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by

Pun Panthaworn

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**AN EXPLORATORY STUDY OF MOTIVATION OF MANAGEMENT
PERSONNEL IN THE HEAVY CONSTRUCTION INDUSTRY**

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**AN EXPLORATORY STUDY OF MOTIVATION OF MANAGEMENT
PERSONNEL IN THE HEAVY CONSTRUCTION INDUSTRY**

by

PUN PANTHAWORN, B.S., M.S.

Dissertation

Presented to the Faculty of the Graduate School

of The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

The University of Texas at Austin

December 2005

Dedicated to Merri Lynn, my wife and dearest friend, whose love and encouragement is infinite.

ACKNOWLEDGEMENTS

I wish to express my appreciation to the many individuals and organizations who have so greatly aided the completion of this dissertation.

I am deeply grateful to my dissertation committee, whose guidance has been constructive and insightful. My special thanks goes to Dr. John D. Borcharding, who introduced me to and fostered my interest in the subject of human factors in construction. He has guided me closely from the beginning of this dissertation to its completion even though I was conducting this study from a distance. My special thanks also goes to Dr. Thomas W. Pullum, whose expertise in statistics made the analysis section of this dissertation possible. Outside my committee, I was fortunate to have Dr. Richard R. Tucker and Dr. Calin M. Popescu, who offered many invaluable and practical suggestions that were instrumental to the successful completion of this dissertation. I am also grateful to Dr. Howard M. Liljestrang, the Civil Engineering graduate advisor, for his patience throughout the progress of this dissertation, especially in administrative matters. Last, but not least, I am thankful to Kathleen M. Rose, the Civil Engineering graduate coordinator, for her help in administrative matters with the Civil Engineering Department and the university.

I also wish to acknowledge a number of colleagues and friends in the heavy construction industry and their organizations. I am grateful to Steve Minassian, a project manager at M.L. Shank Co., Lawrence Parretti, a project manager at Granite Construction Co., Clark Prothero and Randall Lingwall, project managers at W.W. Clyde & Co., Randy Evans, vice-president of BE&K Construction Co. Inc., Dennis Poulton, vice-president of J.F. Shea Heavy Civil

Engineering, Tom West, an administrative manager of Guy F. Atkinson Construction LLC, Michael Kenny, vice president of engineering and Paul Cocotis, president, of Shimmick Construction Co. Inc., David Willard, an office manager at Obayashi Corporation, Hiro Onozaki, general manager of North America operation of Obayashi Corporation, and Keith Byrom, general manager of Zachry Inc. I am deeply grateful to Michael Gowring, a dear friend who has retired after working for many decades in the heavy construction industry, for providing many contacts to solicit participation of this study. Without the help of these individuals, this dissertation would never have been realized. My sincere thanks also go to each of the participants who took the time to complete the questionnaire.

Last, but not least, I am deeply indebted to my dear friend RoAnne Reynolds for her help in editing the dissertation and for those who have been encouraging and faithfully praying for my schoolwork.

Pun Panthaworn

The University of Texas at Austin
Austin, Texas
December 2005

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Publication No. _____

Pun Panthaworn, Ph. D.
The University of Texas at Austin, 2005

Supervisor: John D. Borcharding

This research focuses on identifying factors that boost and factors that hinder motivation of management personnel in the U.S. heavy construction industry. Specific objectives of this research are to: identify motivators and demotivators within this group of people; investigate the relationship between motivation and perceived productivity within this group of people; investigate relationships between job satisfaction and other factors such as age, work experience, time in position and education; identify the company policy or culture that creates either a positive (motivational) or a negative environment for this group of people; analyze the similarities and differences between motivating of management personnel and the workforce within the industry; and analyze the similarities and differences of motivating the management personnel in the heavy construction industry and other industries.

A questionnaire was developed as a tool to collect data from ten heavy, civil construction companies. Several hypotheses were developed and the data were examined and tested using correlation, multiple regression and chi-square test methods, deriving conclusions and findings that lie within the scope of the

objectives. Data were analyzed by descriptive and inferential statistics as well as content analyses.

For management personnel in the heavy construction industry in the U.S.A, some of the findings are synthesized as follow: the higher these individuals' motivational level, the more likely they are to perceive themselves as more productive in their work; there seems to be no association between educational level and motivation; there seems to be no association between age group and motivation; there seems to be no association between time in current position and motivation; the more experience workers have in this industry or the older they become, the less likely it is that their motivation can be influenced by opportunities for promotion and comradeship among co-workers; those who earned only a high school diploma and those who have a degree higher than Bachelor's seem to be more motivated than those whose highest level of education is an associate or bachelor degree; they can be divided into two groups in which certain intrinsic factors seem to highly influence the motivation of one group but not the other. For one group, motivation is highly influenced by a good supervisor, job satisfaction and feeling of accomplishment, while the other group's motivation is influenced by pay raises, benefits and bonuses; the three factors that seem to have the most positive influence on motivation are feeling of accomplishment, job satisfaction and a good supervisor or leader, consecutively; and the three factors that seem to have the most negative influence on motivation are a bad supervisor or leader, lack of information and job dissatisfaction, consecutively.

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CHAPTER ONE

INTRODUCTION

Motivation has been one of the most studied research topics worldwide, particularly in the United States of America. People remain the most dominant source of knowledge and labor even though the world is in the technology age. The use of robots only substitutes some of the labor, especially where a high degree of precision is required or where the work environment is highly hazardous. In other words, one of the key ingredients that lead to the financial success of most organizations is a motivated workforce. As markets become more and more competitive, successful employers are paying more attention to their human resource management by developing incentive programs and positive cultures in an attempt to keep their employees motivated and thus maximize their work productivity. This dissertation aims to identify factors that influence the motivation level of a particular group of people - management personnel in the heavy construction industry. Management personnel are of interest here because they make critical decisions that directly impact the financial health of organizations. The dissertation also attempts to identify the kind of company culture or policy that promotes a motivational environment. Because these people are the most important assets any organization possesses, understanding and treating them the right way will likely bring success to organizations.

1.1 Organization of Dissertation

This chapter is an introduction to the dissertation. Readers will find the motivation for conducting this dissertation as well as its objectives and

limitations. At the end of the chapter, readers will also find working hypotheses that this dissertation proposes to investigate.

Chapter Two serves as a review for literature pertaining to motivation theories and studies. Readers will find major motivation theories including drive theory, behavior theory, unconscious motivation theory, cognitive theory of motivation, Maslow's theory of motivation and needs, Herzberg's two factor theory, ERG theory, McGregor's theories, reinforcement theory, equity theory, McLelland's theory and expectancy theory. Readers will also find a summary of literature on motivation of blue-collar and white-collar workers in the construction industry. Then the chapter concludes with a summary of the work of Haasen and Shea of the American Management Association: "A better place to work: how a new understanding of motivation leads to higher productivity," which looks at management in various industries including manufacturing and software.

Chapter Three summarizes the research methodology. Readers will find the process of developing the data collecting instrument as well as the design of the instrument. This chapter includes the factors influencing motivation that were chosen for investigation and thus incorporated into the instrument.

In Chapter Four readers will find statistical analyses, including inferential statistics, used in testing the working hypotheses. This chapter also describes characteristics of the participants' ten companies as well as some of the company policies.

Chapter Five contains content analyses of the selected three companies based on the motivation level (low, medium and high) of their employees. Readers will find policies and cultures these companies enforce and promote.

Chapter Six closes the dissertation with conclusions derived from the hypotheses and content analyses of open-ended questions from the questionnaires.

Readers will also find the author's recommendations for revisions that should be considered by future researchers who want to pursue this topic.

1.2 Motivation for Dissertation

Most of the large heavy construction companies still in operation in the United States were established decades ago. Unfortunately, many of them went out of business or are going out of business. The majority of the surviving companies are struggling with increasing operating costs that render them less profitable despite the growth in revenues. Many smaller business establishments with relatively smaller overhead costs rise up to compete with larger existing companies. Moreover, more foreign-owned companies are seeking to take part of the market by offering more competitive bids. All of the aforementioned factors contribute to a fierce competitive market for the heavy construction industry. Data from the two most recent U.S. Bureau of Economic Census' reports support the competitive nature of this industry. For example, the number of establishments under Highway and Street Construction decreased about 14 percent from 11,270 in 1997 to 9,689 in 2002 (U.S. Census Bureau, 2002 and 1997). The number of establishments under Bridge and Tunnel Construction also decreased about 7 percent from 1,177 in 1997 to 1,096 in 2002 (U.S. Census Bureau, 2002 and 1997). In addition, the number of establishments under Other Heavy and Civil Construction decreased about 32 percent from 15,475 in 1997 to only 10,502 in 2002 (U.S. Census Bureau, 2002 and 1997). Despite the increase in construction productivity that has resulted from technological advancement and decreased real wage of construction work force (Haas et al., 1999), one of the main reasons that firms operating in the U.S. struggle is a decrease in work productivity among management personnel. What caused work productivity of management personnel to decrease? It seems that this decrease in work

productivity can presumably be contributed to the relatively lower moral of employees, which results in relatively lower motivation. Poorer project management is also likely to occur when the management personnel do not have a relatively high level of motivation. Good management is vital to the financial success of any organization. Furthermore, construction owners are risk evasive (Ahmed et al., 1999). Contractors, having assumed considerable risks, must find ways to motivate their managerial employees in order to achieve higher work productivity to make up for the assumed risks. To sum it up, one author simply stated that motivated employees are needed so that employers can survive (Smith, 1994).

In terms of benefits to society, an increase in productivity means a reduction in the costs of construction. As more states must cope with sharp population growth, there is an increase in demand for public works. With an increase in work productivity in the heavy construction industry, savings can be tremendous and be used elsewhere to better our lives.

This study of motivation of management in the heavy construction industry reveals invaluable information needed to motivate the people who are ultimately responsible for construction projects and the success of their companies. Each year a significant amount of financial resources are spent by U.S.-owned construction firms around the world. Consequently, the construction sector represents a considerable amount of the total gross national product (GNP) for the U.S. Within the construction sector, the heavy construction industry is the most unique industry. Unlike most residential or commercial projects, heavy construction projects are generally far more complex and costly by nature. While most of these projects are funded by the federal government and the states, others are funded by users or ratepayers. The heavy construction industry builds the infrastructure the country needs the most in order to sustain its people and maintain its economic growth. It is simple; the more productive the industry is,

the more infrastructures can be built with the same budget. The savings from higher productivity can also be spent elsewhere to improve the lives of the people. Despite emerging construction technologies and better construction methods and techniques, critical decisions must still be made by a particular group of people -- the management. It is the author's opinion that people today are not nearly as motivated as people once were. They do not seem to work as hard and seem to have less pride in their work than did workers in the past. Maybe technology is responsible for this change in behavior since it eases the way we live. Regardless of what caused people to be less motivated in the construction sector, we need to try to control or even reduce this "motivation deficiency." Studies have been done on how to motivate the construction work force, but there is no research being conducted on the management personnel of the heavy construction industry that provide necessary supervision and support to the work force. Supervision and support from management are pre-requisites to having a motivated work force; therefore, management must be motivated as well as knowledgeable in order to endow proper support. Hence, the motivational force behind this research.

1.3 Scope of the research

Motivation is not the only factor that has an effect on individuals' perceptions of working conditions; stress also affects their perceptions (Gällstedt, 2003). Unexpected incidents occur, and some of these affect an individual's perceptions of the working condition by producing stress. This research does not deal with stress that can arise from the uncertainty that is part of any project because, regardless of stress, motivation is still the driving force that supports individuals in their efforts to reach project objectives.

This research is limited to management personnel of contractors specializing in heavy civil construction such as the construction of the following: highways, roads, dams, bridges, tunnels, airports, channels, ports, railroads, sewer and storm drainage pipelines, water and waste water treatment facilities, marine structures, and power plants. The research data were collected from management supervisors at construction projects such as project managers, office managers, project engineers, quality control engineers, safety engineers/managers, field engineers, office engineers, mechanical engineers/superintendents, electrical engineers/superintendents, equipment superintendents and general superintendents. Data were collected from management personnel at home offices such as presidents, chief executive officers, vice presidents, chief operation officers, corporate equipment managers, corporate safety managers, administrative managers, and human resources managers. Administrative assistant personnel or secretaries are excluded from the study since they do not provide supervision.

1.4 Limitation of Research

The limitation of this research concerns the coexistence of motivation and work ability. No matter how motivated a person is to perform well, good performance is unachievable if the person lacks the necessary ability. Some people can do extremely well on a job without exerting much effort. Others may not perform well even though they are highly motivated to do so. Therefore, productivity or job performance is influenced by both motivation and ability. Many theorists have suggested the following equation to express the relationship of ability and motivation to performance:

$$\text{Ability} \times \text{Motivation} = \text{Job Performance}$$

Note that both motivation and ability can potentially be zero. In the multiplicative combination of the two factors, the job will not be accomplished, if either one is zero. This research focuses solely on the motivation element of people and does not review the ability element. This limitation seems insignificant as it can be assumed that most management people in the construction industry exhibit sufficient ability to perform their job or they will not remain in the position.

1.5 Objectives of the research

The objectives of this exploratory research are to:

- Investigate whether a relationship exists between motivation and perceived productivity for the management personnel in the heavy construction industry.
- Investigate relationships between motivation and job satisfaction as they relate to variables such as age, work experience, time in position/job title and education of this group of people.
- Identify factors that could effectively influence the motivation level of this group of people.
- Identify the company policy or culture that creates a motivational or a suppressive environment for this group of people.
- Analyze the similarities and differences between motivation of the management personnel and the workforce within the construction industry.
- Analyze the similarities and differences of motivating the management personnel in the heavy construction industry and other industries.

1.6 Proposed working hypotheses

Aside from the insights gained from descriptive statistics and content analyses, the collected data can be used to test hypotheses using inferential statistics. This dissertation proposed the following hypotheses that readers may find interesting:

1. The higher heavy construction management personnel's motivational level, the more likely they are to perceive themselves as being more productive with their work.
2. The higher the educational level, the more likely a worker is to have higher motivation.
3. The older a worker becomes, the more likely he/she will have lower motivation.
4. The more time an individual is in current position without any promotion, the more likely he/she is to have lower motivation.
5. The more experience an individual has in this industry or the older he/she becomes, the less likely that individual's motivation can be influenced by opportunities for promotion and comradeship among co-workers.

CHAPTER TWO

RESEARCH BACKGROUND

2.1 Definition of motivation

In behavioral science, motivation refers to behaviors set into motion because of a need felt by the individual. This need indicates that the organism lacks a particular satisfaction; therefore, it strives to achieve relief. Motivation involves several aspects such as:

- needs, which imply the element of want;
- urges, which stress impelling force; and
- incentives, which suggest a reward.

Many contemporary authors have also defined the concept of motivation. Motivation has been defined as:

- the psychological process that gives behavior purpose and direction (Kreitner, 1995);
- a predisposition to behave in a purposive manner to achieve specific, unmet needs (Buford, Bedeian, & Lindner, 1995);
- an internal drive to satisfy an unsatisfied need (Higgins, 1994); and
- the will to achieve (Bedeian, 1993).

Commonly, motivation may be defined as the desire and willingness of a person to expend effort to reach a particular goal or outcome. Relative to this dissertation, the term “motivation” is defined as a combination of influences that causes someone to want to do a job or to complete a project as quickly

and as well as possible. A problem exists, however, because different individuals have different needs. Therefore what motivates one person does not necessarily motivate another. For construction projects, people must be motivated in order to complete a project as quickly and economically as possible while meeting safety and quality goals.

2.2 People produce actual work

What drives the cost of construction is largely the field people who perform the actual work. Nevertheless, the workforce alone cannot perform the tasks productively without proper supervision and support from the management. In order for the management to provide the optimal support and supervision for the workforce, the management must be constantly motivated. This research will attempt to understand the factors motivating this group of people. Enhancing motivation can lead to improved performance and greater organizational success.

2.3 Physiological Aspects of Motivation

One of the most important physiological components of the human body is hypothalamus, which is located at the base of the brain near the pituitary gland. The hypothalamus is important in almost all physiologically based motives and in emotions. It affects hunger, thirst, sleep, wakefulness, sexual responses, general visceral changes, and regulation of body temperature. Inside the hypothalamus is an integrative center which, if stimulated, produces eating behavior. It also determines when the drive of the organism is satiated.

Another center influencing motivation is the reticular formation located in the brain stem. The reticular formation is fed by neurons from all the sense

organs, and serves to regulate the general level of vigilance or arousal of the organism.

