Effect of Foremen on Construction Apprentice

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Abstract: Construction apprentices in a Midwestern city were surveyed to find out their perceptions on their foremen. Based on the analysis of our data, seven foreman factor scales were identified. These scales are: Performance Improvement, Work Facilitation, Achievement Orientation, Support, Work Participation, Bias, and Recognition. These dimensions have varying relationships with motivation and performance of the construction apprentice. These dimensions provide important issues that need to be addressed in developing foremen training programs and in particular how they affect apprentice. Further research may encompass various segments of the construction industry to analyze motivation of craft workers.

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Introduction

Foremen occupy critical positions in construction operation because they are the link between management and the workforce. They are expected to manage, plan and define work, communicate with workers, and motivate them to perform within acceptable levels. They resolve conflicts between crew members and also encourage them to contribute on how to improve productivity. Foremen also are in a position to prevent accidents by encouraging safe work practices, and they are the link between management and craft workers. They are directly involved with field productivity and have strong influence on construction worker performance. Because of the responsibilities placed on foremen, it is expected that they should manage on site resources effectively. Of the five resources (manpower, money, material, machinery, and time) available, foremen have the greatest influence over manpower and time they spend on a task because they plan the work that must be accomplished by the crew. It is the foreman who must direct, coordinate, and motivate the crew to perform effectively.

Construction apprentices form the pipeline for the development of future workforce. A continuous flow of well-trained, qualified, and motivated apprentices into journeymen would ensure quality construction. Since apprentices are craft personnel in training, it is important that they should be satisfied with their learning environment. Given the shortage of skilled personnel in the construction industry, it is imperative that apprentices must be provided with good working conditions so as to sustain their interest in construction trade.

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The objective of this study was to determine the perceptions of apprentices in a union environment and the influence of their foremen on their motivation, performance, and satisfaction. To accomplish this objective, a brief summary of the various motivational theories is presented with in depth discussion on expectancy theory, which is the theoretical framework for this study. Construction apprentices in a unionized environment were surveyed and their response is the basis of this paper.

Motivational Theories

The issue of how to motivate workers to produce more has been studied extensively for a long time. Many models and theories have been suggested, but among those theories only expectancy theory has received widespread acceptance from behavioral scientists. This theory has proven to be superior to other models of motivation. A close review of all theories of human motivation reveals a common driving principle that people do what they are rewarded for doing. In general, the theories on motivation can be classified as need theories, goal-setting theories, reinforcement theories, and expectancy theories.

Need theories suggest that individuals have certain physical and psychological needs that they attempt to satisfy. Motivation in this view is a force that results from an individual's desire to satisfy these needs, such as food or social approval. Conversely, a satisfied need is no longer a motivator. The most commonly known need theories are Maslow's Hierarchy of Needs, Herzberg's Two-Factor Theory, and McClelland's Classification of Needs.

Goal-setting theories affect performance due to three related factors; direction, effort, and persistence. First, a goal has a directive effect because it focuses activity in one particular direction. Second, given that the goal is accepted, people tend to exert effort in proportion to the difficulty of the goal. Third, difficult goals lead to more persistence and more directed effort over time than is given for easier goals. These three dimensions, direction (choice), effort, and persistence are central to the motivational process in goal-setting theory.

