



INFLUENCE OF LABOR ON PRODUCTIVITY

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ABSTRACT: Labor has a significant influence on construction productivity. The level of productivity is a result of the driving, induced, and restraining forces acting upon workers. These forces act positively and negatively with regard to productivity improvement. A framework for analyzing the influence of each of these forces on four major labor related determinants of construction productivity is presented. Approaches to productivity improvement are analyzed in Terms of reducing the negative forces and strengthening the positive forces.

Key words: Labor Productivity, Construction Industry, Construction Management.

1. INTRODUCTION

There are many factors that influence construction labor productivity. The design of the facility determines its complexity and intricacy which, in turn, influences labor productivity. Standardization of design allows for repetitive operations (e.g., standardizing column sizes to simplify forming operations) that promote an increase in productivity. Design specifications, such as the finish requirements for concrete, also influence productivity. Management of the construction firm is a major influence on labor productivity. It is management's responsibility to provide the work force with the necessary tools, equipment, material, and information to do the job in a workmanlike manner. Failure to do so results in lower productivity. Job sequencing and layout are also responsibilities of management that influence productivity. It is hard to conceive of anything that project management does that does not influence labor productivity.

A second distinction that must be made is between factors that influence productivity and those that simply influence costs. For example, the use of skilled trades people to unload materials at a construction site impacts on labor costs but not on productivity, except in a very indirect manner, by preventing the use of a skilled worker on a task where his skill could be more effectively utilized. On the other hand, the requirement for the use of an oiler on a crane impacts on productivity because the oiler does not produce or contribute to production. The focus in this paper will be on those factors that influence productivity and, consequently, labor costs.

Within the context of this analysis, it will be assumed that the worker possesses the ability and know-how to perform the task and, further, that the worker has the required tools, equipment, material, and information to successfully complete the task. If a worker lacks the requisite ability and know-how, it is an indication of a failure in management's selection or training processes, or both. Likewise, a worker's behavior such as searching or waiting for tools, equipment, material, or information will be ignored because the elimination of the cause of this behavior is not within the control of the worker; the cause is a failure of management to effectively perform its required functions. Lastly, the analysis will be limited to manual or craft workers.

2. Influences on Productivity:-

Increasing productivity through labor requires changes in workers' on-the-job behavior. Management must somehow influence workers to change their behavior and function in the highly productive manner necessary for the continued success of the organization. Three distinct influence processes are available to management: compliance, identification, and internalization. In the compliance process, workers will adopt the induced behavior of higher productivity because they expect to gain specific rewards or approval, or both, by conforming to increased expectations of performance. Compliance is particularly applicable to productivity improvement programs because of management's ability to control the reward system. If the behavior required to meet specific goals (e.g., the erection of X linear feet of 6-in. pipe/hr) is defined and the reward system is designed so that rewards valued by the workers are contingent upon goal attainment, management will be able to induce workers to exhibit the desired behavior.

Identification, when used by itself, may be of limited usefulness as an organization-wide approach to productivity improvement because of its dependence upon the workers' identification with a specific group or leader. In this process, the worker accepts influence and modifies his behavior because he wants to establish or maintain a satisfying relationship with another person or group. The process has its greatest potential for success with small, highly cohesive groups in which the leader possesses significant referent power. Identification may be successful, on a project wise basis, on highly visible projects for short durations. Internalization occurs when the worker accepts influence because the content of the induced

behavior is intrinsically rewarding and congruent with his value system. If the manager attempting to influence the worker is perceived as having high credibility, conformity with the objective of the influence will take the form of internalization. The behavior adopted in this manner will be performed whenever the behavior is relevant to the issue at hand, regardless of how closely the worker is supervised. If high productivity is a part of a worker's value system, management may influence the worker's behavior through internalization by stressing the importance of high productivity to the firm and to the worker.

The three influence processes may be employed to bring about a change in worker behavior. Before examining how this can be done, it is necessary to understand the forces that operate on workers and how these forces determine behavior. Thus, it is necessary to develop a conceptual framework from which to analyze workers' behavior. Much of the recent research in this area has dealt with the theoretical development and empirical validation of expectancy theory. As a conceptual basis for the study of worker performance, expectancy theory is excellent. Our understanding of worker performance, though, particularly with regard to productivity improvement, is increased by the use of field theory to highlight expectancy theory.