Scientists have located the “rewarding” and “punishing” areas in the brain. Direct stimulation of “rewarding” brain areas produces sensations of pleasure. Direct stimulation of “punishing” areas produces sensations of pain or fear. Pleasure is complex in that it is the anticipation of pleasure, which constitutes the drive and receiving it is the reward. Pleasure may come in two forms. The first is an emotional state of excitement and heightened awareness, which operates as a drive toward activity. The second is a state of relaxation or rest after vigorous activity, which comes from decreased tension. These states are both regulated by the autonomic nervous system, which is instrumental in regulating emotions. It controls functions such as breathing, heart rate, blood flow, and digestion. Pain and fear sensations are governed by the endocrine system. The endocrine system consists of glands that secrete hormones. One of the most important glands involved in responding to emotion is the adrenal gland, which secretes both adrenalin and noradrenalin. Adrenalin flows under conditions of fear and noradrenalin flows under conditions of anger.

One might summarize from this brief overview of physiology that motivation is the consequence of an unbalanced state of the nervous system. Understanding the basics of physiology helps one gain a very important insight: nothing that man does, thinks, or feels is independent of the way his body works. Sometimes an individual behaves in an unusual way just because his body is not in a normal state and total changes in personality and behavior can be brought about by changes in the brain. While such physiological changes are of interest, it is psychological factors that most directly influence motivation. In the next section, a number of motivation theories are presented to explain what motivates people psychologically.

2.4 Theories of Motivation

Motivated behavior results from the interplay of a number of factors, including leadership style, structure, organizational culture, and human resource policies and practices. Individual personality traits, skills, and attitudes also play a significant part in motivation. There is no single, generally accepted theory of what motivates people in the workplace, but an understanding of the theory of motivation can be very helpful in generating the solutions to a motivational problem. All motivation theories must answer all of the following three questions:

1. What activates behavior?
2. What directs behavior?
3. What reactions do individuals have to the outcomes that result from their behavior?

It is commonly accepted that a good deal of motivation has its origins in certain basic needs. Need theories of motivation are based on the assumption that basic wants govern much of people's behavior. Within the last century, psychologists have come up with a number of motivation theories. The remainder of this chapter discusses some of the popular motivation theories.

2.4.1 Drive Theory

Drive theory, developed by Robert S. Woodworth in a book entitled "Dynamic Psychology," was published in 1918. The theory attempts to explain what induces people to behave in particular ways. Woodworth referred to this

inducement as drive. Later in 1943, the term “drive” took on a very precise meaning in the writings of C. L. Hull as he assumed that all behaviors are motivated by either primary or secondary drives. According to Hull, the primary drives were biologically based; they represented states of homeostatic imbalance. His position was that (Hull, 1943):

“The major primary needs or drives are so ubiquitous that they require little more than to be mentioned. They include the need for foods of various sorts (hunger), the need for water (thirst), the need for air, the need to avoid tissue injury (pain), the need to maintain an optimal temperature, the need to defecate, the need for rest (after protracted exertion), the need for sleep (after protracted wakefulness), and the need for activity (after protracted inaction). The drives concerned with the maintenance of the species are those which lead to sexual intercourse and the need represented by nest building and care of the young.”

In Hull’s theory, outcomes become rewards when they are able to reduce primary drives and thereby reduce homeostatic imbalance and the tension that occurs when organisms are in a state of ecological deprivation. In addition, drive strength can be increased by deprivation and reduced as needs become satisfied. Also, certain secondary drives and rewards could develop or be learned if in the past they were associated with food or other primary rewards.

2.4.2 Behavior Theory

Behavior theory emphasizes that needs spur activity, therefore, humans learn habitual ways to satisfy these urges. Experiments demonstrate that actions

that satisfy a need tend to be repeated. Stated in behavioral terms, an organism encounters a stimulus, responds in some manner, and, as a consequence, gets reinforced for its actions. Habits are learned in this fashion.

2.4.3 Unconscious Motivation Theory

Unconscious motivation theory focuses on unconscious impulses instead of overt behavior. According to Sigmund Freud, much of human action originates from unconscious wishes and unrecognized feelings (Mackay, 1989).

2.4.4 Maslow's Theory of Motivation and Needs

First published in 1954, Maslow's hierarchy of need interpreted human behavior in terms of psychological needs. The theory suggests that human beings are driven by a series of psychological needs that manifest themselves as goals (Maslow, 1954). The needs start with the most basic and escalate up to a scale of necessity and intellectual significance to the highest intellectual state, reflecting self-fulfillment. When a particular lower set of needs is satisfied, the individual becomes psychologically restless and strives for the next highest set, providing that a set of conditions exists. These conditions, which themselves are prerequisites to the hierarchy of needs, such as freedom of speech, freedom to do as one wishes within the law, freedom of expressions and other cultural qualities such as fairness, justice, honesty and decorum, are considered rights in civilized society. The individual will respond to a threat against any of these prerequisites with emergency response actions to defeat the threat to both the prerequisite and the underlying basic need. As illustrated below, there are five different sets of

needs ranging from the lowest set, the physiological needs, to the highest set, the self-actualization needs.

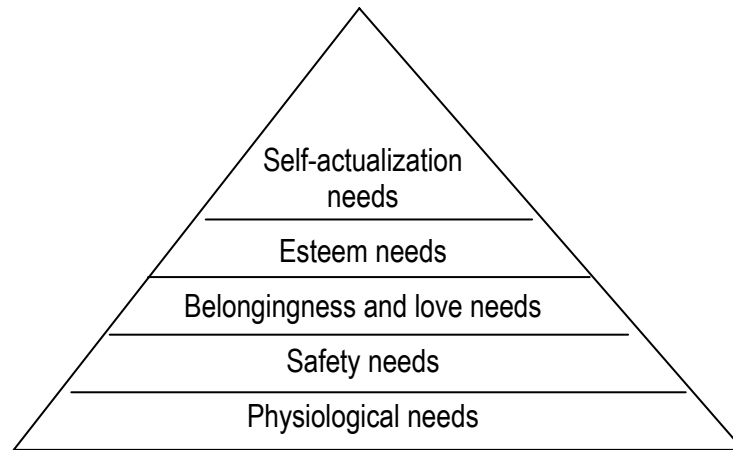


Figure 2.1: Maslow's Hierarchy of Needs (Maslow, 1954)

Physiological Needs

The physiological needs derive from the theorist's assumption that the most comfortable state of any organism is one of homeostasis. Life processes in all organisms depend upon maintaining a delicate set of chemical conditions in individual cells. Motivation arises out of homeostasis imbalance or tension. Homeostasis motives include hunger, thirst, avoidance of extremes of temperature, light, sound, pain-producing stimuli, and elimination of waste products. Based on these homeostasis motives, Maslow's physiological needs are those necessary for survival of the body. They include the need for food, water, shelter, warmth, and sleep. For example, in order for a laborer to satisfy his hunger and to provide enough food for his family, he will tolerate unsafe practices on the job to stay employed. He will also tolerate almost any adversity in connection with the job in order to achieve or maintain the certainty of eating. Once this certainty is achieved, however, his motivating needs become those of the next level, safety needs.

Safety Needs

The safety needs are characterized as the desire for the following: security, stability in relationships with others, freedom from harm, fear, chaos, and anxiety, a structured environment, the presence of a strong protector, predictability of events; and law and order. For example, a rod-buster will not perform well in new and unfamiliar surroundings and may become subconsciously terrified when confronted by disorganized or chaotic events or by the loss of tools he depends upon. However, once he believes that the work environment is safe and manageable he will seek the next-higher level of needs, belongingness and love.

Belongingness and Love Needs

The belongingness and love needs, which are social in nature, are desires to seek love and affection; desires to avoid loneliness, rejection, and ostracism; and desires to achieve a state of acceptance and a feeling of belonging to a group or organization. For example, a new field engineer who is recently hired on a project will feel that he is not a part of the team. He will join the co-workers for lunch in order to associate himself with the team of which he now is a part. When he feels that he has accomplished the goal of acceptance, belonging, and being loved, he then strives for the next level of needs, esteem.

Esteem Needs

Esteem consists of two components: self-esteem and the esteem of others. Self-esteem is a desire for the achievement and mastery of some quality or skill, or a desire to develop competence in some area of performance. Self-esteem enables an individual to develop a sense of self-worth, adequacy, and usefulness that permits him or her to face the world confidently. Self-esteem develops, to a certain degree, from the esteem of others – what others think. For example, a

foreman feels good about himself and his crew when the job is performed by the schedule and achieves the quality goals. His esteem becomes even higher when he gets an “at a boy” from his boss, the superintendent. Once an individual feels confident that he has the esteem of others, he seeks the highest level of needs, self-actualization.

Self-Actualization Needs

At this level, the individual is motivated to become what he feels he must be, being true to himself. He wants to become what he believes he is best suited to be and all that he is capable of becoming. He pursues his ultimate goal, self-fulfillment. Once in the self-actualized state, his motivation derives from the desire to continue doing what he knows he does best. For example, a chief surveyor works in the tunnel over 18 hours a day as the tunnel-boring machine advances through a curve to make sure that the alignments are within the tolerance. Day after day for over two weeks, he does his duty with a sense of great satisfaction because his achievement brings self-fulfillment.

2.4.5 Herzberg’s Two Factor Theory

Herzberg’s theory can be viewed as an extension of Maslow’s, but it introduces the concept of potential de-motivators that can exist in the organizational environment. The Two Factor Theory (Herzberg, Mausner, & Snyderman, 1959) focuses on factors that produce job satisfaction and dissatisfaction. The de-motivators, termed “hygiene factors,” include working conditions, policies, administrative efficiency, style of supervision, and relationships between employees. Herzberg asserts that getting these factors right creates the conditions in which a set of personal needs, or motivators, can produce

high levels of effort. However, if the hygiene factors are wrong, then even activating the motivators will not be effective. Herzberg's motivators somewhat resemble Maslow's needs - achievement, recognition, responsibility and freedom, and advancement.

2.4.6 ERG Theory

Clayton Alderfer (1972), further testing and explaining Maslow's ideas, identified three categories of needs: existence, relatedness, and growth (ERG). Existence needs relate to material desires and include the essential requirements for food, clothing, and shelter. Relatedness needs are the desires for human relationships that are satisfied through interaction with family, friends, coworkers, superiors, subordinates, and friendship groups. Growth needs are the needs to be creative and productive and to be most fully what one can be. Like Maslow's theory, ERG theory is based on three propositions. First, it proposes that the less each need level has been satisfied, the more it will be desired. Second, once the lower-level needs are satisfied, the individual's desire for higher-level needs will be greater. Third, when higher-level needs are frustrated, the individual will again seek lower-level need satisfaction. Unlike Maslow's theory, ERG theory states that two or more needs can operate simultaneously as motivating forces and that emergence of relatedness and growth needs does not require satisfaction of the existence needs.

2.4.7 McGregor's Theories

McGregor's Theory X and Theory Y concepts describe two divergent aspects of labor and their related management styles of directing human energy. Rather than being essentially indolent and lacking in ambition, the worker has the capacity and desire for organizational involvement and the readiness to assume responsibility. The only task for management is to unlock the potential.

Theory X

Douglas McGregor describes Theory X as the conventional idea of the way in which management uses human energy to meet its organizational needs. Theory X characterizes people in the following way (McGregor, 1966):

- Average men are by nature indolent and work as little as possible.
- They lack ambition, dislike responsibility and prefer to be led.
- They are inherently self-centered and indifferent to organizational needs.
- They are by nature resistant to change.
- They are gullible, not very bright, the ready dupe of the charlatan and the demagogue.

One approach to motivate this group of people is to use tight controls, coercion, and threats. McGregor called this approach the conventional conception of management's task and stated it in terms of three propositions as follows (McGregor, 1966):

1. Management is responsible for organizing the elements of productive enterprise – money, materials, equipment, and people – in the interest of economic ends.

2. With respect to people, this is a process of directing their efforts, motivating them, controlling their actions, and modifying their behavior to fit the needs of the organization.
3. Without this active intervention by management, people would be passive, even resistant, to organizational needs. They must therefore be persuaded, rewarded, punished, and controlled – their activities must be directed.

Management by direction and control, however, fails, under today's conditions, to provide effective motivation of human effort toward organizational objectives. It fails because it cannot motivate people whose physiological and safety needs are reasonably satisfied and whose social, esteem, and self-fulfillment needs are predominant.

The other approach is to use permissiveness and accession to people's demands in order to make them tractable and more likely to accept direction. However, the former approach results in antagonism and confrontation, militant unionism, restriction of output, and sabotage of management's objectives. The latter approach results in abdication in management control, indifferent performance, and higher costs for lower output. Therefore, neither approach results in improved productivity or creates a climate conducive to motivation of the individual.

Theory Y

Theory Y provides an alternative to the conventional concept of Theory X. Theory Y is based on more reasonable assumptions regarding human nature and human motivation as follows (McGregor, 1966):

- People are not by nature passive or resistant to organizational needs. They have become so as a result of experience in organizations
- They possess latent motivational capabilities.

- They have the capacity to take on responsibility and the readiness to work toward organizational goals.
- They have the potential for development.

Because people already have these characteristics, management only has to create opportunities, remove obstacles, encourage growth, and provide guidance in order to motivate this group of people. It is a responsibility of management to make it possible for people to recognize and develop these human characteristics for themselves. Management must minimize external controls by giving workers a degree of freedom to assume responsibility in helping to achieve organizational goals and rely on the workers' ability to direct themselves along the same path as management. In contrast to the "management by control" approach, this approach is known as "management by objectives." McGregor believes that implementation of Theory Y would result in substantial improvement in the effectiveness of industrial organizations.

2.4.8 Reinforcement Theory

Based on the work of Burrhus F. Skinner (1953), reinforcement theory focuses on influencing behavior through rewards and punishments, or reinforcement. The process of altering behavior through reinforcement is called behavior modification. The theory maintains that if a desired behavior is followed immediately by some reward, the person will be motivated to repeat that behavior. However, if the consequence of the behavior is displeasing to the person, he or she is less likely to repeat that behavior. And the shorter the time between the behavior and the reinforcement, the more likely it is that the behavior will be influenced. In addition, varying, intermittent patterns of reinforcement are

more motivating than continuous reinforcement and more motivating than reinforcement at regular intervals.

2.4.9 Equity Theory

J.S. Adams (1965) developed Equity theory which states that the presence of inequity will motivate an individual to reduce inequity and that the strength of the motivation to reduce inequity varies directly with the perceived magnitude of the imbalance experienced between inputs and outcomes. Equity theory provides some insight into how people perceive fairness and unfairness and the consequences of these perceptions. The theory assumes that people want to be treated fairly and that individuals within an organization tend to compare their own contributions and rewards with the contributions and rewards of others. To feel fairly treated on the job, one must perceive that what one puts in corresponds with personal outcomes. The person must also feel that his or her contributions and outcomes are in line with the contributions and outcomes of others. The theory also suggests that if one perceives that personal outcomes are too high relative to what one puts in and, in turn, too high in comparison with what others contribute and receive, that person will feel motivated to bring the situation into psychological balance.

2.4.10 McLelland's Theory

McLelland & Burnham's (1976) achievement theory or McLelland's theory, maintains that individuals are motivated by three needs: power or influence, affiliation, and achievement. Each of these needs carries a different

weight with each individual. High motivation will result from situations where an individual has the opportunity to satisfy his psychological needs. Unlike Maslow's theory, McClelland's theory allows all types of psychological needs to co-exist at the same time and recognizes that self-actualization needs can be stronger than physiological or survival needs.

2.4.11 Cognitive Theories of Motivation

Cognitive theories of motivation are based on the assumption that the behavior of individuals is determined by a process of conscious and rational evaluations of the outcome and value of a given behavior. In other words, thinking and judging are prerequisites to an action.

Edward Tolman formulated one of the earliest cognitive theories. Tolman (1932) suggests that the behavior of individuals is determined by the presence of goals and the probability or expectancy that their behavior will lead to the achievement of these goals. This view is grossly different from Maslow's theory of motivation and needs.

Kurt Lewin developed another famous cognitive theory. Lewin (1935) suggests that individuals have a phenomenal field where everything of which they are conscious at any time belongs to a pattern of consistent organization, and whenever anything disrupts the organization, a state of tension is created and directs them into taking action to restore organization. Therefore, the sum of the individual's consciousness makes up his or her phenomenal field and he or she is motivated at all times to keep this field as consistent as possible.

In 1964, the Expectancy Theory was developed by Victor Vroom (1964) based on the previous works of Tolman and Lewin to predict the relationship between motivation and performance in worker behavior. The theory suggests

that an individual's level of motivation in performance of a task depends on three perceptions:

1. How the worker rates the attractiveness of the result that an improvement in his performance will have.
2. How he estimates the probability that increased effort will lead to better performance.
3. How he perceives the probability that better performance will lead to the desired result.