Reinforcement theories, also known as incentive theories, are

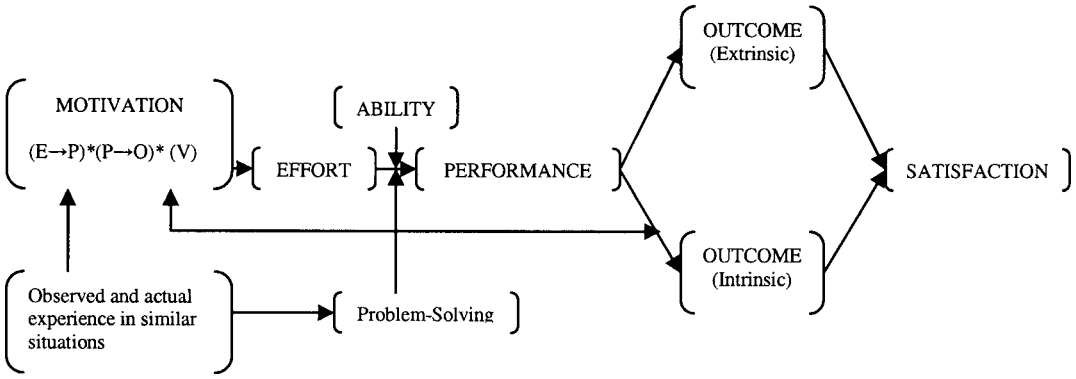

Fig. 1. Expectancy theory

based on a fundamental principle of learning and the law of effect. In its simplest form, it states that behavior that is rewarded tends to be repeated, and behavior that is not rewarded tends not to be repeated. If management rewards behavior, such as high quality work, then that behavior is likely to increase. However, the converse is also true. That is, if managers fail to reward the desired behavior, then such a behavior may not cease over time. Based on reinforcement theory, managers should not expect sustained and high performance from employees if they consistently ignore employees' performance and contributions.

While reinforcement theory focuses on the objective relationship between performance and rewards, expectancy theory emphasizes the perceived relationships. The theory provides a more complex model of man for managers. The model suggests a number of prepositions about the process by which people make decisions about their own behavior in organizational settings. The model requires a thorough diagnosis by managers to determine the relevant forces in the individual, and the relevant forces in the environment, both of which combine to motivate different kinds of behavior.

Performance of individuals is critical in making organizations work effectively. If a manager is to influence work behavior and performance, he or she must have an understanding of motivation and the factors which influence an individual's motivation to come to work, to work hard, and to work well. A brief description of the expectancy theory and a graphical representation of the model is presented.

Expectancy Theory

A person's motivation to exert effort towards a specific level of performance is based on his or her perceptions of associations between actions and outcomes. The critical perceptions which contribute to an individual's motivation are graphically represented in Fig. 1.

The effort-to-performance expectancy ($E \rightarrow P$) refers to the person's subjective probability about the likelihood that he or she can perform at a given level, or that effort on his or her part will lead to successful performance. It varies from 0 to 1. In general, the less likely a person feels that he or she can perform at a given level; the less likely he or she will be to try to perform at that level. A person's $E \rightarrow P$ probabilities are strongly influenced by each situation and by previous experience in that and similar situations.

The strength of a person's motivation to perform correctly is most directly reflected in his or her effort. That is, how hard he or she works. This effort expenditure may or may not result in good performance. For effort to be converted into performance, the person must possess the necessary abilities in order to perform the job well. Unless both ability and effort are high, there cannot be good performance. Another factor is the person's perception of how his or her effort can best be converted into performance. This perception is assumed to be learned from previous experience in similar situations. This perception can vary widely in accuracy, and where erroneous perceptions exist, performance will be low even though effort or motivation may be high. The performance-to-outcome expectancy ($P \rightarrow O$) and valence (V) refers to a combination of a number of beliefs about what the outcomes of successful performance will be and the value or attractiveness (valence) of these outcomes to the individual. Valence varies from very desirable (+1) to very undesirable (−1). The performance-to-outcome probabilities vary from +1 (performance is sure to lead to outcome) to 0 (performance not related to outcome). In general, the more likely a person feels that performance will lead to valent outcomes, the more likely he or she will be to try to perform at the required level.

Based on the expectancy theory, a single level of performance can be associated with a number of different outcomes, each having a certain degree of valence (V). Some outcomes are valent because they have direct value or attractiveness. Some outcomes, however, have valence because they are seen as leading to (or being "instrumental" for) the attainment of other "second level" outcomes which have direct value or attractiveness for the person.

Some outcomes are seen as occurring directly as a result of performing the task itself and are outcomes which the individual thus gives to himself such as feelings of accomplishment and creativity. These are referred to as "intrinsic' outcomes. Other outcomes that are associated with performance are provided externally by the organization, the supervisor, or fellow workers. These outcomes are called "extrinsic" outcomes.

An individual's motivation to perform is determined by the product of the $E \rightarrow P$ expectancy, the $P \rightarrow O$ expectancy, and the valence (V) of the outcome. Since a person's level of performance has multiple outcomes associated with it, the products of all probability–times–valence combinations are added together for all the outcomes that are seen as related to the specific performance. Because of the multiplicative relationship, if either term is zero, motivation is zero.

Maloney and McFillen (1984) conducted the first in-depth study of construction worker motivation using the expectancy theory. This paper discusses the effect of foremen on the construction apprentice in a union environment based on the expectancy theory.