3. FIELD THEORY

The basic schema of field theory as developed by Lewin is that of a person confronted with a goal. The goal is a behavior such as buying a car, jogging five miles, or producing a greater amount of a product with better quality. Forces operate on the person in relation to the goal. Force represents the direction and tendency to change; it may be positive, thereby indicating an attraction toward a particular goal or goal region, or it may be negative and thus indicate repulsion. Given that more than one force may be present at any given time, the resultant force, if greater than zero, will cause movement in the direction of the force. Movement is the psychological process of making the decision to engage in a particular behavior.

Whether movement is toward or away from a particular goal depends upon the valence the anticipated satisfaction resulting from the outcomes associated with achieving the goal—that the individual associates with the goal. A positive valence will indicate attraction, a negative valence

repulsion. The strength of the valence is related to how attractive or repulsive the goal is for the individual such that the more attractive or repulsive a particular goal, the greater the valence. The strength of the force is a function not only of the strength of the valence, but also of the psychological distance between the person and the goal. In general, the greater the person's psychological involvement with the goal, the stronger will be the force acting on the person. The relationship between the strength of the force and the distance to the goal is different for positive and negative valences such that the force strength increases much faster as a person approaches a negative goal than when he approaches a positive goal.

It is important in an analysis of forces to distinguish among the various types of forces. Several types have been identified that may be relevant in any given situation:

1. Driving forces: forces toward a positive valence or away from a negative valence that lead to movement; correspond to a person's own needs.
2. Induced forces: forces that do not correspond to the person's own desires but to the wishes of another person.
3. Restraining forces: forces that do not correspond to either an individual's own needs or to the wishes of another person but to the requirements of the situation; hinder or prevent movement by physical or social obstacles or barriers.

3.1 FIELD THEORY AND PRODUCTIVITY IMPROVEMENT

Field theory provides an understanding of the dynamics of productivity improvement and why so many productivity improvement programs have not achieved the expected results. In addition, it provides an understanding of an individual's response to an organization's efforts to increase productivity. Given the goal of producing more with a high level of quality, all three types of forces may operate on a person with regard to the goal, depending upon the outcomes that are the natural consequences of goal attainment. A person will associate a positive valence with the goal and, thereby, be subject to positive forces directed toward goal attainment when the outcomes accruing from goal attainment enable the person to satisfy his needs. Goal attainment may enable the person to receive an increase in compensation, a promotion, recognition from his superiors, or increased self-esteem. There are a multitude of outcomes that will result in need satisfaction; the motivation to satisfy unfulfilled needs is the driving force toward goal attainment. Similarly, movement will occur away from outcomes with valences such as discharge or discipline. It is important to remember that these forces and their origin are psychological and, thus, internal to the person. Induced forces are relevant because the impetus to improve productivity is typically provided by the management of the organization. Low profit levels or an inability to compete in the market place are typical measures assumed to indicate possible productivity problems. As the concern for improved productivity is communicated downward in the organization, supervisors attempt to influence or induce the workers to improve their productivity. If a worker's spouse believes that the worker may obtain a raise or a promotion by being more productive, and the raise or promotion will make possible the purchase of desired goods or services or contribute to an increase in peer esteem or prestige, the spouse will attempt to induce the worker to attain the goal. A worker's spouse may attempt to influence the

worker away from goal accomplishment if the worker, by accomplishing the goal, returns home from work physically or mentally exhausted, or both, which result in a decrease in the duration and intensity of the worker's interaction with his or her family.

3.2 Field Theory and Productivity Determinants

Productivity improvement means many things to many people. Many workers and union officials see productivity improvement as a speedup and a return to the sweatshop where production is the only goal and employee health, safety, and happiness be damned. There are many managers who would agree with this view and would insist that increased productivity can only be obtained when employees work harder. Productivity, though, is a multifaceted concept such that increases in it may be obtained through several means. There are four major labor factors influencing productivity:

- (1) The intensity of the individual worker's effort
- (2) The duration of that effort
- (3) The effectiveness with which the worker's effort is combined with technology and other resources
- (4) The overall efficiency with which these inputs are translated into usable outputs of acceptable Quality.