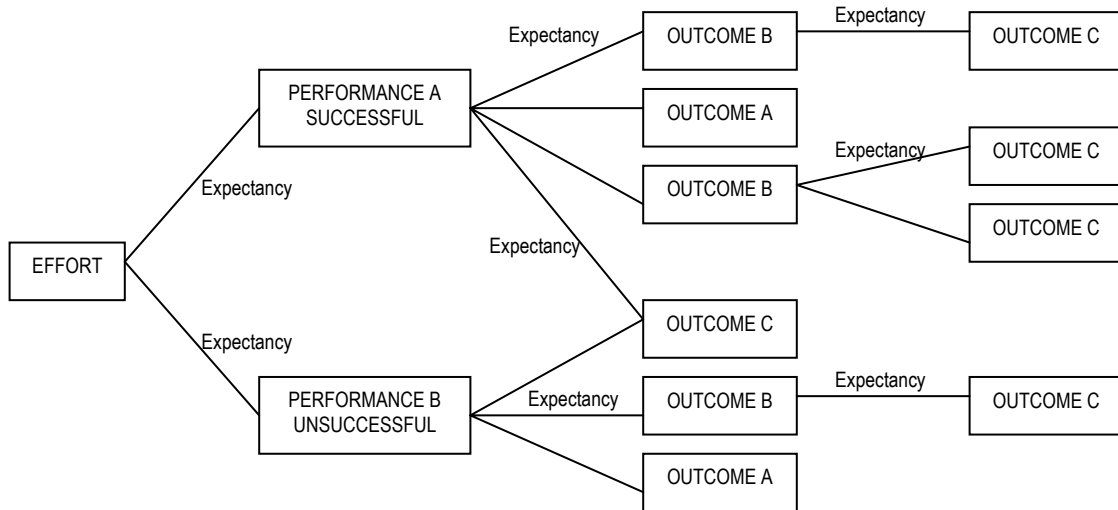
The theory emphasizes that in all cases, it is perceived probabilities that govern the worker's actions and not the actual results. In other words, motivation is a function of an individual's expectancy that a certain amount of effort will lead to a certain level of performance that, in turn, will lead to desired outcomes or rewards. Each potential outcome has a valence, which is its degree of attractiveness or value to a specific individual. These valences vary for different people because of individual needs and perceptions. Thus, the more attractive the reward and the stronger the perception that changes in effort will produce like changes in performance and that improved performance will lead to the reward, the higher the motivational level will be.

2.4.11.1 Expectancy Model for Motivation in Organizations

To better understand how to motivate people in organizations, an expectancy model is developed based on these following four points:

1. People have preferences among the various outcomes that are potentially available to them.
2. People have expectancies about the likelihood that an action (effort) on their part will lead to the intended behavior or performance.

3. People have expectancies (instrumentalities) about the likelihood that certain outcomes will follow their behavior.
4. In any situation, the actions a person chooses to take are determined by the expectancies and the preferences that he or she has at the time.



Performance A: Intended performance, a successful result from effort

Performance B: Performance other than that intended, an unsuccessful result from effort

Outcome A: An outcome sought as an end in itself

Outcome B: An outcome sought as a prerequisite to other outcomes

Outcome C: An outcome that can be obtained whether or not the effort leads to the intended performance

Figure 2.2: Expectancy Motivation Model (Lawler, 1994)

The expectancy model illustrated above shows the major factors that influence the strength of a person's motivation to perform in a given manner. First, motivation is influenced by the expectancy that effort or action on the part of the person will lead to the intended behavior. Therefore, expectancy is the person's estimate of the probability that he will accomplish his performance, given the situation in which he finds himself. This is effort \rightarrow performance (E \rightarrow P) expectancy. The model also shows that expectancies about the

consequences of task performance influence motivation. The model shows a number of expectancies since successful task performance leads to a number of outcomes. These are performance \rightarrow outcome ($P \rightarrow O$) expectancies that are subjective probability estimates. Some of the outcomes are seen as leading to others outcomes. Some outcomes such as personal growth are sought as ends in themselves. The attractiveness of any outcome can be thought of as varying from very desirable (+1) to very undesirable (-1). And expectancies can range from 0 to 1. Overall, the model suggests that a person's motivation to perform in a particular way will be influenced by his expectancies about the outcomes associated with performing at that level ($P \rightarrow O$), and the attractiveness of the outcomes involved. These factors combine to produce a motivational force to perform in the specified manner.

Although the model does not show how the various expectancy factors combine to determine motivation, most expectancy theories have operated on the assumption that the higher the $E \rightarrow P$ expectancy and the more closely the performance is seen to be related to positive outcomes, the greater will be the motivation. This assumption seems to be valid based on the fact that motivation seems to be greatest when $E \rightarrow P$ is high for successful performance and low for unsuccessful performance and when $P \rightarrow O$ is high for positive outcomes and low for negative outcomes.

2.4.11.2 Determinants of $E \rightarrow P$ and $P \rightarrow O$ Expectancies

It is important to understand how $E \rightarrow P$ and $P \rightarrow O$ expectancies develop since they are basic to understanding motivation. The most important determinant of a person's $E \rightarrow P$ expectancies is the actual situation itself. However, a person's perception of the situation can be inaccurate, resulting in a situation that may not completely determine a person's $E \rightarrow P$ expectancies. Other factors that influence

E→P expectancies such as communication of other people's perceptions may, however, correct that person's perception of the situation. Although other people's perceptions are not necessarily accurate, it is more likely that they can be a corrective influence when a person badly misperceives the situation.

Learning also influences E→P expectancies and helps make these expectancies more accurate. As people gain more experience in a situation, they usually are able to develop more accurate E→P expectancies.

The other factor that can influence E→P expectancies is self-esteem. A critical component of people's self-image is the beliefs they have concerning their response capabilities and their value and effectiveness. These beliefs can be influenced either positively or negatively depending on a person's effectiveness in dealing with the environment. People with low self-esteem tend to underestimate the likelihood that they will be successful. As a result, motivating low self-esteem people to perform well is difficult since they are predisposed to believing that they cannot perform well. Conversely, high self-esteem people tend to have realistic E→P expectancies; therefore, they respond more predictably to their environment. Figure 2.4 summarizes the factors that influence E→P expectancies.

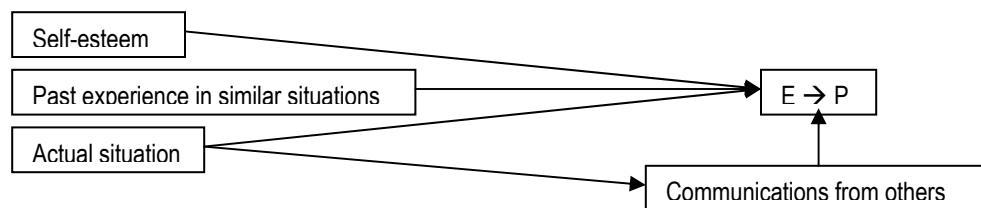


Figure 2.3: Determinants of E→P expectancies (Lawler, 1994)

Like E→P expectancies, P→O expectancies are strongly influenced by the situation, by people's past experiences in similar situations, and by other people's perceptions about the situation. Some research suggests that P→O probabilities

are influenced by the nature of the outcomes and that people exhibit a general tendency to downgrade the possibility that very positive things or very negative things will happen to them. Other research suggests that $E \rightarrow P$ probabilities can influence certain $P \rightarrow O$ probabilities, specifically when the $E \rightarrow P$ probability is around 0.5. When this happens the achievement motive is aroused; thus, $P \rightarrow O$ expectancies related with achievement-type outcomes are affected.

There is evidence to believe that $P \rightarrow O$ probabilities are influenced by people's personalities. People are controlled in one of two ways: internally or externally. A person who is high on internal control believes he can influence what happens to him and what outcomes he obtains. In contrast, a person who is high on external control believes that fate and forces beyond his control influence what happens to him and what outcomes he receives. People who are oriented toward internal control are more likely to feel that performance on their part will lead to rewards than are people who believe in external control. The figure below summarizes the factors that influence $P \rightarrow O$ expectancies.

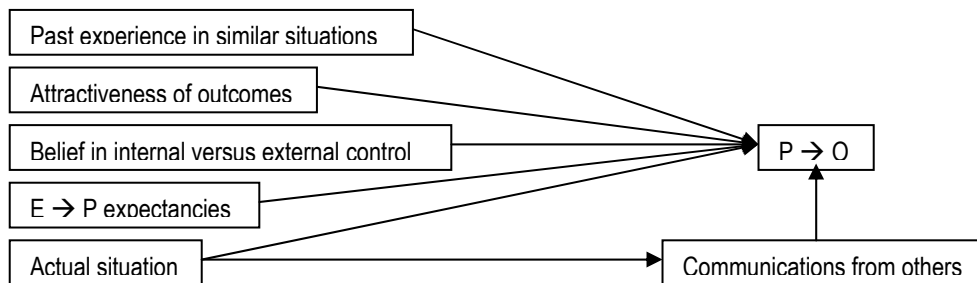


Figure 2.4: Determinants of $P \rightarrow O$ expectancies (Lawler, 1994)

In using the motivation model as described, it is important to remember that people do not consider all alternatives. They would rather remain complacent

than optimize. When people are considering performing effectively, they do not consider all of the outcomes associated with the behavior. Thus, in using the model to predict an individual's behavior, consideration must be limited to only the cognition that the person is actually using as a basis for decision. Most importantly, the observer may not place the same value on the outcomes that the actor does. The observer may also consider totally different behaviors than the actor does.

Another cognitive theory was presented by Latham & Locke (1992), who proposed that providing employees with a goal is the key to not only increased motivation but also controlling behavior. The theory proposes that goal setting is a feature of the management theory of empowerment which suggests that participation in goal setting, decision-making, problem solving and change produces psychological 'ownership'. However, most behavioral scientists still favored the Expectancy theory at the time.

These eleven motivational theories are just some of the well-known theories being published in the behavioral science community. They help us to better understand how differently each individual can effectively be motivated. They also are used to formulate the data collection instrument, which will be discussed in the next chapter.

The next section summarizes a review of literature pertaining to motivation specifically in the construction industry in the U.S. Later, findings from this research will be compared to the findings from the literature.

2.5 Literature Review of Motivation in the Construction Industry

Motivation literature dealing within a construction setting is very limited compared to that in the purely psychological realm. A number of literature studies were found which examined construction workers in the U.S. and other

countries. Borcharding & Oglesby (1977) and Borcharding et al. (1980) studied construction workers and low-level supervisory staff in large projects and found that an unplanned project that did not support the work force can have adverse effects on worker motivation. Maloney & McFillen (1985, 1986a&b) and McFillen & Maloney (1988) conducted research of construction worker motivation among union members. They concluded that the primary means of influencing motivation is to make receipt of important job outcomes contingent on the performance or completion of the assigned task (Maloney & McFillen, 1985) and, quite significantly, that the expectancy theory is a workable conceptual base for understanding the motivation of construction workers (Maloney & McFillen, 1986a). Anderson et al. (1991) surveyed construction tradeswomen and professionals and found that both were predominantly satisfied at work; all respondents agreed that construction projects are intrinsically satisfying. Although this study included construction professionals, it only aimed to investigate their job satisfaction. Ng et al. (2004) conducted a survey of construction workers in seven civil engineering projects in Hong Kong, aiming to improve worker productivity by identifying factors that were likely to induce the demotivation of workers. The study found that material availability, overcrowded work areas and rework were the most significant demotivators.

Research conducted on motivation of professionals in construction is even more limited. Their findings were only drawn from construction professionals in Australia. Barrett (1993) asked Australian professionals to indicate levels of 'wants' and 'gets'; needs were calculated from the difference between 'wants' and 'gets'. Barrett concluded that generally extrinsic motivators such as good pay or high bonuses were found to be much stronger than intrinsic motivators such as positive feedback or sense of achievement.

Chan (1993) conducted motivation research among Australian project managers, using McLelland's theory of need achievement and Herzberg's two-

factor theory. Chan found that Herzberg's theory was applicable for those with less experience and that the characteristic of experience widely equaled the characteristic of age. He also concluded that project size had generally no bearing on motivation.

Smithers & Walker (2000) investigated the effect of the workplace environment encountered on a construction site on motivation and demotivation of 58 construction professionals and concluded that the environment of a construction site such as long hours and poor planning as a result of unfair resource distribution did affect demotivation levels of site personnel.

Gilbert & Walker (2001) addressed the questions “What is the relationship between motivation, demotivation and gender?” and “Are men and women motivated and demotivated by different variables encountered in the construction industry?” They concluded that there was no statistically significant difference in total motivation and demotivation levels between male and female employees in Australia. They did, however, find that there were significant differences with regard to the perceived attractiveness and unattractiveness of certain work place and job characteristics. They based their findings on merely 56 respondents.

Unfortunately, there has been no identified research being conducted to investigate factors that motivate or dissatisfy management personnel in the construction industry in the U.S. What about management’s perspective in terms of work satisfaction in other industries? Investigating what the management in other industries view as motivators can be very helpful in figuring out what motivates management personnel in the construction industry. The next section is devoted to a literature review of motivation of management in other industries.

2.6 Literature Review of Motivation in Other Industries

The best literature that captures motivation and morale of employees in industries other than the construction industry is the work of Haasen and Shea of the American Management Association. They reported findings from their interviews of managers and front-line workers of diverse companies. There are eight case studies chosen to represent a diversity of businesses from small (80 to 150 employees) to large (2,000 to 6,000 employees) – some in metal fabrication or steel production, others in automotive manufacture or high-technology product areas. Haasen & Shea (1997) suggested that people seem to exhibit intrinsic motivation and productivity. Using extrinsic determinants only stimulates motivation within a certain period of time; it does not last. To keep people motivated constantly, management needs to focus on intrinsic motivation. This can be unleashed by letting people be in charge, offering them opportunity to acquire new skills and abilities to meet a different challenge, and making them feel that they are part of a successful team. Intrinsic motivation leads to infinite productive energy and creativity.

There are three important elements in unleashing intrinsic motivation. Firstly, people need full control and autonomy at work. The job must be their responsibility and they must be able to make all important decisions related to their work. At the same time, management must provide them with support and be their mentors. Secondly, people need opportunities to learn and to master new knowledge and skills. Learning not only is a motivation in itself but also builds self-esteem. Moreover, learning makes people more flexible and helps them to understand the interrelationships of a business. Thirdly, people need to be part of a work team that gives them a base of support and allows them to find their own level of challenge. A work team is able to tackle meaningful pieces of work, thus making it enjoyable when the work is accomplished. Once this new management

philosophy is in place, a company will possess intrinsically motivated employees. This type of employee is indeed a key source of a company's competitive advantage.

These three important elements learned in this section should be used hand in hand with the experience learned from the preceding two sections to derive potential variables or influences that may motivate management personnel in the heavy construction industry.

In the next chapter, the research methodology and design of the data collection instrument are reviewed. This includes predicted variables that should influence motivational level of the management personnel in the heavy construction industry. These predicted variables are suggested based on the understanding of motivational theories as well as the literature reviewed in this chapter.

CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1 Respondents/Participants

This research focuses on three distinctive groups of management personnel on construction project job sites: project managers, project supervisors and superintendents. The research also focuses on the management at the company headquarters or home offices, because this group of people provides support for construction projects. Project managers are at the top of the hierarchical authority at the project level (See Figure 3.1).

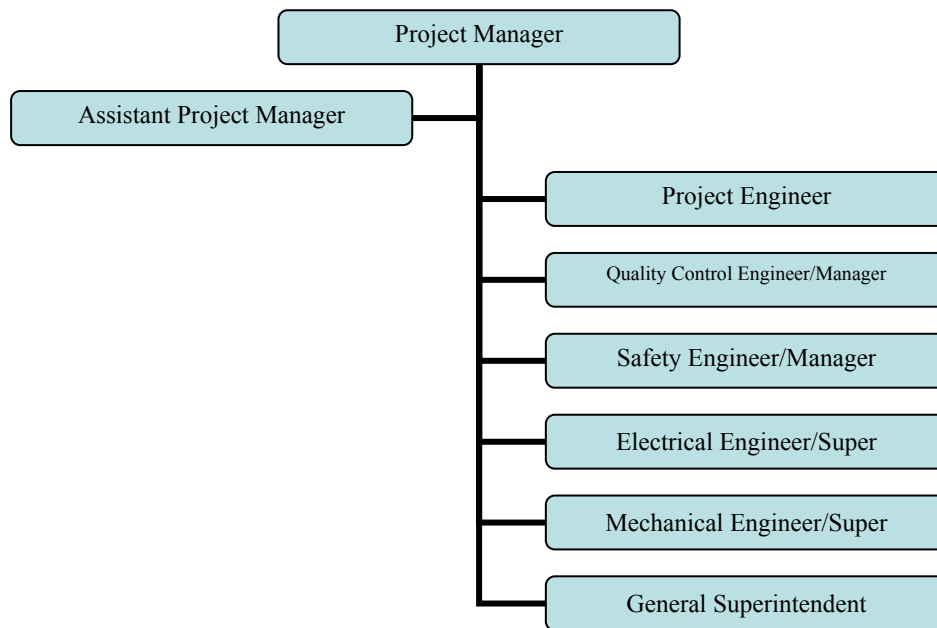


Figure 3.1: Project-Level Hierarchy Diagram

A project manager's supervisors are usually senior managers, area managers or project sponsors who supervise and support them from a distance at the company headquarters or home offices. Project managers have the ultimate authority in the day-to-day operation of their project and do not typically interact with their supervisors on a daily basis. However, the project supervisors and superintendents interact with their supervisors, project managers, on a daily basis. Although project managers, project supervisors and superintendents are subjected to the same company policy, perspective of what influences their motivation can be quite different. Therefore, the data-gathering techniques being used will be designed to accommodate the difference of their perspectives. As mentioned, in addition to these three groups of management personnel at construction project job sites, management personnel at home offices will also be asked to participate in the research. Some of the people included in this group of management personnel are presidents, vice-presidents, directors, general managers, project sponsors, senior project managers, area/regional managers, safety managers and human resources managers.