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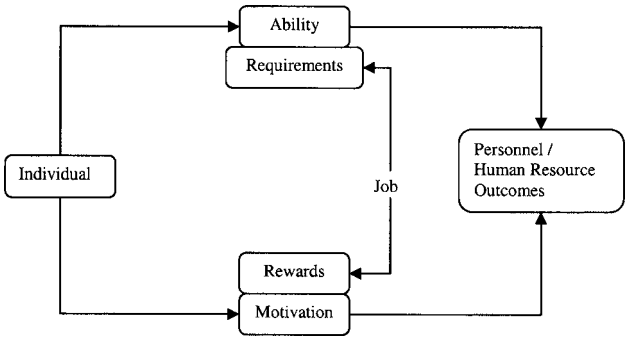

Fig. 2. Correspondence between individual and job characteristics

Foremen on Construction Site

Effective leadership is essential for any crew to perform well and attain its objectives. A leader should be able to bring coherence to the team and to motivate them to improve their performance. In construction, the foreman is the leader of the work crew, and this individual observes the crew on a daily basis, works with apprentices in the crew, and motivates them to perform effectively. It has been observed that construction foremen spend about half of their time on planning work, controlling workplace activities and quality, and giving instructions (Laufer and Shohet 1991). Based on this observation, it can be inferred that foremen interact frequently with their crew. How well a foreman interacts with the crew determines to a great extent the effectiveness of his crew.

The expectancy model is helpful in understanding the importance of foremen in influencing construction apprentice motivation, performance, and satisfaction. The expectancy theory defines motivation as a function of a person's belief that he or she can convert his or her effort into a specified level of performance (expectancy), and that his or her belief that a specified level of performance will result in the receipt of specific outcome (instrumentality). A foreman can be expected to affect a worker's perception of expectancy and instrumentality. Fig. 2 illustrates the correspondence between an individual and job characteristics. The figure can be used to explain how foremen can influence apprentice motivation, performance, and satisfaction.

A foreman can affect an apprentice's expectancy by the way the apprentice's ability is matched to the job requirements. For example, assigning an apprentice a task which he or she has not been trained for may frustrate the individual, thus leading to poor performance. Also, the apprentice's desires must match rewards available from the work in order to result in a satisfied apprentice while also satisfying management.

As the model suggests, two characteristics of job and two characteristics of workers are important in influencing worker behavior such as doing work and attendance. Based on the model, the two critical job characteristics necessary for an individual to perform well are job requirements and rewards. Job requirements refer to the knowledge and skills necessary to perform a given job successfully while job rewards are the attractive or unattractive consequences of doing the job. They include aspects of the work itself, the social environment like supervision, co-workers, and consequences of policies such as promotion.

The two employee characteristics considered to be critical for an individual to perform well are ability and motivation. Ability refers to an individual's current capabilities, while motivation demonstrates the individual's willingness to engage in the specific behavior. Ability and motivation combine with job requirements and reward to influence performance, which results in outcomes. The foreman's ability to match an apprentice's ability with specific job requirements will determine whether the apprentice will be successful in performing the task assigned.

Apprentices are in training to acquire the requisite set of skills so that they can perform well and advance to journeymen. As a result, foremen are important in this development process. If a foreman can match job requirements to an apprentice's ability and provide clear direction on how to accomplish the task, it will enhance the apprentice expectancy perceptions. With apprentices, this is very important because some of them may exaggerate their ability while some may underestimate their ability or show lack of confidence. Also, the foreman's knowledge of the job is important in explaining to an apprentice what needs to be done and how it will be accomplished. Further, the apprentice will continue to rely on the foreman for guidance and direction long after the particular job is completed. Thus, foremen play an important role in the development of the apprentice toward journeyman status.

The other component of the expectancy theory that the foreman can influence is instrumentality. This is defined as the individual's subjective probability that if they perform it will result in the receipt of specific rewards. These rewards can be either intrinsic or extrinsic. Thus, an apprentice can develop instrumentality perceptions that link to job performance such as "sense of pride" (intrinsic) or "praise" (extrinsic) by the foreman. A foreman can therefore influence an apprentice's intrinsic rewards through job assignment, job scope, and job variety. Similarly, a foreman can also influence the extrinsic rewards that an apprentice receives. This can be achieved by the types of work the foreman assigns to the individual or by providing overtime opportunities to the apprentice. As an illustration, foreman can praise an apprentice for doing a good job or recognize the apprentice for taking initiative. Thus, a foreman can provide extrinsic rewards that are not necessarily monetary in nature. This type of reward is important in the development of an apprentice.