TABLE 1 :- NEGATIVE FORCES ACTING ON PRODUCTIVITY

SR.NO	PRODUCTIVITY COMPONENTS	FACTORS		
		INDIVIDUAL	Group	Institutional
1	INTENSITY OF EFFORT	REWARD FOR REDUCING INTENSITY (SAME PAY, LESS EFFORT)	PEER PRESSURE IN THE FORM OF GROUP NORMS TO RESTRICT OUTPUT (REDUCE INTENSITY)	COLLECTIVELY BARGAINED WORK RULES ON PRODUCTION STANDARDS PLACE LIMITS ON DAILY OUTPUT
2	DURATION OF EFFORT	REWARD FOR SHORTENING DURATION (SAME PAY, LESS EFFORT)	PEER PRESSURE IN THE FORM OF GROUP NORMS RELATING TO LATE STARTS, EARLY QUILTS, SOCIAL NATURE OF THE JOB	COLLECTIVELY BARGAINED WORK RULES ON COFFEE BREAKS, WASHUP TIME, RELIEF TIME
3	EFFECTIVENESS OF COMBINATION OF WORKER'S EFFORT, TECHNOLOGY, AND OTHER RESOURCES	FEAR OF DISPLACEMENT LEADING TO A LACK OF ACCEPTANCE OF NEW TECHNOLOGY AND PROCEDURE	INFORMAL GROUP LEADERSHIP FAILS TO PROVIDE SUPPORT AND ASSISTANCE TO GROUP MEMBERS TO FACILITATE ADAPTATION TO NEW TECHNOLOGY AND PROCEDURES	COLLECTIVELY BARGAINED WORK RULES ON CREW SIZES, NUMBER OF MACHINES A WORKER MAY OPERATE, PROHIBITION OF NEW EQUIPMENT OR TOOLS, REQUIREMENT THAT WORK BE DONE TWICE, RESTRICTIONS ON DUTIES OF WORKERS IN GIVEN OCCUPATIONS, REQUIRING UNNECESSARY WORK, REQUIRING LIMITS ON LOADS, JURISDICTIONAL AGREEMENTS

4	ADOPATION OF WORK METHODS AND INNVAOTION		GROUP OPPOSITION	
5	EFFICIENCY WITH WHICH INPUTS ARE TRANSLATED INTO USABLE OUTPUTS OF ACCEPTABLE QUALITY	NEGLIGENCE,INATTENTIO N,ACCIDENT,SABOTAGE;N O REWARDS FOR EFFICIENCY AND PERFORMANCE	INFORMAL GROUP LEADERSHIP RESTRICTS INFORMATION FLOW ON MORE EFFICIENT METHODS AND TECHNIQUES	COLLECTIVELY BARGAINED WORK RULES REQUIRING LESS EFFICIENT METHODS OF WORK
6	INTEGRATION OF PEOPLE AND WORK METHODS		GROUP RESTRICTIONS ON MORE EFFICIENT METHODS	JURISDICTIONAL AGRREMENTS

4. ELIMINATION OF NEGATIVE FORCES

Group and institutional restraints on productivity improvement are manifestations of individual insecurities. Institutional restraints arise through collective bargaining and are the codification of the amalgam of the norms of various work groups within an organization. It is necessary, therefore, to concentrate on eliminating the workers' insecurities that cause the development of the individual, group, and institutional restraints on productivity. Security guarantees and productivity bargaining are two means of doing this.

4.1 Security Guarantees:-

In a recent survey, union officials were asked to indicate the degree of their agreement or disagreement with a series of statements dealing with work, productivity, and job satisfaction. Their responses showed that they overwhelmingly believed that increased productivity is a worthwhile and essential objective. However, they further indicated that while the objective of increased productivity should be pursued, it should not be pursued at the expense of the jobs and welfare of the workers. It has been stated numerous times by labor leaders that when workers are allowed to share in the "fruits of progress," they will cooperate in rather than oppose productivity improvement plans. In this context, the opinions of union leaders may be considered representative of labor in general, not just organized labor. The establishment of security guarantees whereby workers are protected from adverse economic consequences resulting from increased productivity appears to be a necessary condition to obtain workers' acceptance of a productivity improvement program. Without these guarantees, labor perceives productivity improvement as a variable sum game in which management receives a large positive payoff while labor potentially receives a negative payoff. There is a great deal of uncertainty associated with the consequences of a productivity improvement program, particularly in the short run. Workers are concerned as to whether they may work themselves out of a job. This is particularly important given the finite duration of projects in construction and the uncertainty of employment beyond the current project. If the productivity of the organization is increased without a commensurate increase in the volume of the firm's business, the result has to be a decrease in the organization's demand for labor. Workers are concerned that the employer, in pursuit of additional profits, will lay off excess labor even if the surplus is expected to be short-lived.

4.2 Productivity Bargaining

If the work force is unionized, there is the potential that institutionalized restraints may have arisen through the collective bargaining process. Because these restraints arose through collective bargaining, they must be removed in a similar manner by the parties' engaging in productivity bargaining, which may be defined as: "the negotiation and implementation of formal collective agreements that stipulate certain changes in working rules in order to achieve greater productivity and ensure that labor receives its share of the resulting savings".