3.2 Data Collection Methods

There are a variety of data-gathering techniques a researcher may use to conduct behavioral science studies. The techniques or methods used most frequently are interviews, questionnaires, observation, and secondary data. For this research topic, observation cannot render meaningful and accurate data. The secondary data technique is impractical for this research because the information that might be useful to the research is not readily available and can be deemed confidential and sensitive. Therefore, companies are unlikely to be cooperative enough to release that type of information. Interviews and questionnaires are thus

the two most promising methods for collecting meaningful and accurate information regarding people's perspective of their job and the level of their motivation.

3.2.1 Interviews

An interview is a widely used data-gathering technique. It has the advantage of being direct, personal, and flexible. It allows interviewers to gather subjective data on values and attitudes because it is possible to probe and ask interviewees to clarify statements. Many people including the author also find it interesting to be the subject of an investigation. As long as questions are not intimate and repulsive, an interview can be a very promising means for obtaining useful information. However, an interview is time-consuming and maintaining the individual's anonymity may be an issue. It is also difficult to quantify results of interviews. Interviews can also be costly due to the required effort interviewers must commit and the demographic diversity of the interview locations. Interviews may be used in conjunction with questionnaires or used as a secondary means to clarify unclear information found in the questionnaires.

3.2.2 Questionnaires

Questionnaires are gaining popularity as an alternative to the interview method because it can provide relative richness of data compared to an interview, with a better chance of success in terms of the number of interviewees. Since questionnaires are self-administered, maintaining anonymity is no longer an issue. Questionnaires can also be given to several people at the same time; and thus, are

less costly than the interview method. With commonly used electronic messaging, questionnaires can virtually be distributed and returned in a matter of minutes with minimal cost if any. However, in order to receive meaningful and accurate responses, questionnaire forms must be well designed and sent to the right people. Ideally, a well-designed questionnaire has few imperfections. Researchers may perfect questionnaires by performing many pilot tests and removing the flaws. The most common imperfections are lack of clarity in definition and ambiguities in phrasing questions. Questionnaires may produce survey errors because various meanings are associated with the same word by different people, and because of replies that are liable to misinterpretation. The omission of questions that would be illuminating could also generate errors. Emotionally toned words, leading questions, and the influence of the rigid patterning of the responses should be avoided in the questionnaire.

A survey questionnaire was used primarily to convey the necessary information for this research. Careful consideration was given to generating a well- designed survey questionnaire, which respondents can complete through self-administration. Optionally, the questionnaires can be completed by administrators conducting face-to-face or telephone interviews with the respondents. Based on the high response rate of the author's previous research, a majority of respondents was asked to participate through a self-administered questionnaire sent via post. Some of the advantages of using postal questionnaires are (Oppenheim, 1992):

- Low cost of data collection
- Low cost of processing
- Avoidance of interviewer bias
- Ability to reach respondents who live at widely dispersed locations

Postal questionnaires also have disadvantages (Oppenheim, 1992):

- Generally low response rates
- Unsuitability for respondents of poor literacy or the visually impaired
- No opportunity to correct misunderstandings or to probe, or to offer explanations or help
- No control over the order in which questions are answered
- No control of passing on of questionnaires to others

These disadvantages will be addressed later in this chapter in Section 3.4 - Development of Questionnaire.

3.3 Considerations in Designing Questionnaire

As mentioned earlier, there are a number of items to be considered in designing a survey questionnaire in order to minimize the unbiased responses of the respondents. Some of the more important considerations are:

3.3.1 Question-Order Effects

Apart from sampling error, question-order effects are probably the most frequently offered explanation for an unexpected survey finding. Because individual survey questions are not asked in isolation, but rather as part of a continuous flow of questions, the context in which any question appears or its position in a sequence of items may conceivably influence the answers given to it. This can potentially be a serious problem for a number of reasons. Firstly, any attempt to generalize about survey results is suspect if they may be a function of a

particular order of questions. Secondly, question order effects can ruin trend studies if they merely shift marginals. After all, the primary results of any trend studies are nothing but changes in marginals. This research is therefore susceptible to the former possibility of question order effects.

3.3.2 Response-Order Effects

Closed survey questions present two or more alternatives from which respondents are to choose. If the order in which alternatives are read influences choice, responses become biased by response-order effects. Despite the obvious similarity to the problem of the question-order effects, the consequences of response-order effects are those that occur between questions. There is no problem of different effects from one survey to another since the alternatives to a closed question are usually asked in the same order whenever it is repeated. However, response-order effects may be invisible to an investigator. For instance, the third of three alternatives is chosen not because of its substance, but because it is the last in the list.

3.3.3 Open and Closed Questions

Questionnaires can be comprised of either open or closed questions. Proponents of the use of open questions believe that they allow respondents to express their opinions without being influenced by suggestions from the researcher. Closed questions typically provide an incomplete and arbitrarily closed set of response options, which are almost bound to distort respondents' answers. However, closed questions are believed to have some advantages over

open questions. Firstly, closed questions allow respondents to answer the same question so that answers can be meaningfully compared. Secondly, closed questions invoke a recognition task, as opposed to a recall task, to respondents; therefore, respondents find them much easier to answer. Thirdly, closed questions produce data that are much easier to computerize and analyze because they produce less variable answers.

3.3.4 Quality of Questions (Good or Bad)

Questions are thought of as having low quality or being bad when they are (Labaw, 1981):

1. Incomprehensible to the respondent because either the wording or the concepts, or both cannot be understood by the respondent;
2. Unanswerable either because the respondent does not have access to the information to enable him or her to answer it, or because the options provided as answer categories do not adequately encompass the true answer as perceived by the respondent;
3. Leading, in that the respondent is forced or directed into an answer that he or she would not ordinarily give if all possible answer categories or concepts were provided, or if all the facts of the situation were provided.

Questions should not obscure, prohibit, or distort the fundamental communication from respondent to researcher. A researcher often thinks he or she has written an excellent question because it accurately conveys his or her point of view to the respondent, but if the respondent cannot answer it meaningfully, it still remains a bad question.

3.4 Development of the Questionnaire

The questionnaire was designed with specific objectives. There were no existing questionnaires the author could adapt to be used for this research based on the reviewed literature in the previous chapter. Thus, the mentioned considerations for designing the questionnaire are important. The questionnaire was designed with these considerations in mind. It was also designed to deliver the following objectives:

1. Investigate whether a relationship exists between motivation and perceived productivity for the management personnel in the heavy construction industry.
2. Investigate relationships between motivation or job satisfaction and other variables such as age, time in industry, time in position/job title and education of this group of people.
3. Identify factors that could effectively influence motivation level of this group of people.
4. Identify the company policy or culture that creates a motivational as well as a suppressing environment for this group of people.

The questionnaire was brief, simple, and worded specifically with a particular audience in mind (i.e., management personnel). More importantly, design of the questionnaire emphasized its accuracy. Accuracy in questionnaire design is defined as obtaining a true report of the respondent's position. Having been in a management position himself, the author understands the respondent's position which allowed him to predict behavior and attitude with greater consistency. In addition, questions were reviewed to ensure that each question did not inadvertently ask two questions. In short, there were no "double-barreled" questions.

After the guidelines were developed, several basic concepts, which clarify respondents' answers and provide tools for analysis of the answers, were examined. The first concept is determining levels of respondent consciousness. This concept helps identify whether people are aware of what they are saying. Respondents who are unconscious of the meaning or implications of what they say may exhibit more volatile and unpredictable behavior (Presser & Schuman, 1996). Lack of consciousness can be detected by answers that are inconsistent, or misleading.

The second concept is determining the influence of structures on attitudes and behavior. This concept helps the researcher understand the context of the respondent's answers and the influences conditioning those answers. When respondents are unconscious, they are more likely to be heavily influenced by their environment. Answers can only be understood in a total respondent context. Without this context, answers may appear illogical, irrelevant or contradictory. Fortunately, all of the returned questionnaires exhibited none of these qualities; therefore, no follow-up interview for this purpose was necessary.

The third concept is determining how knowledge affects the respondent's behavior and answers. This concept helps researchers to learn the salience to the respondent of his or her own answers. Knowledge also indicates respondent priorities and values, helps define sensitive topics, and deflates the prevalence of socially acceptable answers. In this research, respondents likely possessed personal knowledge from firsthand experience in the situation and factual knowledge, which is derived from reading, personal experience, or indirect exposure through their profession and co-workers. Respondents were predicted to use their personal knowledge to answer questions regarding what influences his or her motivation. They were to use factual knowledge in answering questions pertaining to their company policy.

In developing the questionnaire, the author had to consider the following:

1. The main type of data collection instruments
2. The method of approach to respondents, i.e., sponsorship, stated purpose of the research, length and duration of the questionnaire, confidentiality and anonymity
3. The making of question sequences or modules within the questionnaire, and the ordering of questions and scales
4. The order of questions within each module, using a funneling approach
5. The type of question to be used (i.e., closed and open)

Once a general guideline was established, design details of the questionnaire were generated. The questionnaire incorporated the following elements.

3.4.1 Attitude Scaling

Attitude scaling is a method of measuring attitudes. It is a technique for placing people on a continuum in relation to each other. Attitude scales are constructed based on Principles of Measurement, which consist of:

1. Homogeneity – measuring the same dimension or measuring of one thing at a time, as uniformly as possible.
2. Linearity – equal or equal-appearing intervals. This quality also makes quantitative scoring possible.
3. Reliability or Consistency – the measuring instrument behaves in a fashion that is consistent with itself.
4. Validity – the degree to which the scale measures what it supposes to measure.

There are a number of attitude scales being used in surveys such as Thurstone scales, Factorial scales, Guttman scales, Social-Distance scales and Likert scales. The questionnaire will employ Likert scales to measure respondents' attitude toward a number of factors that can potentially influence their motivation. Because of the uni-dimensionality property of Likert (1932) scales, importance of these factors can be ranked relative to one another by assigning a score to each of the attitude positions. In this questionnaire, five equally spaced scores are given ranking from '1' to '5' – from 'strongly disagree' to 'strongly agree.' A ten equally spaced scale developed initially by the author in the first version of the questionnaire was proven to be ineffective in the first pilot test.

3.4.2 Promise of Confidentiality and Anonymity

No information will be published about identifiable persons or organizations unless permission is given to the researcher. Individuals mentioned in the "Acknowledgement" might or might not be respondents and did not object to being acknowledged. Findings of any kind cannot be linked directly to identifiable persons or companies; therefore, anonymity was assured. For the questionnaires that were sent by post, assurance of confidentiality was stated in the introduction letter (see Appendix B), which accompanied the questionnaire. For those that were handed out to respondents in person, the respondents were promised anonymity. Furthermore, the author reassured the respondents of confidentiality by displaying the following statements at the beginning of the questionnaire form, "The contents of this form are absolutely confidential. Information identifying the respondent will not be disclosed."

3.4.3 A Comprehensive Listing of Variables

The questionnaire exhausted every possible variable to be measured based on all the literature that had been reviewed and additional variables suggested in a pilot interview with a few members of the respondent population prior to pilot testing of the questionnaire. Because variables or factors that can influence a person's motivation are too numerous to be included in the questionnaire, spaces were provided so that respondents could add their own factors for motivator and dissatisfier. Readers can find a complete list of variables, factual variables and opinion variables such as factors that influence motivation, in Section 3.5 – Study Variables.

3.4.4 Other Considerations

To maximize the success of gathering necessary information and meaningful data, other considerations was incorporated into the design of the questionnaire and the approach for potential respondents. These considerations are as follows:

- Potential contribution

The cover letter emphasized that respondents' opinions are invaluable for improving the heavy construction industry.

- Endorsement

This research was endorsed by a highly reputable academic institution- the University of Texas at Austin. The research committee members within the Construction Engineering and Project Management discipline of Civil

Engineering department are highly reputable professors. Their names were stated in the introduction letter as some of the companies' top management might recognize the names. This might influence them to participate.

- Envelopes

The appearance of the envelope being sent to the respondents was professional with a personal touch. Proven successful in the author's previous research and with permission of the Civil Engineering Department, the envelope used was an official envelope bearing the symbol of the University of Texas in the upper left corner. Each envelope was addressed to the respondent in beautiful handwriting. The envelopes were not commercially franked; instead postage stamps were used. All of these showed how much effort and preparation the author had made in sending the questionnaire to individual top management.

- Accompanying letter's appearance

Again, with permission from the Civil Engineering Department and also because it has been proven successful in the author's previous research, the paper used for the accompanying letter was an official paper bearing the symbol of the university. The paper is of high quality and its appearance attracts attention. The layout and fonts also appeared pleasing to eyes of the respondents. Finally, the author personally signed each letter.

- Incentive to participate

Proven successful in the author's previous research, the respondents were promised an executive summary of the research findings if they decided to participate. This incentive might help increase the response rate.

- Reminders

Two reminders were sent to the original recipients of the letter and questionnaire. Both were in either hand-written postcards with an affixed postage stamp or in electronic messages. The first set of postcards was mailed out to reach the recipients after three weeks of receiving the original letter. The first round of electronic messages was sent in less than a week for those recipients who received the letter and the questionnaire via electronic mail. The author was acquainted with these recipients via Dr. Borcharding, Dr. Haas, and the author's colleagues in the heavy construction industry. Out of 27 companies, all received the first reminder. When the author did not receive any responses after sending the first reminder for two weeks, a second reminder was sent to those recipients who were not responsive. A summary of means of sending the questionnaire and the reminders will be illustrated later in the Data Collection section of this chapter.

- Length of the questionnaire

Time is of importance to participants, thus the accompanying letter was written to be as concise as possible while retaining its effectiveness in convincing the respondents to participate in the research. More importantly, the questionnaire was designed so that the respondents could complete it within thirty minutes. This estimate of time required to complete the questionnaire was highlighted in the accompanying letter.

- Means of completing and returning the questionnaire

Whether by means of postal or electronic mail, the recipients received the questionnaire in two formats: paper and electronic. Respondents could choose to either fill the questionnaire out by hand on paper or by typing on a computer. If the respondent filled out the questionnaire in electronic format, the easiest means

to return it to the author would be via an electronic mail. If the respondent filled out the questionnaire in paper format, it either could be mailed or faxed back.

- Deadline

The respondents were asked to complete and return the questionnaire within six weeks of receiving it. A period of six weeks is more than sufficient for the respondents to complete the questionnaire. This deadline would also allow ample time for questionnaires to be distributed to management personnel within each company at various job sites.

3.5 Study Variables

The variables for this study can be categorized into two groups: factual variables and opinion variables.

3.5.1 Factual Variables

The factual variables include factual data about the respondents. The following are factual variables:

1. Gender [male, female]
2. Age [number of years]
3. Time in heavy construction industry [number of years]
4. Time in current position [number of years]
5. Education in term of the highest degree received [high school, technical school, undergraduate (bachelor's), graduate (masters' or doctorate)]

3.5.2 Opinion Variables

The opinion variables are derived from a number of questions. The opinion variables can be divided into seven major variables:

1. Level of respondent's perceived motivation
2. Level of respondent's perceived work productivity
3. Presence of possibility for promotion in a near future (within 5 years)
4. Level of respondent's perceived job satisfaction
5. Presence of respondent's participation being perceivably accepted
6. Respondent's preference on factors that positively influence motivation
7. Respondent's preference on factors that negatively influence motivation

The level of respondent's perceived motivation is a single variable. After the word "motivation" was defined as "a desire to complete a project as quickly and as well as possible," a respondent answered this question, "How motivated are you at work?" There are five possible choices for an answer:

- 1 = not at all
- 2 = not much
- 3 = somewhat
- 4 = quite
- 5 = highly

The possible answers for the level of respondent's perceived work productivity are the same as the above. For this single variable, the respondent was asked, "How productive are you with your time at work?"

The presence of possibility for promotion in the near future was detected by asking the respondent "Do you see yourself being promoted to another position with more responsibilities within 5 years?" The response could be "probably," "probably not," and "not applicable." The "not applicable" was included so that a

respondent who is at the top of a hierarchy or is at the highest position of a career given his/her qualifications could select an appropriate response.

The level of respondent's perceived job satisfaction is a single variable that is derived from two questions. In the first question, the respondent was asked, "How often do you look forward to going to work?" There are four possible answers to this question: every day, most days, some days, and never. With these same possible answers, the respondent was asked the second question, "How often do you desire to leave work early?"

