A two-tier wage structure has emerged in many developed and developing countries, with both wages and fringe benefits for core workers well above those of the rest of the workforce.

For example, permanent workers in the Philippines earn much more than those on temporary contracts²¹. In Brazil, workers on formal contracts earn more than those without such contracts¹⁴. Also in China, formal employees earn much more than rural laborers (who form the bulk of the labor force) working on the same site¹⁰. In India, the organized section of the construction labor force (those working in large private and public enterprises) enjoys wages and non-wage benefits similar to those found in other organized sectors, while the bulk of the construction workforce receives much lower wages and no benefits.

In Mexico, permanent workers and those working in large firms are paid around 60 per cent more, than temporary workers and employees in small and micro-firms⁴. In a number of African countries the wage differential between core workers and the rest of the workforce is even greater. For example, the core workers receive a salary based on collective agreements which constitutes between two and 12 times the wages paid to unskilled workers¹¹.

For the bulk of the temporary workforce, wages are increasingly set by the market. Hence the level of wages, like the level of employment, will reflect the demand and supply in the labor market. Wide fluctuations are common, in line with the cyclical (and sometimes seasonal) fluctuations in construction output and labor demand.

Research investigating the effect of self-employment on wages in the United Kingdom found a high degree of fluctuation through the economic cycle and also a large difference in wages (for the same category of worker) between sites. During a recent recession, it was also found that approximately two-thirds of those directly employed enjoyed relative wage stability, whereas 75 per cent of the temporary self-employed suffered wage cuts which in some cases were in excess of 30 per cent⁶.

Construction workers in a number industrialized country have experienced wage cuts in recent years. Higher wages that had been secured through collective bargaining have been eroded. In the United States, there has been a significant drop in real wages since 1980 and a closure of the union/non-union wage differential¹. Also, in Germany, unions have negotiated a number of concessions which have led, in effect, to significant cuts in pay².

In contrast, in typical developing countries, where the supply of labor (particularly unskilled) is far in excess of the number of jobs, earnings for the majority of construction workers are only at the level of the minimum wage and sometimes even below it.

For example, in Brazil, 35 per cent of unregistered temporary construction workers (who form the bulk of the workforce) earn less than one minimum wage and approximately 70 per cent earn less than two such wages. It is generally assumed that a family of four would require two minimum wages just to survive. Hence, 70 per cent of construction workers do not earn enough to support even a small family. Therefore, it may be concluded that construction workers in Brazil form a large proportion of the working poor. It is sometimes suggested that employers may offer workers better wages in exchange for not registering for work permits¹⁴.

Recently, productivity has increased in the construction industry, but piece-work rates have fallen leaving workers no better off than before. Also, in slack periods it was found that skilled workers take unskilled jobs, putting downward pressure on the wages of the unskilled.

In China, wages for construction workers vary according to location. In Beijing they are roughly 20 Yuan for an unskilled worker and 25 for a skilled worker per eight hour day. Laborers, generally from rural areas, are paid enough to provide food for themselves in the city and to send money home to provide for their families in rural areas. However, the workers sometimes receive less than they should from their employer (which includes both private and state enterprises). They are also often only paid at the end of the year which is done, in part, so that the employers can gain interest on the wages and as a means of keeping the laborers under control (Lu and Fox, 2001).

Health and Safety

Accidents on construction job sites are not unheard of. They have always been part of the industry, despite efforts to reduce their number and create a safe working environment¹⁶. The relation between the changing aspects of construction of and the occurrence of accidents, however, is difficult to determine statistically. This fact is true even in developed regions such as the European Union⁸. This is not necessarily due to lack of data, but is difficult to calculate due to the cyclic variations in construction output. For example, the number of accidents increases during periods of economic upturns and are considerably lower during periods of recession⁸.

In developing countries safety analysis is difficult due to lack of proper records. It has been mentioned that the rights of the working class in these areas are not taken seriously. As an example, there is lack of insurance coverage for a large percentage of workers. In addition, a large number of workers are of foreign origin, and they reside in countries illegally. These individuals do not appear on any records, let alone have health insurance. In an effort to reduce costs, the contractors in developing regions neglect safety procedures, and the lack of records make it difficult to analyze the situation statistically.

It has also been observed that the nature of health and safety control is different for direct contractor-employed labor as compared to those employed by sub-contractors. Studies undertaken of nine high profile companies in the United Kingdom are noteworthy^{5, 8}. Seven out of these nine companies performed pre-employment medical checks on their own employees, while only one company did the same for sub contractor employed labor.

Although there are rules and regulations in place in developed and developing countries to maintain a standard for the health and safety conditions of workers, the problem encountered is the lack of implementation⁸. There has been a steady decrease in union membership, the result of which does not appear to enhance safety practices. Also, there is insufficient inspection which allows contractors, on occasion, to bend the and even break safety rules and regulations.

Summary and Conclusion

The construction industry of a nation is considered to be vital to its developmental status. Developed countries have a sophisticated and equipment dependent approach to construction, while developing regions are more labor intensive. This, inevitably, indicates that the quality of work in developed countries tends to be better, besides reducing the duration of numerous activities.

The labor available in developing countries, despite their availability, are rather unskilled, and generally lack in the technical knowledge required for the job. Besides this, the management-labor relationship is a greater influence in developing regions, due to the large number workmen involved in a project. This problem is compounded by the fact that the workers in developing countries are or less aware of their rights, in addition to the benefits available to them. These benefits include social security, health insurance, safety, and the responsibility of the contractors to maintain a safe working environment, minimum wages, among others. This may lead to blatant exploitation on the contractors' part and, consequently, poor relations with the workers and subsequently lower quality.

Firms in developing countries often concentrate on reducing costs by using cheap unskilled labor and inferior materials, to provide a facility of inferior quality. However, the condition of the construction industry in developing countries can be improved. This involves, in part, developing conformance to industry standards throughout the design and construction industry. Initially, governmental agencies must perform intensive inspections and sting operations to check, in part, for corruption, health and safety violations, and complacency on the part of contractors. These are just a few measures, but they would definitely be a start, if taken under consideration, for developing a process in order to reform the construction industry in developing countries.

Acknowledgement

The authors wish to recognize Ms. Linda Dousay for her assistance with the production activities involved with the preparation of this paper.

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