There are two inseparable features of productivity bargaining: the change in work rules which results in improved productivity, and the sharing of the subsequent savings. Both features are necessary and interdependent; management cannot modify or eliminate productivity inhibiting work practices without sharing the resultant savings with the workers, while the workers cannot expect to gain monetarily without agreeing to changes in work rules. Thus, productivity bargaining is a compliance based influence process.

5. STRENGTHENING DRIVING AND INDUCED FORCES

Once the negative forces have been reduced or eliminated, it is necessary to develop and strengthen the positive forces acting upon workers to improve productivity. This requires a change in focus. Institutional forces are of little concern once the restraining forces are eliminated; however, they must be such as to allow the actions necessary to strengthen the driving and induced forces. Individual and group forces, as related to the concepts of driving and induced forces, respectively, become the primary concern. In the presentation of field theory, it was pointed out that individuals exogenous to the work environment, e.g., a worker's spouse, may contribute to the development of induced forces. These individuals will be excluded from the analysis because they are not subject to managerial control. The analysis will focus on those factors within management's control that can be used to strengthen the driving and induced forces acting upon workers to improve productivity. All human behavior is motivated, i.e., individuals engage in a behavior that provides them with rewards that satisfy their specific needs. Management controls the reward system and is, therefore, in the position to use it as a compliance based influence process to strengthen driving forces. The expectancy theory model of motivation as developed by Vroom and, later, Porter and Lawler is the preeminent motivation model used today. In empirical tests of the model, it has been found that the best predictor of an individual's choice among alternative behaviors is the relative attractiveness of the behavior. Workers will engage in the behavior that is the most attractive in terms of potential outcomes.

Management controls the awarding of extrinsic outcomes and is, therefore, able to determine which outcomes will be granted in return for performance of required tasks. The decision as to which outcome to award an individual must be based upon the concept of individual differences. This requires a manager to make an assessment of the valence a worker associates with each potential outcome. The attractiveness of a particular behavior is directly related to the valence of the outcomes contingent upon the performance of that behavior. Management can influence the attractiveness of a behavior by providing outcomes with greater valence. To do this, management must determine which outcomes have the greatest valence for workers. The attractiveness of the desired behaviors to the worker can be increased by making the high valence outcomes contingent upon the performance of the desired behaviors. For example, one worker may place a relatively high valence on a pay increase while a second worker does the same for a promotion. Management must be able to discriminate between these two workers with regard to the valences associated with specific outcomes. Only by doing this can management create an effective motivation program. If this is not done, management may attempt to motivate workers by using outcomes that have low valences with the result that the attractiveness of the desired behavior is low.

If another person provides the impetus to a worker to engage in a behavior, even if the behavior leads to the worker's receipt of a need satisfying outcome, the force acting upon the worker to engage in the behavior will be an induced force. Management must undertake an active role if the strength of the induced force acting upon a worker is to be increased. Foremen and supervisors must continually stress the need for organizationally desired behaviors. As the dispenser of rewards, they may induce the desired behaviors through compliance. As leaders, they may induce the desired behavior through identification. Finally, if they fulfill the necessary criteria, they may induce behavior through internalization. Only by assuming an active role can they create and strengthen these induced forces. The use of group reward systems may create induced forces acting on a worker in a similar manner in that the three influence processes by which behavior may be induced are equally applicable for use by a group.

6. SUMMARY AND CONCLUSIONS

Workers will move toward the goal of increased productivity if the force resulting from the interaction of the positive and negative forces acting on the worker is positive toward the goal. This can be achieved by eliminating or reducing the strength of the negative forces and increasing the strength of the positive ones. Negative forces can be reduced or eliminated by providing security guarantees and negotiating changes in work rules through productivity bargaining. Positive forces can be strengthened by the use of one or more influence processes: compliance, identification, and internalization. There is no best way to obtain productivity improvement via the human element. The method selected must depend upon the specifics of the situation. If the actual level of performance is viewed as the result of the interaction of opposing forces, it is possible to develop an effective program of productivity improvement that reduces the negative forces and increases the positive ones. Thus, the establishment of job, income, and employment security, and the utilization of productivity bargaining are approaches to negate the forces acting to decrease productivity, while the individual and group reward systems and team building are approaches which enhance the forces acting to increase productivity. The actual level of productivity is dependent upon the strength of the opposing forces. An effective program of productivity improvement must recognize and deal with these forces together. A program that deals with only one of the forces will fail. Reducing the negative force while building the positive force will result in permanent increases in productivity.

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