The presence of respondent's participation being perceivably accepted is a variable measured by asking the respondent "How often, after suggesting a better way of doing something, is your idea implemented?" Four possible answers are: often, sometimes, rarely, and never.

The respondent's preference on factors that positively influence motivation and preference on factors that negatively influence motivation are determined by asking, "Do you agree or disagree that the following factors have had - a positive

- a negative influence on your level of motivation?" The five ordinal measurements are:

- 1 = strongly disagree
- 2 = somewhat disagree
- 3 = neutral
- 4 = somewhat agree
- 5 = strongly agree

In addition, the respondent who never experienced or offered specific factors could select "N/A" for those factors. The respondent was asked to rate their preference on thirteen factors he/she felt positively influenced his/her motivation and thirteen factors that negatively influenced motivation. These

factors were predicted based on a review of literature summarized in the previous chapter. The next section describes these factors or variables individually.

3.5.3 Predicted Variables that Motivate Management Personnel in Construction Industry

Man is a composite of many characteristics, and all men have each of these characteristics in varying degrees. Therefore, there is no single way to motivate people since no two people share the exact needs and wants. Generalizations about the nature of man cannot be applied to the performance of a given individual. To make the issue more complex, people are not the same in groups as they are alone. This applies to the management personnel in the construction industry because they work in self-managing work teams that are responsible for completion of particular construction projects.

Although there are significant individual differences among employees in the importance of different needs and outcomes, there is also evidence that these individual differences are related to many organizational factors and to personal characteristics. Therefore, it is possible to identify those people for whom a particular reward is likely to be important or attractive.

Rewards can be grouped into two different kinds: extrinsic rewards and intrinsic rewards or factors. In order for employees to have a high job satisfaction, thus being motivated, employers must make sure that they emphasize both types of rewards. Lacking one type of reward can easily affect employees' job performance. The most obvious extrinsic rewards are pay and promotion.

Thirteen motivating factors and thirteen dissatisfying factors were offered in the questionnaire to measure the respondents' level of preference on each of

these factors. These factors are explained in detail in Appendix D for readers who are interested.

3.6 Pilot Testing

Pilot testing is a critical step in constructing a questionnaire. It can help the designer of the questionnaire identify inadequacies that may not be immediately noticeable. Two pilot tests were conducted with the author's colleagues at a large civil engineering contractor. The first pilot test was conducted with 3 management personnel. The first version of the questionnaire consisted of four sections: general information, opinion about motivation, policy information, and opinion about policy (see Appendix C). This first version contained four full 8.5"x11" pages and required at least 40-45 minutes to complete. All three respondents thought it was too lengthy and they did not know the answers to several questions about their company policy. The second version of the questionnaire was shortened to two and one-half 8.5"x11" pages. It contained everything the final version of the questionnaire has less one question, "Do you agree or disagree that the following factors have had a negative influence on your level of motivation?" It was tested on twelve people in three local civil engineering contractors in central Utah. The results were satisfactory except that the two persons who completed the electronic formatted questionnaire thought that it was not user-friendly. Details of the final version of the questionnaire are discussed in Section 3.8 – Organization of the Questionnaire.

3.7 Data Collection

Several approaches were attempted to solicit participation. The author contacted the American Society of Civil Engineering (ASCE) through the research director as suggested by a former professor and head of the Construction Engineering and Project Management program at UT Austin; however, ASCE declined to help with the study. The author and one of the dissertation committee members contacted the Construction Industry Institute (CII), but CII also declined to help due to its policy with its member companies. The author proposed to send out the questionnaire to 400 companies listed under “heavy construction” category at Business Collaboration Services (BVOM.com) hoping to receive one response each from some of these companies. The dissertation committee suggested soliciting participation from a significantly less number of companies in hoping to receive a few responses from each company so that different company cultures could be analyzed. The author then selected twenty-seven heavy civil construction companies with inputs from the dissertation committee. Out of 27, the author acquired 7 contacts through his colleagues in the industry and 4 contacts from some of the dissertation committee members. The questionnaire was sent by post unless the contacts’ electronic mailing addresses were available, in which case it was sent via electronic mail. It was sent to either the contacts or heads of the company. Out of 27, only six companies agreed to participate, all of which received the questionnaire through a contact. Up to two reminders were sent to the remaining 21 companies; however, there was no response. Several telephone contacts were made to the five contacts and some of the companies with no contact that did not respond after two reminders had been sent, nonetheless no response was received. Several companies reported that they had a policy not to participate in research. At most companies, the author was directed to a human resource manager, who was rarely available to answer the

telephone. The author left several phone messages, but no return telephone call was received. The selected companies, presence of contacts, reminders and responses are illustrated in Table 3.1 – Summary of Selected Companies and their Response.

Table 3.1: Summary of Selected Companies and their Response

No.	Company	State	Contact	Sent By	1st Reminder	Response	2nd Reminder	Response
1	Affholder, Inc.	MO		postal	postal		postal	
2	Balfour Beatty, Inc.	GA		postal	postal		postal	
3	BE&K, Inc.	AL	√	email	email	√		
4	Bernard Construction Co.	MT		postal	postal		postal	
5	Bradshaw Construction Corp.	MD		postal	postal		postal	
6	CH2M Hill Cos. Ltd.	CO		postal	postal		postal	
7	Fluor Corp.	CA		postal	postal		postal	
8	Foster Wheeler, Ltd.	NJ		postal	postal		postal	
9	Frontier-Kemper Constructors, Inc.	IN		postal	postal		postal	
10	Granite Construction, Inc.	CA	√	email	email		email	
11	Guy F. Atkinson Construction, LLC	CO	√	email	email		postal	√
12	J.F. Shea Company, Inc.	CA	√	email	email		email	√
13	Kenny Construction Company, Inc.	IL		postal	postal		postal	
14	M.L. Shank Company, Inc.	CA	√	email	email	√		
15	MERCO, Inc.	NJ	√	postal	postal		postal	
16	Modern Continental Construction Co.	MA		email	email		postal	
17	Parsons Brinckerhoff, Inc.	NY		postal	postal		postal	
18	PCL Civil Constructors	CO		postal	postal		postal	
19	Perini Corporation	MA		postal	postal		postal	
20	Peter Kiewit Sons, Inc.	NE	√	postal	postal		postal	
21	S.A. Healy Company, Inc.	IL	√	postal	postal		postal	
22	Shimmick Construction Co.	CA	√	postal	postal	√		
23	Skanska, Inc.	NY		postal	postal		postal	
24	Traylor Bros., Inc.	IN	√	email	email		email	
25	Tutor-Saliba Corporation	CA		postal	postal		postal	
26	W.L. Hailey & Co.	TN		postal	postal		postal	
27	Zachry Construction Corp.	TX	√	email	email		postal	√

The response rate for companies with no contact is zero percent (0 out of 16). The response rate for companies with contacts is 55 per cent (6 out of 11). Overall response rate, therefore, is about 22 per cent (6 out of 27). The attempt to solicit participation to general heavy civil contractor population failed, in the author's opinion, because the study required not one but a few respondents from each company. This requirement likely conveyed to the heads of the company too much loss of productivity if they agreed to allow their employees to participate.

The high response rate of 55 per cent is considered successful compared to a normal response rate of 20 per cent, which can be expected for a questionnaire survey. Without the known contacts the author would have had to collect data using another approach. With 68 responses from only six companies, the author contacted more colleagues in the industry and was able to get another 26 responses from four other companies. The questionnaire was sent via electronic mail to two of these companies and was hand delivered to the other two companies. A total number of 94 responses were received, representing ten civil heavy construction companies. A profile of each of these ten companies is illustrated below in Table 3.2 – Profile of 10 Participating Companies. Five other responses were received from a subsidiary company of BE&K Construction Co. Inc. specializing in constructing paper mills. These responses were not included in the study because they represented the industrial construction sector.

Table 3.2: Profile of 10 Participating Companies

<i>Company</i>	<i>State</i>	<i>Founded</i>	<i>Revenue(\$mil)</i>	<i>Employee*</i>	<i>Type of Construction Contracts</i>
BE&K Construction Co Inc.	AL	1980	1400	4000	Civil engineering, paper/pulp mill, industrial building/plant construction
Granite Construction Co	CA	1922	1600	3943	Highway and street, bridge, tunnel, dam, canal construction
Guy F. Atkinson Construction	CO	2000	60	400	Tunnel construction
J.F. Shea Heavy Civil Engr	CA	1881	30	25	Tunnel and dam construction
M.L. Shank Co. Inc.	RI	1977	50	80	Tunnel construction
Neshaminy Construction Co Inc	PA	1984	12	60	Highway and street paving
Obayashi Corporation (USA)	CA	1985	32	120	Tunnel construction
Shimmick Construction Co Inc.	CA	1990	61.1	100	Earthmoving (highway) and sewer line
W.W. Clyde & Co.	UT	1926	44.8	75	Highway and street, excavation work, dam construction
Zachry Inc.	TX	1976	2100	15000	Highway and street, bridge, pipeline, dam construction

Source: American Business Directory 2004

*Total Regular Employees

Although these ten companies were not randomly selected, they represented companies with annual revenues ranging from relatively small to large (\$12 million to \$2.1 billion) doing contract works throughout the country.

3.8 Organization of the Questionnaire

The questionnaire is composed of four major parts:

1. factual information about the respondents;
2. questions to probe the respondents' perceived presence of motivation level, work productivity, expected promotion, job satisfaction, and accepted participation;
3. questions to probe the respondents' preferences on influencing factors and company policy; and
4. general comments to probe the respondents' company culture.

As mentioned earlier in Section 3.5, there are two types of variables: factual and opinion. The factual variables come from the first part of the questionnaire. The factual variables include:

1. Gender [male, female]
2. Age [number of years]
3. Time in heavy construction industry [number of years]
4. Time in current position [number of years]
5. Education in term of the highest degree received [high school, technical school, undergraduate (bachelor's), graduate (masters' or doctorate)]

In addition to these factual variables, name, current position/title, position/title of superior, and discipline of highest college degree were also

collected. The name was asked for the purpose of follow-up if needed. The other information provided the context for the author when analyzing the data.

The respondents were then asked six close-ended questions. They are close-ended because the possible answers were pre-determined. Some of the opinion variables are derived from these questions. The second part included these six following questions:

1. How motivated are you at work? [perceived motivation level]
2. How productive are you with your time at work? [perceived work productivity]
3. Do you see yourself being promoted to another position with more responsibilities within 5 years? [presence of expected promotion]
4. How often do you look forward to going to work? [perceived job satisfaction]
5. How often do you desire to leave work early? [perceived job satisfaction]
6. How often, after suggesting a better idea of doing something, is your idea implemented [perceived accepted participation]

The third part consists of three open-ended and two close-ended questions pertaining to the respondents' preference on influencing factors on motivation, company policy and culture. The remainder of opinion variables is derived from the close-ended questions. The five questions in this part are as follows:

7. Do you agree or disagree that the following factors have had a positive influence on your level of motivation? [13 pre-determined variables plus 1 spacing for the respondents' own input]
8. Please list up to 5 items in your company policy that you find the most rewarding – boost your motivation and morale. [for content analysis]

9. Do you agree or disagree that the following factors have had a negative influence on your level of motivation? [13 pre-determined variables plus 1 spacing for the respondents' own input]
10. Please list up to 5 items in your company policy that you find the least rewarding – reduce your motivation and morale. [for content analysis]
11. What could your company add to the benefits package or change in the general policy that you feel would increase your motivation? [for content analysis]

The fourth and last part of the questionnaire consists of two open-ended questions that allow the respondents to comment on company's work environment or culture. The questions are:

- Do you feel that your company created a positive atmosphere at your work place?
- What made you feel that way or why did you not feel that way?

Readers can find the final version of the questionnaire in Appendix A.

3.9 Statistical Analyses

The statistical analyses used in this study can be categorized into two groups: descriptive and inferential statistics.

Descriptive statistics consists of tools and issues involved in describing collections of statistical observations (Loether & McTavish, 1993). It is statistics because it is a measure of a characteristic or property of a sample of statistical observations. It is impossible to collect statistical observations of the entire management personnel population, thus only a sample of statistical observations

was collected. In this study, the descriptive statistics used include: univariate distributions for one variable, bivariate distributions and measures of association for two interval variables, and multiple regression for three or more variables. The measures of univariate distributions used are: arithmetic mean for central tendency and standard deviation for variation. Mean, standard deviation and Pearson's correlation coefficient, which is a measure of association between two variables, are considered parametric techniques. These more traditional parametric techniques rely on the assumption that the population sampled for the data is normally distributed, thus they are also known as distribution-bound statistics.

Inferential statistics consists of logic and procedures for evaluating risks of generalizing from descriptions of samples to descriptions of populations (Loether & McTavish, 1993). Inferential statistics is used because only a sample of observations was collected for this study. In this study, the inferential statistics used for testing the hypotheses of association include: chi-square test for independence, test for significance of gamma, test of significance for the regression coefficient using Student's *t*-distribution, and test of significance for the coefficient of determination using *F*-distribution. Since Student's *t*-distribution and *F*-distribution are distribution-bound, they are considered parametric. Conversely, nonparametric techniques, which have been developed recently, make no assumptions about the shape of the population distribution sampled. They are also known as distribution-free statistics, which include chi-square and gamma tests.

As explained earlier, the statistical analyses used are both parametric and non-parametric techniques. For the parametric techniques, variables must be measured in at least an interval scale. Conversely, the non-parametric techniques require that variables be measured in either a nominal or ordinal scale. The study variables are restricted to these assumptions when subject to these statistical

analyses. The remainder of this section will briefly describe the statistical analyses used in this study.

Arithmetic Mean

The arithmetic mean or common average is simply the sum of all scores divided by their number. It will be used to describe the sampled population's characteristics such as age, time in the industry, time in current position, level of perceived motivation, level of perceived work productivity, and preferences on the factors that positively and negatively influence motivation. These preferences will then be ranked based on their arithmetic mean.

Standard Deviation

The standard deviation is a measure of variation of scores from the arithmetic mean. The variance is the square of a sum of the differences between the mean and each score. It is simply an average of squared deviations of scores from the arithmetic mean. The standard deviation is the square root of the variance.

Pearson's Correlation Coefficient

The Pearson's correlation coefficient or product-moment correlation coefficient (r) is a measure of association between two interval variables, using a linear model as definition of a perfect association. It is a symmetric measure because it makes no prediction of a dependent variable, only the relationship between two variables. In this study, the author used the Pearson's correlation coefficient to explore the natures between various pairs of variables. The values of r vary from -1.0 to 0 to $+1.0$, indicating direction and strength of association.

The square of r expresses a percentage of the variation “explained” by the linear relationship between two variables. However, relatively small values do not necessarily mean weak relationships because the nature of relationships may not be too close to linear.

Multiple Regression and Multiple Correlation Coefficient

The multiple regression analysis is appropriate when used in predicting or analyzing scores on one dependent variable by combining the predictive power of several independent variables by means of an equation called a multiple regression equation. The multiple correlation coefficient, R , indicates how well the multiple regression equation is able to predict scores on the dependent variable. Like the Pearson’s correlation coefficient that is based on the least squares regression equation or line, the multiple correlation coefficient analysis is based on the assumption that variables are related to the dependent variable in as simple linear fashion. Also, all the variables must be interpreted as interval measures. Moreover, it is based on another assumption that effects of variables can be mathematically added together to form a prediction of dependent variable. Finally, there is another assumption that an independent variable is not a function of another independent variable; independent variables are not highly correlated (Berry & Feldman, 1985). The four assumptions mentioned are only basic assumptions. There are two additional assumptions when using this analysis to run statistical tests of hypotheses about a population from random sample data: the dependent variable is normally distributed within categories of independent variables, singly and in combination; the variance in the dependent variable is equal across categories of independent variables.

Like the coefficient r , the multiple correlation coefficient, R , can be interpreted more usefully by squaring it. R^2 has an interpretation quite similar to

r^2 : the proportion of the variation in the dependent variable that is explained by the multiple regression equation.

Student's t -Distribution and F -Distribution Tests of Significance

For the regression coefficients that are determined to be significant, these estimated regression coefficients will be tested for their significance using the t -statistic. At the same time, their coefficients of determination will be tested for statistical significance using the F -statistic. These two statistical tests are considered parametric tests and can be used to test hypotheses. For the t -statistic, the null hypotheses (H_0) are that the population correlation coefficient, ρ , equals to zero. If computed t is more than the critical t value for a chosen significance level (0.05), then $H_0: \rho = 0$ is rejected in favor of an alternative hypothesis. The alternative hypothesis (H_a) states that $\rho \neq 0$.

The Statistics/Data Analysis or its acronym, STATA, computes the F value, its significance level (Prob > F), and the t value with its significance level ($P > |t|$) when running regression with one dependent variable with one or more variables.