A foreman is important in transmitting information to workers and ensuring that the work plan is executed properly. Foremen help in building effective teams by motivating workers to perform well, and they are influential in improving job satisfaction and crew expectations. From management standpoint, it is important to know the perceptions of apprentices toward their foremen. This knowledge will help in identifying the issues with which apprentices are not satisfied with or believe can be improved. Further, this will help in improving a foreman's performance while devising strategies for motivating apprentices.

Data Collection

The mode of data collection is through a survey instrument. The instrument used in this study is based on the expectancy model of a construction worker. It is a modified version of the instrument used by Maloney and McFillen (1984) in their landmark study on construction worker performance. The instrument was modified with the inclusion of a section on safety. This paper is based on apprentices' responses from a section on foremen.

Six hundred survey instruments were distributed to a unionized Midwestern Building Trades Council, a local construction organization group, and a few firms. The survey instruments were given to each of these entities for distribution and we collected the completed survey instruments. The length of the survey in-

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strument we suspect may have been problematic for some workers, as they returned it to us uncompleted, and thus we did not get full cooperation. A total of 319 (53.17%) instruments were returned to us, which is a very good response rate for studies of this type. Of the number returned, 30 were not used because of either missing information or were not completed in a usable form. Only 289 instruments were considered to be valid for further analysis. Out of these, 201 respondents reported they were apprentices and their responses form the basis for this paper.

Analysis

The data were analyzed using the *Statistical Package for Social Sciences*. Factor analysis technique was used for data reduction. This is a statistical approach which involves condensing the information contained in a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information (Hair et al.1998). For this study we chose to use exploratory factor analysis (EFA) because we have no specified number of factors. Further, EFA will help us in uncovering the underlying relationships among the different variables. The factors obtained were tested for adequacy using KMO and Bartlett's test. For factor analysis to proceed, the KMO measure of sampling adequacy should be greater than 0.5 and Bartlett's test must be significant, that is, the associated probability must be less than 0.05. The KMO value for this analysis is 0.874, and Bartlett's test was found to be significant.

Findings

Demographics

When we evaluated the responses by gender and ethnicity for the apprentices, we found that there were 6.47% females in the apprentices. On ethnicity, we found that 11.94% were black, 1% Oriental, 76.6% White, 1% American Indian, and others 0.5%. From our data, 65.2% of the apprentices are of 18–29 age group. The entire apprentice group attended at least high school, and the average number of years attended in college is 0.738.

Factor Analysis Results

The factor analysis of responses on foreman using principal axis factoring with oblique rotation resulted in seven different underlying factors. These factors are Performance Improvement, Work Facilitation, Achievement Orientation, Support, Work Participation, Bias, and Recognition.

Appendix A lists all factors, and items with significant loadings (>0.3 out of 1) on each of the factors. As factor loading is the correlation between the factor and its items, those items with high loading determine the nature of that factor. Factor scores are also calculated for each item. Factor scores are values of a case or unit of analysis for an index developed by factor analysis. Since the number of variables in each factor is different with varying weights, the resultant maximum and minimum scores for each factor will be different. So it is very difficult to represent factor scores on a simple scale. To overcome this, each factor is converted into a scale of 0–1 proportional to the factor's potential range. All scores are represented on this scale to achieve uniformity and to allow comparison between different factors.

Table 1. Foreman Factor Scales

Foreman factor scale	Minimum	Mean	Maximum
Performance improvement	0.14	0.71	1.0
Work facilitation	0.14	0.66	1.0
Achievement orientation	0.14	0.74	1.0
Support	0.14	0.65	1.0
Work participation	0.14	0.69	1.0
Bias	0.16	0.51	0.98
Recognition	0.14	0.73	1.0

Discussion on Factors

The factors identified are presented in descending order of explained variance. That is the first factor accounts for the largest amount of variance in the sample's response while the second factor accounts for the next largest amount of variance. Thus the last factor accounts for the least amount of variance. The minimum, mean and maximum values for the identified factors are listed in Table 1.

The first scale we identified was performance improvement. This scale is concerned with how the foremen help the apprentice in performing their job. The mean value for this scale, 0.71, indicates that apprentices believe that their foremen help them in how they perform. The degree to which they help them in their performance ranges from a minimum score of 0.14 to a high of 1.00. A score of 0.14 will suggest that there are some apprentices that do not believe that their foreman is helpful to them as they learn to perform their job.