Chi-Square Test for Independence

The chi-square (χ^2) test is a goodness-of-fit test. It is designed to review how well a theoretical model such as a normal distribution, or a Poisson distribution, or an S-shaped distribution predicts the form of some body of empirical data. The chi-square test is commonly used for assessing the statistical significance of cross-tabulated variables based on a comparison between observed cell frequencies of a cross tabulation and the frequencies that would be expected if the null hypothesis of no association were true. The chi-square technique that is

appropriate for this kind of application is known as the chi-square test for independence. However, the data have to meet several assumptions: 1) the observations are independent, 2) the data constitute a simple random sample of the population, 3) the expected frequencies are no smaller than the minimum allowable size of five, and 4) the sum of all of the expected frequencies must be equal to the sum of all the observed frequencies.

In order to explain the test procedure, a framework must first be established. A cross tabulation is a tabular display of the joint frequency distribution of two discrete variables which has rows (r) and columns (c). The cells indicate the joint outcomes of the two variables and their expected frequencies. In essence, the cross tabulation provides the observed frequencies and the expected frequencies under independence. The chi-square statistics summarizes the discrepancy between these two types of frequencies across all cells in the table. When using the chi-square statistics to test for independence, the chi-square essentially measures the extent to which the observed frequencies in a contingency table deviate from those frequencies that would be expected if the null hypothesis H_0 : no association between variables in the population were true. The alternative to the null hypothesis would be H_a : there is some association between variables in the population. Once χ^2 has been obtained, it must be compared to the χ^2 value in the appropriate chi-square sampling distribution that bounds the chosen critical region (5% level of significance for this study). If the computed χ^2 is in the desired critical region of .05, it is appropriate to reject the null hypothesis in favor of the alternative hypothesis.

χ^2 does not measure strength of relationship between the variables being investigated like Pearson's correlation. It merely measures whether there is a relationship that is not likely to be due to chance. Thus, when the computed χ^2 is large, it means that we can be more confident about rejecting the null hypothesis and concluding that the variables are related. The level of statistical significance

of the chi-square test is also independent of the strength of the relationship that exists between the variables studied. Therefore, it is possible to get a large and very significant χ^2 when the association between the variables of interest is very weak. Likewise, it is possible to get an insignificant χ^2 when the association between the variables of interest is very high.

Test for Significance of Gamma

Goodman and Kruskal's gamma (G) is a symmetric measure for association of two ordinal variables. It is a generalized version of Yule's Q for $r \times c$ tables. It uses like-ranked (concordant) and opposite-ranked (discordant) pairs in a set of data. The value of gamma can range from -1.0 to +1.0. When the parameter γ is used as an estimate for the total population, it is appropriate to test the null hypothesis, $H_0: \gamma = 0$, to evaluate the possibility that the computed G is merely due to sampling error. If this null hypothesis can be rejected, there will be reason to believe the computed sample G reflects a population association, which differs from 0.

In using the sample G to test the null hypothesis that $\gamma = 0$, it is necessary to make the following assumptions: 1) the measures that the sample G is based on are independent, 2) the measures of both variables are ordinal in nature, 3) the sample is a simple random sample from the population, and 4) the sample is large enough to justify using a normal approximation to the sampling distribution. However, it is not necessary to assume that the population is normally distributed, thus, the test for significance of gamma is a non-parametric or distribution-free technique.

Factor Analysis

Like the multiple regression, factor analysis is another multivariate procedure. However, unlike the multiple regression which uses one interval dependent variable with several interval independent variables, factor analysis seeks one or more linear combinations of interval variables that, together, explain as much of the co-variation among a set of variables as possible. The use of factor analysis is merely to make an observation and not to test any hypothesis.

3.10 Missing Data

Missing data is typical of questionnaire analyses and usually occurs when a respondent either unintentionally or intentionally does not answer a question. In statistical analysis, missing data is usually handled in two ways, a list-wise or a pair-wise manner (Norusis, 1994). In the list-wise manner, if a case has any variable that misses a value or values the entire case is excluded from all calculation. This manner throws away as much data as possible, thus it is generally used when sampled cases are relatively large. Conversely, the pair-wise manner uses as much data as possible. It excludes from calculation only data taken from a respondent that are missing, but includes all other available data from the respondent. Due to the relatively small samples, the pair-wise manner is used for this study to minimize the amount of missing data.

The author also tried to minimize the amount of missing data by reviewing the questionnaires as soon as they were returned. For the questionnaires that were collected internally from several job sites within a company, it was extremely difficult to obtain the missing data. However, for the questionnaires that were returned individually via electronic mail and those in which the author collected by hand, all the missing data were completed.

3.11 Reclassifying Data

Reclassifying the data becomes necessary when frequency counts are too small because there are several categories in the data. Reclassification is quite common when the sample population is small. In order to meet the requirement of a minimum of five frequency counts for the chi-square test, three reclassifications were made in the study. First, the level of perceived motivation was reclassified into three categories (low, medium, and high) from the original five categories (not at all, not much, somewhat, quite, and highly). The categories “not at all,” “not much,” and “somewhat” were then combined into one group, which later be reclassified as “low.” Secondly, the level of perceived work productivity was reclassified in the same manner as the reclassification of the level of perceived motivation. Thirdly, the respondents’ age was regrouped into four categories: less than 35, between 35 and 44, between 45 and 54, and between 55 and 64.

It is noteworthy to acknowledge that any reclassification results in loss of information to some extent. The loss of information from these three reclassifications is tolerable because it was necessary in order to perform meaningful statistical analyses.

3.12 Level of Significance

The specific shape of the sampling distribution depends on the size of the sample from which the statistic is computed. If one can specify the sample size before the data are collected, one can then determine exactly which outcomes justify rejecting the null hypothesis. In the case of this study, the criteria for rejecting the null hypothesis must be set up since the sample size depends on the outcome of data collection. A decision must be made such that the author will

consider any sample outcome so infrequent as to occur by chance in the specified sampling distribution 5% of the time or less as warranting the rejection of the null hypothesis. This 5% specification is known as a level of significance or alpha (α), in this case, the 5% level of significance or $\alpha = .05$. In effect, this means if the outcome the author observes is so unusual that it would be likely to occur in the sampling distribution less than 5 times out of 100 by chance then the author will decide to reject the null hypothesis.

The STATA used for statistical computations of this study provides computed probability value (p) for various analyses, which will be compared with the significance level of .05 as a basis to reject a null hypothesis.

CHAPTER FOUR

ANALYSIS OF DATA AND PRESENTATION OF RESULTS

This chapter is dedicated to the statistical analysis of the collected data. It also presents the findings pertinent to the analysis. Information from the remainder of the collected data will be analyzed by content analysis in the next chapter. This chapter contains three sections. In section one, demographic information of the sampled respondents will be presented. Section two covers the general characteristics of the sample and examines one of the research objectives. In section three, the remainder of the research objectives and proposed hypotheses will be discussed in detail, in relation to data analyses.

4.1 General Information about the Respondents

Ninety-four respondents from ten companies participated in the study, representing the management personnel in the heavy construction industry. The names of these companies and the company profiles can be found in Chapter Three. Names of individual respondents are protected due to an assurance of confidentiality. The graph in Figure 4.1 summarizes the sex of the sample.

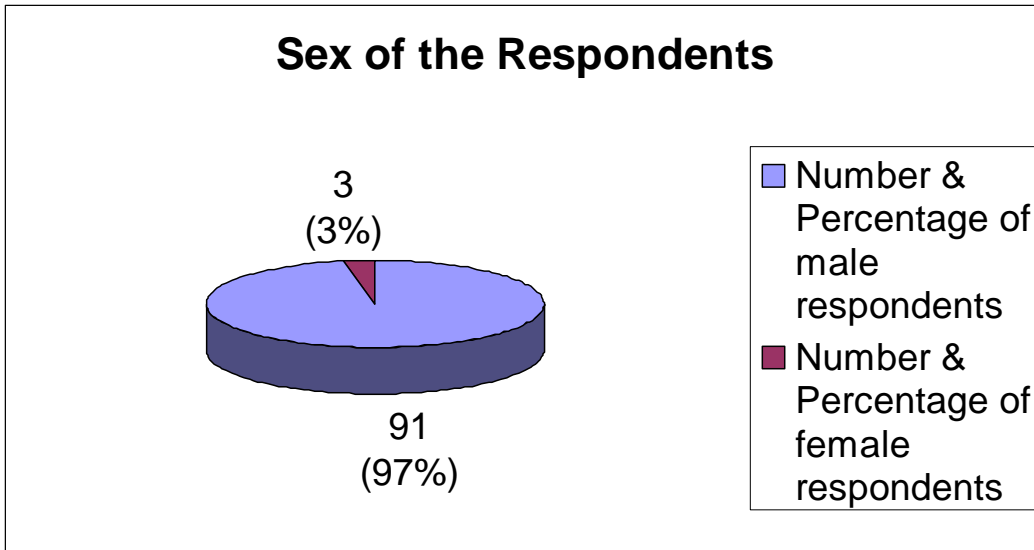


Figure 4.1: Sex of the Respondents

The age of the respondents ranges from 24 to 64, with experience in construction ranging from nine months to forty-six years. The respondents have remained in their current position/title from 6 months to 20 years. The respondents' age, time in the construction industry, and time in current position are summarized in Figure 4.2 with computed averages and standard deviations. These computed figures excluded four respondents who chose not to disclose the information.

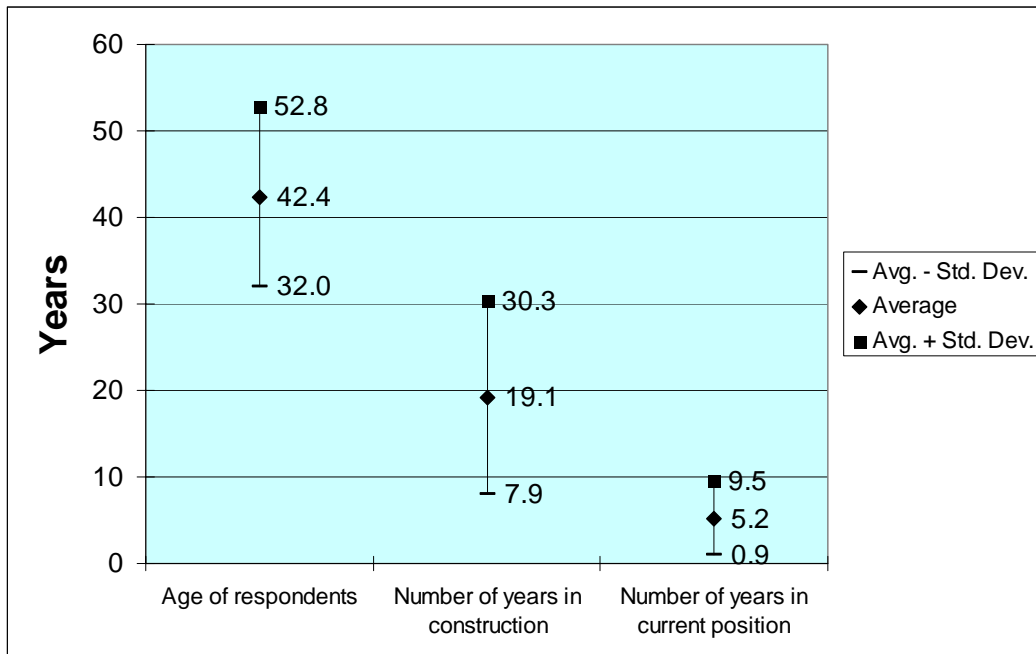


Figure 4.2: Time Related Characteristics of the Respondents

The following is a list of the respondents' positions or titles and their frequency, divided into two groups (at the home office and at project level):

At the home office or headquarters

- President 1
- Vice-president or Executive Vice-president 9
- Chief Financial Officer 1
- General Manager 1
- Operations Manager 1
- Director of Engineering 2
- Director of Construction 2
- Project Sponsor or Area Manager 2
- Administrative Manager 2
- Safety Director 1

- Equipment Manager 1
- Estimator or Senior Estimator 2

At project level

- Project Manager 18
- Deputy Project Manager 1
- Safety Manager 5
- Quality Control Manager 6
- Office Manager 1
- Project Engineer 9
- Engineer, Field Engineer, or Office Engineer 15
- General Superintendent 9
- Electrical Superintendent 1
- Assistant Superintendent 1

There are a total of twenty-five respondents representing the management at the home office or headquarters. There are a total of sixty-six respondents representing the management at project level, including eleven respondents from the management in the field. Three respondents chose not to disclose their position or title. Figure 4.3 summarizes the respondents' type of management.

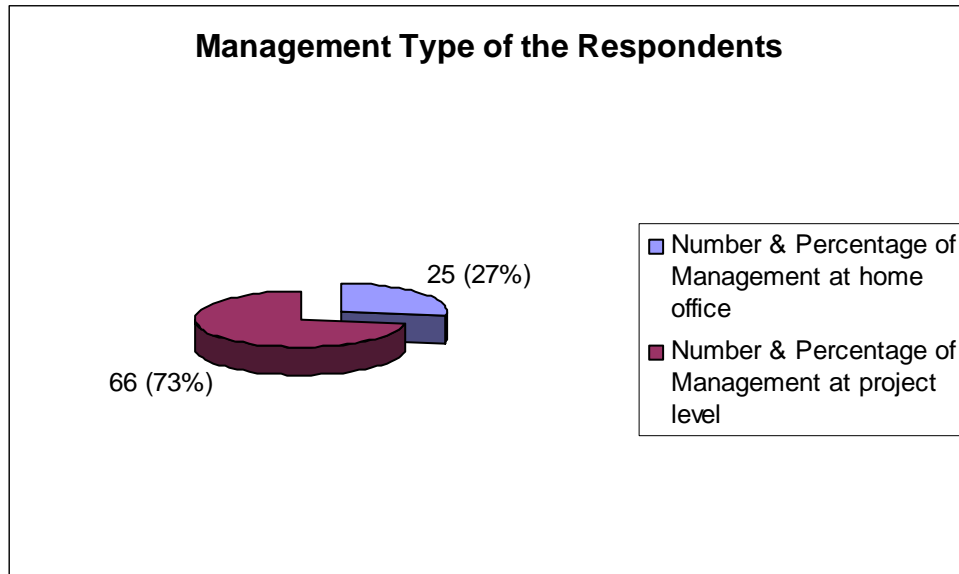


Figure 4.3: Management Type of the Respondents

The respondents' level of education is summarized in Figure 4.4. All of the respondents disclosed this information.

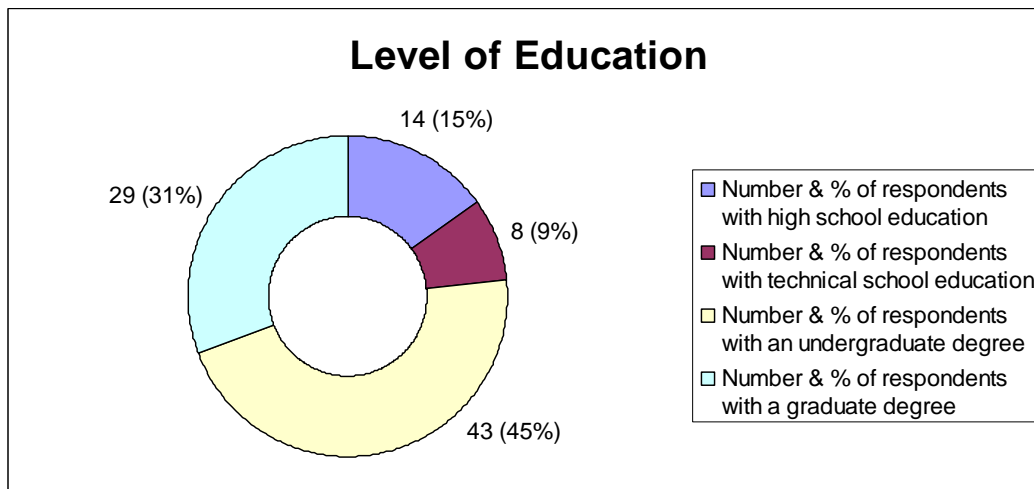


Figure 4.4: Level of Education of the Respondents

The next sections discuss the analysis and results of the research objectives and proposed hypotheses in details.

4.2 Descriptive Statistics

Data were entered with codes from all of the closed questions in the questionnaire into a spreadsheet, which the STATA can read. Then commands were executed to tabulate and summarize each of the variables. The age variable was reclassified into four age groups: <35, 35-44, 45-54, and 55-64. The tabulation of the age group variable of the respondents is shown in Table 4.1.

Table 4.1: Tabulation of Age Group

Age Group	Frequency	Percent
< 35	22	23.4
35-44	32	34.0
45-54	24	25.5
55-64	16	17.0
TOTAL	94	100.0

The perceived motivation variable is an ordinal measure of the respondent's perceived motivation level. When the respondent was asked, "How motivated are you at work?" after being given a definition of motivation, he or she responded with one of five possible answers from 1 = "not at all" to 5 = "highly." Interestingly, none of the respondents answered either "1" or "2." Therefore, reclassification is necessary to deal with these two categories that have zero frequency. All of the respondents' scores were reduced by 2, thus the scores 3 = "somewhat" became 1, 4 = "quite" became 2, and 5 = "highly" became 3. The new scale was constructed as follows: 1 = "low," 2 = "medium," and 3 =

“high.” Table 4.2 below displays a tabulation of the respondents’ perceived motivation level.