The second foreman scale, work facilitation, consists of those factors that describe the behavior their foreman exhibits that demonstrate they know their job and his ability to facilitate work. It includes such items as, "is competent," "knows technical parts of his job well," and "helps you solve work-related problems." The apprentices believe that their foremen are competent and are able to facilitate their work. The mean of this scale is 0.66. The mean score ranges from 0.14 to a high of 1.0. Even though the range is affected by extreme values, the median of the data is 0.66 which implies that a greater number of apprentices believe that the typical foreman is competent. We would have expected the apprentice to rate their foreman higher than the value we obtained. One possible reason could be the foreman may not be providing the apprentices' with good direction. While they have knowledge of the job, they are probably not doing as well as they could in helping the apprentices.

Achievement orientation is the third foreman scale. This factor demonstrates the behavior that foremen exhibit that encourages the apprentice to put out quality work and achieve their objectives. This is an important factor as it demonstrates how foremen stimulate apprentices to perform well. It includes such factors as: "treats you better if you do a good job," and "demands high quality work." The mean response of 0.74 indicates that a typical foreman was perceived by apprentices to be oriented toward quality work. The score ranges from a minimum of 0.14 and a maximum of 1.00. This factor is as expected. Foremen progressed

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Table 2. Foreman Factor Scales by Apprentice Trade

Primary trade of respondent	Performance improvement	Work facilitation	Achievement orientation	Support	Work participation	Bias	Recognition
Asbestos workers	0.71	0.73	0.76	0.71	0.75	0.40	0.69
Electric workers	0.70	0.66	0.73	0.65	0.69	0.54	0.72
Painters	0.69	0.65	0.70	0.70	0.64	0.54	0.77
Roofers	0.74	0.59	0.79	0.62	0.63	0.51	0.68
Others	0.74	0.62	0.78	0.65	0.64	0.48	0.77
Total	0.71	0.66	0.74	0.65	0.68	0.52	0.72

through the ranks. Therefore it is not surprising that they are exhibiting behaviors that cause the apprentice to achieve their work objectives.

Support, the fourth foreman scale, comprises behavior that foremen exhibit that enhances the apprentice's psychological well being. Such behaviors include being concerned for the apprentice's welfare and helping in their personal problems. The scale mean of 0.65 suggests that the apprentices perceive their foremen to be interested in their personal growth and participation in their job. The score ranges from a low of 0.14 to a high of 1.00.

The fifth foreman scale is work participation. This is the behavior that foreman exhibit by helping apprentices by directing them in their job and by providing them with the opportunity to be involved in making decisions. This is very important for apprentices as they are developing their skills. The scale mean, 0.69, is high and indicates that the apprentices believe that their foremen involved them in making many decisions about their work environment. The range of the work perception, however, ranges from a low of 0.14 to a high of 1.0. Because foremen are craft oriented, it is not surprising that apprentices rated their foreman high on work participation. This is an important behavior as these apprentices are training to become journeymen. It helps them to be involved in various aspects of their jobs.

Bias is the sixth foreman scale. This scale focuses on those behaviors that foremen exhibit that discriminate between workers for performance reasons. It includes such items as picking on certain apprentices, playing favorites, and providing special privileges to some apprentices. The items on this scale that had significant loadings were reverse scored. As a result, the greater the value of the factor score, the less biased the foreman. The mean response for the sample, 0.51, suggests that the foremen were somewhat biased. The range of values on this scale is a low of 0.16 and a high of 0.98. This value would indicate that some apprentices may have encountered foremen that were either very biased or those that were not.

The seventh and last foreman scale is recognition. This scale demonstrates the behavior that recognizes apprentices for good performance and obtains respect from them. The mean of 0.73 indicates that a typical foreman recognizes the apprentice when they perform well. This factor is important because the behavior encourages the apprentice to exhibit the desired behavior because they are acknowledged by their foreman.

Table 2 shows the means of foremen factor scales by trades. The minimum number of responses for each trade is set to 10. Trades with less than 10 responses were all grouped as "Others." As a result, trades such as carpenters, cement masons, and brick layers were grouped together as "Others." There is not much variation in foreman factor scales by trade. The highest standard deviation from the mean was observed in Bias, which is 0.057.

Table 3 shows foreman factor scales by the age groups of the apprentice. It can be observed that the younger apprentices have almost identical scores on the same factors, whereas apprentices who are older ($\geqslant$40) perceived that their foremen were relatively less competent, did not show much interest in their personal participation, and did not reward them when they performed well. It may be that these older apprentice would have preferred such simple recognition as "well done" or "keep up the good work." This finding, however, does have a broader implication for the industry as we rely on nontraditional workers to join the construction trade.

Relationships and Correlations

The relationship between the foreman factors and other variables was determined by calculating Pearson product-moment correlation coefficients. Only those correlations which were significant at the 0.05 level or better are presented. Foreman factor scales are analyzed for correlations between motivational variables, performance variables, importance variables, satisfaction variables, and organizational constraints. All variables are obtained from apprentices' responses from different sections in the survey instrument.

Motivational variables are obtained from questions pertaining to expectancy, valence, and instrumentality. Performance variables are effort, quality of work, and quantity of work. Quality of work is not reported for lack of significant correlations. Impor-

Table 3. Foreman Factor Scales by Age Group

Worker age group	Performance improvement	Work facilitation	Achievement orientation	Support	Work participation	Bias	Recognition
18–29	0.71	0.68	0.74	0.66	0.70	0.51	0.73
30–39	0.73	0.66	0.75	0.67	0.70	0.54	0.74
$\geqslant$40	0.71	0.58	0.79	0.60	0.61	0.53	0.67
Total	0.71	0.67	0.75	0.66	0.69	0.52	0.73

Table 4. Foreman Factor Correlations

	Performance improvement	Work facilitation	Achievement orientation	Support	Work participation	Bias	Recognition
Motivational variables							
Motivational score	0.366	0.423	0.353	0.385	0.397	—	0.250
Expectancy	0.221	0.320	0.272	0.185[a]	0.276	—	—
V-I score	0.436	0.454	0.383	0.445	0.429	—	0.311
Positive extrinsic instrumentalities	0.251	0.184[a]	—	0.378	0.222	—	0.189[a]
Positive intrinsic instrumentalities	0.353	0.459	0.345	0.340	0.409	—	0.335
Positive opportunity instrumentalities	0.412	0.419	0.296	0.455	0.418	—	0.259
Negative extrinsic instrumentalities	—	0.274[a]	0.318	—	0.182	—	—
Negative intrinsic instrumentalities	0.182[a]	0.323	0.320	0.170[a]	0.284	—	0.211
Performance variables							
Effort	0.167[a]	0.215	0.263				0.179[a]
Quality of work	—	0.192[a]	—	—	—	—	0.173[a]
Importance variables							
Intrinsic rewards	0.322	0.353	0.341	0.230	0.240	—	0.213
Interpersonal rewards	0.293	0.212	0.251	0.234	0.257	—	0.204
Opportunity factor	0.227	0.270	0.238	0.222	0.179[a]	—	0.172[a]
Supervision	—	—	0.219	—	—	—	—
Extrinsic rewards	0.233	0.261	0.216	0.200	0.217	—	—
Satisfaction variables							
General job satisfaction	0.194[a]	0.248	0.287	—	—	—	0.198
Intrinsic satisfaction	0.405	0.448	0.492	0.269	0.265	—	0.260
Intrinsic rewards	0.338	0.417	0.343	0.274	0.302	—	0.205
Interpersonal rewards	0.429	0.427	0.203	0.413	0.430	0.195[a]	0.358
Opportunity factor	0.341	0.365	0.224	0.309	0.344	—	0.237
Supervision	0.330	0.426	0.195	0.377	0.446	—	0.297
Extrinsic rewards	0.205	0.252	0.221	—	0.157[a]	—	—
Organizational constraints							
Contractor failure to provide tools	—	−0.206	−0.160[a]	—	—	—	—
Hours delayed due to lack of tools	—	—	—	—	—	—	−0.166[a]
Foreman variables							
Performance improvement	—	—	—	—	—	—	—
Work facilitation	0.818	—	—	—	—	—	—
Achievement orientation	0.663	0.728	—	—	—	—	—
Support	0.773	0.665	0.475	—	—	—	—
Work participation	0.663	0.694	0.437	0.703	—	—	—
Bias	—	—	−0.319	—	—	—	—
Recognition	0.737	0.701	0.467	0.728	0.601	—	—

[a]Correlations significant at 0.05 level. All others are significant at 0.01 level.

tance and satisfaction variables are obtained from the factor analysis of questions pertaining to importance and satisfaction, respectively. Organizational constraints variables are from questions on constraints from the side of the contractor. Means of these variables are given in Appendix B.