Table 4.2: Tabulation of Perceived Motivation Level

Perceived Motivation Level	Frequency	Percent
Low	19	20.2
Medium	33	35.1
High	42	44.7
TOTAL	94	100.0

With the same possible answers, the respondents’ level of perceived work productivity was measured by the question, “How productive are you with your time at work?” Only one respondent answered 1 = “not at all” and one other respondent answered 2 = “not much.” Again, reclassification became necessary to eliminate these categories. The categories “1,” “2,” and “3” were combined into a single category “Low.” The categories 4 = “quite” became “medium” and 5 = “highly” became “high.” Table 4.3 illustrates a tabulation of the respondents’ perceived work productivity level.

Table 4.3: Tabulation of Perceived Work Productivity Level

Perceived Work Productivity Level	Frequency	Percent
Low	19	20.2
Medium	53	56.4
High	22	23.4
TOTAL	94	100.0

When asked, “Do you see yourself being promoted to another position with more responsibilities within 5 years?”, 68 percent of the respondents (or 59 people) indicated that it was possible while 32 percent (or 28 people) indicated that it was unlikely. Seven of the respondents indicated that a promotion was not

applicable to them. An obvious reason for one respondent is that he was the president of the company. Others believed that they had reached the highest possible positions given the circumstances.

Question number 4, “How often do you look forward to going to work?,” serves two purposes. First it is designed to test consistency of the responses with Question number 1, “How motivated are you at work?” It is highly logical for a person who looks forward to going to work to be motivated once he is at work. The Pearson’s correlation coefficient between the responses from both of these questions confirms the consistency when it is computed to be 0.5355, with the following scoring for Question number 4: “every day” = 4, “most days” = 3, “some days” = 2 and “never” = 1. Secondly, it is designed to measure the respondents’ job satisfaction, when used with Question number 5, “How often do you desire to leave work early?” Table 4.4 tabulates the responses of Question number 4. Note that none of the respondents answered “never.”

Table 4.4: Tabulation of Responses of Question number 4, “How often do you look forward to going to work?”

Response	Frequency	Percent
Some days	13	13.8
Most days	56	59.6
Every day	25	26.6
TOTAL	94	100.0

In addition to using Question number 5 in combination with Question number 4 to measure the respondents’ job satisfaction, Question number 5 is designed to test response consistency against Question number 4. With the opposite nature of these two questions, a negative correlation between the two is expected when the consistency is present. This is the case since the correlation coefficient between the two is computed to be -0.2504, with the following scoring

for Question number 5: “every day” = 1, “most days” = 2, “some days” = 3 and “never” = 4. The job satisfaction variable, an ordinal measure, is constructed by subtracting the score of Question number 5 from the score of Question number 4. Table 4.5 tabulates the responses of Question number 5.

Table 4.5: Tabulation of Responses of Question number 5, “How often do you desire to leave work early?”

Response	Frequency	Percent
Every day	13	13.8
Most days	69	73.4
Some days	11	11.7
Never	1	1.1
TOTAL	94	100.0

Note that only one respondent answered “never.” This may seem unrealistic; however, the author knows this particular respondent personally and believes that the response was indeed honest and accurate. This person only has a high school diploma, reached a retirement age recently, had been in the same position for ten years with one company, was eagerly awaiting a promotion and was living alone far away from family; thus, sadly, there was no apparent reason for this respondent to leave work early.

Question number 6, “How often, after suggesting a better way of doing something, is your idea implemented?,” is used to measure a presence of team and respect towards others at work place. This question is useful when performing content analysis and comparison between companies. Table 4.6 tabulates the responses of Question number 6.

Table 4.6: Tabulation of Responses of Question number 6, “How often, after suggesting a better way of doing something, is your idea implemented?”

Response	Frequency	Percent
Never	4	4.3
Rarely	9	9.6
Sometimes	41	43.6
Often	40	42.6
TOTAL	94	100.0

Question number 7 attempts to measure the respondents’ preference on thirteen predefined factors and one undefined factor that have had a positive influence on their motivation. The rating scales for preference range from one to five as follows: 1 = “strongly disagree,” 2 = “somewhat disagree,” 3 = “neutral,” 4 = “somewhat agree” and 5 = “strongly agree.” The respondents rated their preference for each of the factors when it was presented otherwise the N/A (not applicable) would be selected. The N/A responses are excluded from the statistical calculation of arithmetic means and standard deviations, but were indirectly reported in number of observations. All but one factor have at least 90 out of 94 observations. Interestingly, only 70 respondents out of 94 (or approximately 74 percent) have experienced some sort of compressed workweek or flextime in their career. Table 4.7 and Figure 4.5 summarize the respondents’ preference on various positive influencing factors as follows.

Table 4.7: Preference on Positive Influencing Factors

Variable (Factor)	Obs.	Mean	Std. Dev.	Min.	Max.
Opportunities for promotion	94	4.00	0.97	1	5
Good supervisor or leader	94	4.26	1.02	1	5
Compressed workweek or flextime	70	2.87	1.25	1	5
Job satisfaction	94	4.36	0.89	1	5
Feeling of accomplishment	94	4.52	0.74	1	5
Pay raises	92	4.17	0.88	2	5
Being informed	94	4.14	0.86	1	5
Job security	91	3.78	1.03	1	5
Pleasant work in itself	93	3.66	1.11	1	5
Comradeship among co-workers	94	4.00	1.01	1	5
Benefits	93	3.84	0.95	1	5
Bonuses	94	4.01	1.06	1	5
Specific responsibilities	90	4.10	0.89	1	5

Means of the Respondents' Preference on Positive Influencing Factors

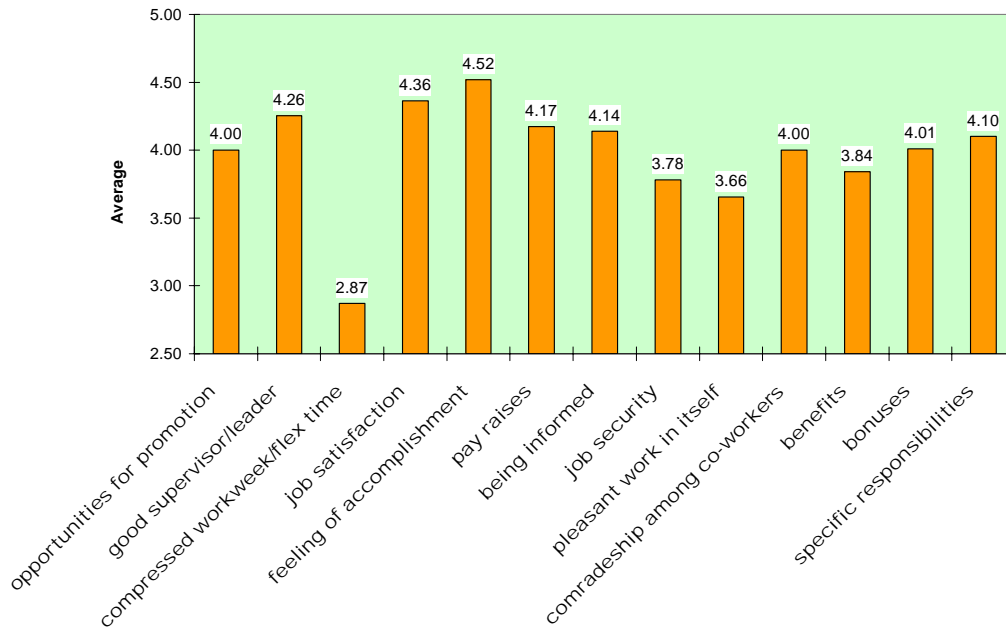


Figure 4.5: Means of the Respondents' Preference on Positive Factors

Another way to report this information is to rank these positive influencing factors from the highest to the lowest level of preference;

1. Feeling of accomplishment
2. Job satisfaction
3. Good supervisor or leader
4. Pay raises
5. Being informed
6. Specific responsibilities (from inception to completion)
7. Bonuses
8. Opportunities for promotion
9. Comradeship among co-workers
10. Benefits
11. Job security
12. Pleasant work in itself
13. Compressed workweek or flextime

Other reported positive factors that influence motivation are: required traveling, profit sharing plan, positive feedback from supervisor, acceptance from blue-collar workers, good rapport with clients, desirable jobsite location, understanding and support by upper management, and company sponsored education or training.

Question number 9 attempts to measure the respondents' preference on thirteen predefined factors and one undefined factor that have had a negative influence on their motivation. The rating scales for preference are the same as those of Question number 7. The respondents rated their preference for each of the factors when it was presented or was presenting, otherwise the N/A (not applicable) would be selected. The N/A responses are excluded from the statistical calculation of arithmetic means and standard deviations. Table 4.8 and

Figure 4.6 summarize the respondents' preference on various negative influencing factors as follows.

Table 4.8: Preference on Negative Influencing Factors

Variable (Factor)	Obs.	Mean	Std. Dev.	Min.	Max.
No opportunities for promotion	88	3.09	1.52	1	5
Bad supervisor or leader	91	3.53	1.50	1	5
No compressed workweek/flexitime	81	2.93	1.40	1	5
Job dissatisfaction	88	3.39	1.48	1	5
No feeling of accomplishment	88	3.18	1.58	1	5
Insignificant or no pay raises	92	3.37	1.47	1	5
Not being informed	90	3.50	1.38	1	5
No job security	92	3.01	1.49	1	5
Unpleasant work in itself	86	2.76	1.49	1	5
No comradeship among co-workers	90	2.88	1.48	1	5
Bad or no benefits	90	3.07	1.46	1	5
Insignificant or no bonuses	90	3.28	1.43	1	5
No specific responsibilities	89	2.98	1.54	1	5

Means of the Respondents' Preference on Negative Influencing Factors

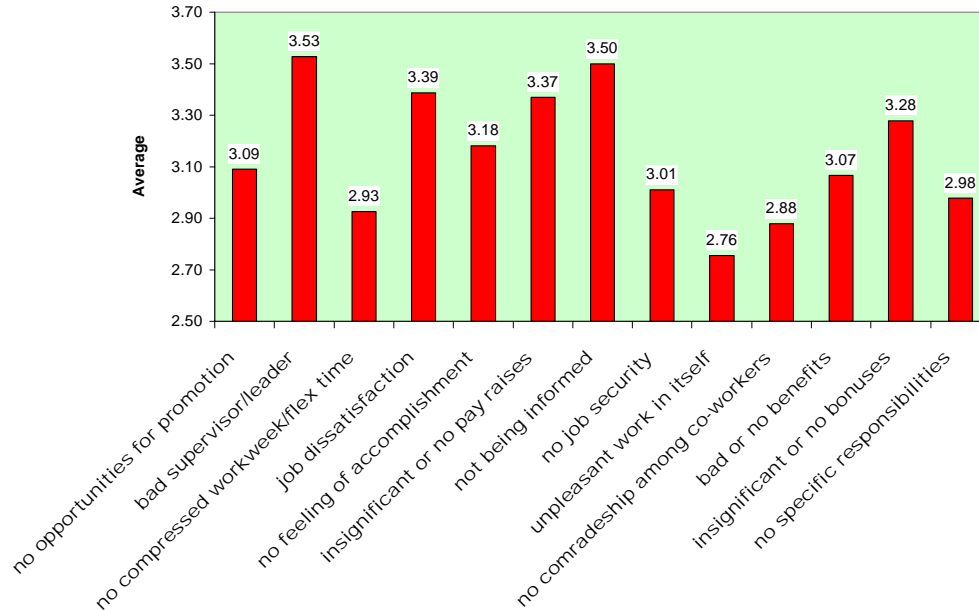


Figure 4.6: Means of the Respondents' Preference on Negative Factors

From the observations column in Table 4.8, only a few respondents (between two and thirteen) had never experienced each of the negative influencing factors. Rankings of the respondents' preference on negatively influencing factors from the highest are:

1. Bad supervisor or leader
2. Not being informed
3. Job dissatisfaction
4. Insignificant pay raises or no pay raises
5. Insignificant bonuses or no bonuses
6. No feeling of accomplishment
7. No opportunities for promotion
8. Bad benefits or no benefits

9. No job security
10. No specific responsibilities (from inception to completion)
11. No compressed workweek or flextime
12. No comradeship among co-workers
13. Unpleasant work in itself

Other reported negative factors that influence motivation are: absence of profit sharing plan, no praise from supervisor, bad rapport with clients, undesirable jobsite location, absence of formal company policy, second guessing by upper management, and absence of company sponsored education or training.

Both Questions 7 and 9 were used to examine one of the objectives, to identify factors that could effectively influence motivation level of this group of people. It is apparent from examining the data in both Tables 4.7 and 4.8 that individual factors affect motivation differently. The next section will examine the remaining research objectives and hypotheses that can be explained statistically.

4.3 Examination of Research Objectives and Hypotheses

In the previous section, descriptive statistics were employed to make a number of observations about the sample in general and to examine one particular research objective. This section, however, will examine the research objectives and hypotheses using descriptive statistics as well as inferential statistics and factor analysis.

4.3.1 Perceived Motivation and Perceived Work Productivity

One of the objectives is to investigate whether a relationship exists between perceived motivation and perceived productivity for the management personnel in the heavy construction industry. First, Pearson's correlation coefficient is calculated to examine the nature of the relationship between the two variables. The STATA calculates this pair-wise correlation to be 0.2998 and reports its significant level as 0.0033. This significant level is much higher than the 0.05 significant level (or 95% confidence) established as a criterion to reject or accept hypotheses. Because the Pearson's correlation coefficient of 0.2998 indicated a positive association, further analyses are needed to confirm that this association did not happen by chance. Also, to further investigate this objective, a null hypothesis is proposed that there is no association between perceived motivation and perceived work productivity. Chi-square and gamma tests are performed to determine whether to reject the null hypothesis in favor of the alternative hypothesis, that there is a positive association between perceived motivation and perceived work productivity.

Table 4.9 summarizes the results of cross tabulation between the two variables, including chi-square and gamma values.

Table 4.9: Cross Tabulation of Perceived Motivation and Perceived Work Productivity

Perceived Motivation	Perceived Work Productivity			
	Low	Medium	High	Total
Low	6	9	4	19
Medium	10	21	2	33
High	3	23	16	42
Total	19	53	22	94

<i>Pearson</i>	<i>chi2(4)</i>	<i>15.1868</i>	<i>Pr</i>	<i>0.004</i>
	<i>gamma</i>	<i>0.4651</i>	<i>ASE</i>	<i>0.13</i>

From the above results, the chi-square value of 15.1868 with four degrees of freedom is quite large and its p -value of 0.004 is indeed small, much smaller than 0.05 for 95% confidence level. The gamma value of 0.4651 is quite greater than 0. Therefore, there is more confidence about rejecting the null hypothesis. And thus, the alternative hypothesis that suggested a positive association between perceived motivation and perceived work productivity is accepted.

4.3.2 Perceived Motivation and Job Satisfaction

A variable called job satisfaction is created from the responses of Question numbers 4 and 5 as explained earlier in this chapter. Its scores range from -1 to 3, from the lowest job satisfaction to the highest. The scores are then reclassified into three categories: scores -1 and 0 become “low,” 1 becomes “medium,” and 2 and 3 become “high.” A tabulation of job satisfaction is shown in Table 4.10. It is predicted that job satisfaction is positively associated with perceived motivation for this group of people.

Table 4.10: Tabulation of Job Satisfaction

Job Satisfaction	Frequency	Percent
Low	18	19.2
Medium	48	51.1
High	28	29.8
TOTAL	94	100.0

The STATA calculates this pair-wise correlation to be 0.5553 and reports its significant level as 0.0000. The null hypothesis of no association is tested by chi-square and gamma tests with the following results in Table 4.11.

Table 4.11: Cross Tabulation of Job Satisfaction and Perceived Motivation

Job Satisfaction	Perceived Motivation			Total
	Low	Medium	High	
Low	12	4	2	18
Medium	7	20	21	48
High	0	8	20	28
Total	19	33	42	94

<i>Pearson</i>	<i>chi2(8)</i>	36.9636	<i>Pr</i>	0.000
	<i>gamma</i>	0.7210	<i>ASE</i>	0.087

From the above results, the chi-square value of 36.9636 with eight degrees of freedom is quite large and its p -value of 0.000 is much smaller than 0.05 for 95% confidence level. The gamma value of 0.7210 is quite greater than 0. Therefore, there is more confidence about rejecting the null hypothesis. And thus, the alternative hypothesis that suggested a positive association between perceived motivation and job satisfaction is accepted.