Satisfaction Variables

We identified seven satisfaction variables in this analysis. They are general job satisfaction, intrinsic satisfaction, extrinsic rewards, opportunity, interpersonal rewards, and supervision. These variables strongly correlated with foreman factors except bias, which is only correlated with the interpersonal rewards. General job satisfaction is correlated with performance improvement, work facilitation, achievement orientation, and recognition. The lack of correlation of general job satisfaction with support, work participation, and bias would mean that even when a foreman does not exhibit these behaviors, the apprentices are generally satisfied with their jobs.

Intrinsic satisfaction and intrinsic rewards are both correlated with all foreman factors except bias. This is as expected because although a foreman may be biased towards an apprentice, the foreman is not able to deny the apprentice the feeling of being satisfied with his work or self accomplishment. Interpersonal rewards are correlated with all the foreman factors. It is interesting to note that interpersonal rewards are correlated with bias because a foreman's like or dislike for an apprentice will influence his interpersonal relationship with the foreman.

Opportunity factor and supervision are both not correlated with bias. This is possibly because the apprentices are satisfied with the opportunity that working in the industry provides to them and the level of supervision they receive. Extrinsic rewards are not correlated with support, bias, and recognition. This is as ex-

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pected because apprentices are not affected by the foreman's feeling. Thus, whether foremen provide support, or biased toward the worker, or fail to recognize the apprentice's performance, apprentices will still receive their wage.

Foreman Variables

Performance improvement is strongly correlated with competency, work quality, personal participation, work participation, and recognition. This is as expected because, for the apprentice to perform effectively, it is expected that the foreman be competent and stress work quality and participation. As apprentices are on training, they will be encouraged when foremen recognize the effort they have expended and the quality of work they are exhibiting. This suggests that the foreman should be encouraged to interact with the apprentice and involve them in planning work. This will help them in understanding the tasks necessary to be completed and will provide them with insights into work design and scope. An important point from this study is the need for foremen to provide support to apprentices. Bias is found to be negatively correlated with achievement orientation. The implication of this is that a foreman who is biased will likely influence the apprentice's effort.

Effort is correlated with performance improvement ($r=0.167, p<0.05$), competency ($r=0.215, p<0.01$), work quality ($r=0.263, p<0.01$), and recognition ($r=0.179, p<0.05$). Those who believe they work hard also believe that their foreman demands high work quality, helps in improving their performance, and recognizes their effort. Quality of work is correlated with competency ($r=0.192, p<0.05$) and recognition ($r=0.173, p<0.05$). This indicates that apprentices believe if they do quality work, they will be recognized for their performance.

Job clarity is correlated with performance improvement ($r=0.509, p<0.01$), competency ($r=0.501, p<0.01$), work quality ($r=0.474, p<0.01$), personal participation ($r=0.383$, $p<0.01$), work participation ($r=0.320, p<0.01$), and recognition ($r=0.430, p<0.01$). Table 4 shows significant correlations of foreman factors with different variables

Conclusion

This study is relevant to both researchers and industry practitioners. For researchers, it provides a framework that can be used to further study how foremen influence apprentices in their new jobs. As an illustration, there is a need to know how much influence foremen have on the quality and quantity of work put out by the apprentice. The motivation of construction workforce is critical for productivity improvement. Therefore understanding what motivates the apprentice is important. Industry practitioners can use the information obtained from this research and similar ones to design training programs for their foremen. Further, it provides the framework that they can use for analyzing the motivation of their workers. They can customize the questionnaire and adjust it to match their requirements. This focused study helps in designing the strategies for the increased productivity of the workforce.

Our study has identified seven foreman factors. They are performance improvement, work facilitation, achievement orientation, support, work participation, bias, and recognition. These factors appear logical when considered within the framework of worker motivation, performance, and satisfaction with work. The factors however may not be generalized since our study is limited both in population and geographic area. It does not provide an initial point in comprehensive study of the impact of the foreman on an apprentice. However, this study is particularly useful because of the shortage of skilled workers in the industry and also considering the fact that an apprenticeship program is a pipeline for future workers.

Another interesting finding is the analysis of foreman factors by trade. This reveals that work facilitation, work participation, support, and bias are the four areas that need improvement. This could be part of a training program for foremen. As an illustration, apprentices would learn more if foremen involved them in reviewing the work that needs to be done. This way they will have the opportunity to ask questions for clarification and understand why things are done in a certain way. Expectancy theory also supports apprentice involvement in planning their work.

The study also shows that foremen are not free of bias. Two of the factors under bias are: "looks for someone to blame when things go wrong" and "criticizes people who perform poorly." What can be deduced from this finding is that foremen should be taught how to correct an apprentice when they do something wrong. Some apprentices may, as a result of bias exhibited by their foremen, not put out appropriate effort or might even leave the trade.

The construction industry is filled with hard-working, diligent foremen who were never instructed on how to train, motivate, measure, reward, and discipline workers. Generally a good craftsperson is promoted to foreman and superintendent. What the study suggests is that an apprentice respects those foremen who have knowledge of the trade and are willing to help them improve their performance and achieve success. Apprentices will likely respect their foremen if they are objective in assessing their performance.

The construction industry is more complex than before. Constructors are expected to uphold a high degree of professionalism in their work. The first level supervisor on a construction site is the foreman. Thus, the quality of the work on a site can be influenced by foremen. Our study suggests that foremen should give clear instructions, plan out work effectively, and facilitate the performance of the apprentice.

Appendix A: Factor Means and Weights

Factor	Mean	Weight
Performance improvement		
Evaluates your performance accurately	4.9503	0.284
Knows how well you are doing your job	5.1453	0.157
Helps you discover problems before they get bad	4.9375	0.114
Does a good job of judging performance	4.9531	0.090
Defends you to higher ups	4.6630	0.078
Helps you develop your skills	5.1503	0.045
Praises good work	5.0442	0.065
Makes it clear how you do work	4.8556	0.050
Work facilitation		
Knows the technical parts of his job very well	5.3591	0.083
Handles administrative part of his job extremely well	4.8912	0.026
Is competent	5.1927	0.125
Plans out work in advance	5.2618	0.127
Is someone I can trust	4.9833	0.143
Keeps you informed about work being made	5.0778	0.156

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Factor	Mean	Weight
Makes sure you know what has to be done	5.1844	0.124
Helps you solve work related problems	5.0881	0.109
Leaves you alone unless you want help	5.1602	0.049
Achievement orientation		
Demands you give your best effort	5.3370	0.369
Insists that you work hard	5.0615	0.188
Treats you better if you do a good job	4.9326	0.191
Demands high quality work	5.3128	0.164
Support		
Feels you are important as individual	4.8534	0.250
Stands up for you	4.7876	0.235
Is concerned about you as a person	4.4916	0.184
Keeps informed about how you think and feel	4.4056	0.112
Helps you with your personal problems	4.0263	0.070
Work participation		
Encourages you to participate in important decisions	4.5497	0.104
Leaves up to you how to do a job	4.7127	0.025
Is always fair with you	4.8947	0.378
Factor	Mean	Weight
Does things to make your work life easy	4.6702	0.240
Deals with you well	5.0419	0.146
Keeps you informed	4.7330	0.107
Encourages speaking when you disagree	4.4866	0.076
Bias		
Picks on certain people	3.6667	0.311
Looks for someone to blame when things go wrong	3.7709	0.192
Tends to play favorites	3.5111	0.177
Favors people who think like he does	3.3370	0.154
Gives some people special privileges	3.0221	0.075
Makes important decisions without involving you	3.3438	0.074
Criticizes people who perform poorly	4.7514	0.022
Can't stand being criticized	3.5445	0.001
Never gives a chance to make important decisions	3.9778	0.039
Recognition		
Has your respect	5.1768	0.918
Rewards good performance	4.5083	0.155

Appendix B: Means of Correlation Variables

Correlation variable	Mean
Motivational score	0.4664
Positive expectancy	0.7804
Contractor failure to provide tools	0.5132
Number of hours delayed due to lack of tools	1.4941
Valance—Instrumentality score	0.5865
Effort	0.9040
Quality of work	0.8514
Quantity of work	0.8057
General job satisfaction	0.8743
Intrinsic satisfaction	0.7671
Positive extrinsic instrumentalities	0.5124
Positive intrinsic instrumentalities	0.8052
Positive opportunity instrumentalities	0.7150
Negative extrinsic instrumentalities	0.7109
Negative intrinsic instrumentalities	0.6694
Intrinsic (importance) factor	0.8330
Interpersonal (importance) rewards	0.7629
Opportunity (importance) factor	0.8002
Supervision (importance) factor	0.7547
Extrinsic (importance) rewards	0.7903
Intrinsic (satisfaction) rewards	0.8399
Opportunity (satisfaction) factor	0.7821
Extrinsic (satisfaction) rewards	0.7952
Interpersonal (satisfaction) rewards	0.7878
Supervision (satisfaction) factor	0.7685

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