4.3.3 Perceived Motivation or Job Satisfaction and other Interesting Variables

Another objective of this study is to investigate relationships between motivation or job satisfaction and other variables such as respondent's age, time in industry, time in position/job title, and the education of this group of people. To begin this investigation, a correlation was chosen by running perceived motivation (y) as a variable against a number of variables of interest such as: age group (x_1), time in industry (x_2), time in position (x_3) and education (x_4). The results are illustrated in Table 4.12.

Table 4.12: Correlation Coefficients of Perceived Motivation and Other Variables

	Y	x1	x2	x3	x4
y	1.00				
x1	0.06	1.00			
x2	0.06	0.90	1.00		
x3	-0.02	0.47	0.47	1.00	
x4	0.03	-0.13	-0.23	-0.11	1.00

From the results shown in the above table, there seems to be no association between perceived motivation and the variables of interest. The highest correlation coefficient of 0.06 between perceived motivation and age group is very small. These results can be further confirmed by performing a multiple regression analysis when selecting perceived motivation as a dependent variable. The STATA summarizes the results of regression analysis in Table 4.13.

Table 4.13: Linear Regression Results of Perceived Motivation and Other Variables

Source	SS	df	MS	Number of obs = 90		
Model	0.4529	4	0.1132	F(4, 85)	0.2	
Residual	48.4471	85	0.5700	Prob > F	0.9384	
				R-squared	0.0093	
				Adj R-squared	-0.0374	
Total	48.9	89	0.5494	Root MSE	0.7550	

Y	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
x1	0.0440	0.1944	0.23	0.821	-0.3425	0.4305
x2	0.0031	0.0174	0.18	0.859	-0.0315	0.0377
x3	-0.0113	0.0213	-0.53	0.595	-0.0536	0.0309
x4	0.0311	0.0821	0.38	0.706	-0.1322	0.1944
_cons	2.1080	0.3278	6.43	0.000	1.4562	2.7597

Note the large numbers of probability values, Prob > F and P > t, in both F-distribution and t-distribution. If any relationship exists, these numbers would have to be 0.050 at the most at 95% confidence level. The corrected coefficient of multiple determination, Adj R-squared, of -0.0374 is very insignificant. Further regression analysis was performed by age group, yet there still seems to be no relationship of any kind.

Next, relationships between job satisfaction and these four variables are investigated in the same manner. Table 4.14 displays results of these correlation coefficients where the variable (y) is job satisfaction and the other variables (x_i) remain the same.

Table 4.14: Correlation Coefficients of Job Satisfaction and Other Variables

	y	x1	x2	x3	x4
y	1.00				
x1	0.14	1.00			
x2	0.16	0.90	1.00		
x3	0.10	0.47	0.47	1.00	
x4	-0.05	-0.13	-0.23	-0.11	1.00

The results in Table 4.14 indicate a relatively stronger relationship between job satisfaction and age group ($r = 0.14$), time in industry ($r = 0.16$) and time in position ($r = 0.10$). However, further investigation using multiple regression analysis revealed no relationship of any kind as illustrated in Table 4.15 below. The probability values, in bold, is much greater than 0.05 at 95% confidence level. The corrected coefficient of multiple determination, Adj R-squared, of -0.0195 is very insignificant.

Table 4.15: Linear Regression Results of Job Satisfaction and Other Variables

Source	SS	Df	MS	Number of obs = 90		
Model	1.0496	4	0.2624	F(4, 85)	0.58	
Residual	38.7727	85	0.4561	Prob > F	0.6814	
Total	39.8222	89	0.4474	R-squared	0.0264	
				Adj R-squared	-0.0195	
				Root MSE	0.6754	

y	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
x1	-0.0294	0.1739	-0.17	0.866	-0.3751 0.3164
x2	0.0105	0.0156	0.67	0.502	-0.0205 0.0415
x3	0.0060	0.0190	0.32	0.752	-0.0318 0.0438
x4	-0.0056	0.0735	-0.08	0.939	-0.1517 0.1405
_cons	2.0069	0.2933	6.84	0.000	1.4238 2.5900

From all of the aforementioned analyses in this subsection, the following conclusions can be formulated from the sample:

1. There is no association between perceived motivation and age group.
2. There is no association between perceived motivation and work experience.
3. There is no association between perceived motivation and time in current position.
4. There is no association between perceived motivation and education level.

5. There is no association between job satisfaction and age group.
6. There is no association between job satisfaction and work experience.
7. There is no association between job satisfaction and time in current position.
8. There is no association between job satisfaction and education level.

These are the null hypotheses, which will be tested individually by the chi-square and gamma tests.

A cross tabulation of perceived motivation and age group with the chi-square and gamma values is shown in Table 4.16. Because the chi-square Pr = 0.493 is greater than 0.050 at 95% confidence level and the gamma = -0.0738 is not significantly greater than zero, the null hypothesis cannot be rejected.

Table 4.16: Cross Tabulation of Perceived Motivation and Age Group

Perceived Motivation	Age Group				Total
	<35	35-44	45-54	55-64	
Low	3	9	3	4	19
Medium	9	7	11	6	33
High	10	16	10	6	42
Total	22	32	24	16	94

Pearson chi2(6) = **5.4082** Pr = **0.493**
 gamma = **-0.0738** ASE = **0.124**

The chi-square test in Table 4.16, however, violated the rule of minimum cell frequency because there were three cells with a frequency of less than 5. Thus, a regression analysis was performed to validate the hypothesis. Because the calculated probability values in both F- and t-statistics of 0.574 are significantly greater than 0.050 at 95% confidence level, the null hypothesis cannot be rejected.

A linear regression summary of perceived motivation and work experience is shown in Table 4.17. Because the probability values in both F- and t-statistics of 0.581 are significantly greater than 0.050 at 95% confidence level, the null hypothesis cannot be rejected. A cross-tabulation between perceived motivation and time in the industry cannot be constructed meaningfully unless the time in the industry variable is reclassified into fewer categories. When this variable is regrouped into three categories (“0-10 years,” “10-20 years,” “>20 years”) and the variable is cross tabulated with the perceived motivation variable, the calculated chi-square $Pr = 0.859$ and $\gamma = -0.0334$ also lead to embracing the null hypothesis of no association between perceived motivation and work experience.

Table 4.17: Regression of Perceived Motivation and Work Experience

Source	SS	df	MS	No.of obs =	90
Model	0.1699	1	0.1699	F(1, 88)	0.31
Residual	48.7301	88	0.5538	Prob > F	0.581
Total	48.9	89	0.5494	R-squared	0.0035
				Adj R-squared	-0.0078
				Root MSE	0.7441

perceived motivation	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
time in industry	0.0039	0.0070	0.55	0.581	-0.0101 0.0178
_ cons	2.2256	0.1555	14.31	0.000	1.9166 2.5346

A linear regression summary of perceived motivation and time in current position is shown in Table 4.18. Because the probability values in both F- and t-statistics of 0.845 are significantly greater than 0.050 at 95% confidence level, the null hypothesis cannot be rejected.

Table 4.18: Regression of Perceived Motivation and Time in Current Position

Source	SS	df	MS	No. of obs =	90
Model	0.0214	1	0.0214	F(1, 88)	0.04
Residual	48.8786	88	0.5554	Prob > F	0.845
Total	48.9	89	0.5494	R-squared	0.0004
				Adj R-squared	-0.0109
				Root MSE	0.7453

Perceived motivation	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
time in position	-0.0036	0.0184	-0.20	0.845	-0.0401 0.0329
_cons	2.3187	0.1236	18.76	0.000	2.0731 2.5643

A linear regression summary of perceived motivation and education is shown in Table 4.19. Because the probability values in both F- and t-statistics of 0.819 are significantly greater than 0.050 at 95% confidence level, the null hypothesis cannot be rejected.

Table 4.19: Regression of Perceived Motivation and Education

Source	SS	df	MS	No. of obs =	94
Model	0.0317	1	0.0317	F(1, 92)	0.05
Residual	55.3406	92	0.6015	Prob > F	0.8189
Total	55.3723	93	0.5954	R-squared	0.0006
				Adj R-squared	-0.0103
				Root MSE	0.7756

perceived motivation	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
education	0.0185	0.0807	0.23	0.819	-0.1417 0.1787
_cons	2.1905	0.2491	8.79	0.000	1.6957 2.6853

To test for existence of association between job satisfaction and age group, a cross tabulation is constructed. This cross-tabulation is shown in Table 4.20.

Table 4.20: Cross Tabulation of Job Satisfaction and Age Group

Job Satisfaction	Age Group				Total
	<35	35-44	45-54	55-64	
Low	3	6	2	7	18
Medium	15	18	11	4	48
High	4	8	11	5	28
Total	22	32	24	16	94

A chi-square test is not appropriate here due to a few low frequency cells (bolded); therefore, a linear regression was performed and the results are summarized in Table 4.21. Because the probability values in both F- and t-statistics of 0.956 are significantly greater than 0.050 at 95% confidence level, the null hypothesis cannot be rejected.

Table 4.21: Regression of Job Satisfaction and Age Group

Source	SS	df	MS	Number of obs =	94
Model	0.0015	1	0.0015	F(1, 92)	0
Residual	44.9347	92	0.4884	Prob > F	0.9559
Total	44.9362	93	0.4832	R-squared	0
				Adj R-squared	-0.0108
				Root MSE	0.6989

job satisfaction	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
age group	0.0039	0.0707	0.06	0.956	-0.1365 0.1443
_cons	2.0971	0.1819	11.53	0.000	1.7359 2.4583

To test an association between job satisfaction and work experience, a linear regression analysis was performed instead of a chi-square test because tabulation was not meaningful with several low frequency cells. The results of the regression analysis are summarized in Table 4.22.

Table 4.22: Regression of Job Satisfaction and Work Experience

Source	SS	df	MS	No. of obs =	90
Model	0.9899	1	0.9899	F(1, 88)	2.24
Residual	38.8324	88	0.4413	Prob > F	0.1378
Total	39.8222	89	0.4474	R-squared	0.0249
				Adj R-squared	0.0138
				Root MSE	0.6643

job satisfaction	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
time in the industry	0.0094	0.0063	1.50	0.138	-0.0031 0.0219
_cons	1.9761	0.1388	14.24	0.000	1.7002 2.2519

Because the probability values in both F- and t-statistics of 0.138 are significantly greater than 0.050 at 95% confidence level, the null hypothesis cannot be rejected. Thus, there seems to be no association between job satisfaction and work experience.

Following the same logic for testing the previous hypothesis, a linear regression analysis of job satisfaction and time in current position is summarized in Table 4.23. The null hypothesis of no association cannot be rejected because the probability values in both F- and t-statistics of 0.335 are significantly greater than 0.050 at 95% confidence level.

Table 4.23: Regression of Job Satisfaction and Time in Current Position

Source	SS	df	MS	No. of obs =	90
Model	0.4213	1	0.4213	F(1, 88)	0.94
Residual	39.4010	88	0.4477	Prob > F	0.3347
Total	39.8222	89	0.4474	R-squared	0.0106
				Adj R-squared	-0.0007
				Root MSE	0.6691

job satisfaction	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
time in current position	0.0160	0.0165	0.97	0.335	-0.0168 0.0488
_cons	2.0724	0.1110	18.67	0.000	1.8519 2.2930

In the same manner, a linear regression analysis was performed to test an association between job satisfaction and education. The results are illustrated in Table 4.24 below. The null hypothesis of no association cannot be rejected because the probability values in both F- and t-statistics of 0.629 are significantly greater than 0.050 at 95% confidence level.

Table 4.24: Regression of Job Satisfaction and Education

Source	SS	df	MS	No.of obs =	94
Model	0.1146	1	0.1146	F(1, 92)	0.24
Residual	44.8216	92	0.4872	Prob > F	0.6288
Total	44.9362	93	0.4832	R-squared	0.0026
				Adj R-squared	-0.0083
				Root MSE	0.6980

job satisfaction	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
education	-0.0352	0.0726	-0.48	0.629	-0.1794 0.1090
_cons	2.2094	0.2242	9.85	0.000	1.7641 2.6547

When multiple regression analysis was performed by running age or work experience as a dependent variable against the thirteen factors that have positive influence on motivation, a very interesting observation can be made. As individuals age or gain work experience they become less and less influenced by motivating factors such as opportunities for promotion and comradeship among coworkers. Table 4.25 summarizes the results of the regression of the *age* variable on these thirteen factors and Table 4.26 summarizes the results of the regression of the *years in the industry* variable on these thirteen factors. The following are the null hypotheses.

1. There is no association between age and motivation of opportunities for promotion or between age and motivation of comradeship among coworkers.

2. There is no association between time in the industry and motivation of opportunities for promotion or between time in the industry and motivation of comradeship among coworkers.

Table 4.25: Regression of Age Variable and Thirteen Positive Factors

Source	SS	df	MS	No. of obs = 66	
Model	2165.2560	13	166.5582	F(13, 52)	1.52
Residual	5707.1834	52	109.7535	Prob > F	0.1426
Total	7872.4394	65	121.1145	R-squared	0.275
				Adj R-squared	0.0938
				Root MSE	10.4760

age	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
+factor 1	-3.5659	1.7418	-2.05	0.046	-7.0610 -0.0708
2	-0.5497	1.9068	-0.29	0.774	-4.3759 3.2765
3	0.4034	1.2527	0.32	0.749	-2.1103 2.9171
4	2.4860	2.1494	1.16	0.253	-1.8271 6.7991
5	2.7414	2.2742	1.21	0.233	-1.8221 7.3050
6	-2.8922	2.4163	-1.20	0.237	-7.7408 1.9565
7	1.6269	2.0281	0.80	0.426	-2.4427 5.6966
8	-0.2315	1.6188	-0.14	0.887	-3.4799 3.0168
9	0.1412	1.5954	0.09	0.930	-3.0603 3.3426
10	-4.1030	1.834	-2.24	0.030	-7.7831 -0.4229
11	-0.5270	2.4167	-0.22	0.828	-5.3764 4.3224
12	4.0987	2.2267	1.84	0.071	-0.3694 8.5668
13	0.9999	1.7156	0.58	0.563	-2.4427 4.4425
_cons	38.6966	9.8137	3.94	0.000	19.0039 58.3892

From the results of multiple regression in Table 4.25, the probability $P>t$ of the t-statistics for age and opportunities for promotion (positive factor number 1) is calculated to be 0.046, which is smaller than 0.05 at 95% confidence level. Likewise, the probability $P>t$ for age and comradeship among coworkers (positive factor number 10) is 0.030. Thus, the first null hypothesis can be rejected; there seems to be an association between age and both the opportunities for promotion variable and the comradeship among coworkers variable. The t-values of -2.05 and -2.24 revealed that the relationships are inverted. Thus, an alternative

hypothesis is accepted that there is an invert or negative association between age and motivation of both opportunities for promotion and comradeship among coworkers.

Table 4.26: Regression of Time in Industry and Thirteen Positive Factors

Source	SS	df	MS	No. of obs =	66
Model	2866.5	13	220.5	F(13, 52)	1.98
Residual	5798.2	52	111.5	Prob > F	0.042
Total	8664.7	65	133.3	R-squared	0.3308
				Adj R-squared	0.1635
				Root MSE	10.56

Time in industry	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
+factor 1	-4.2008	1.7556	-2.39	0.020	-7.7236 -0.6780
2	-1.6016	1.9219	-0.83	0.408	-5.4582 2.2549
3	0.4482	1.2626	0.35	0.724	-2.0855 2.9819
4	3.7267	2.1665	1.72	0.091	-0.6207 8.0740
5	2.3215	2.2923	1.01	0.316	-2.2783 6.9213
6	0.0816	2.4355	0.03	0.973	-4.8055 4.9688
7	1.1888	2.0442	0.58	0.563	-2.9132 5.2908
8	0.5145	1.6316	0.32	0.754	-2.7596 3.7886
9	0.1500	1.6081	0.09	0.926	-3.0768 3.3769
10	-5.0974	1.8485	-2.76	0.008	-8.8067 -1.3881
11	-2.1509	2.4359	-0.88	0.381	-7.0388 2.7370
12	3.9892	2.2443	1.78	0.081	-0.5144 8.4928
13	0.9905	1.7292	0.57	0.569	-2.4794 4.4604
_cons	16.2012	9.8916	1.64	0.107	-3.6478 36.0503

From the results of multiple regression in Table 4.26, the probability $P>t$ of the t-statistics for work experience (time in the industry) and motivation of opportunities for promotion (positive factor number 1) is calculated to be 0.020, which is smaller than 0.05 at 95% confidence level. Likewise, the probability $P>t$ for work experience and comradeship among coworkers (positive factor number 10) is 0.008. Thus, the first null hypothesis can be rejected; there seems to be an association between work experience and both the motivation of opportunities for promotion variable and the comradeship among coworkers variable. The t-values

of -2.39 and -2.76 revealed that the relationships are inverted. Thus, an alternative hypothesis is accepted that there is an invert or negative association between work experience and both motivation of opportunities for promotion and comradeship among coworkers.

4.3.4 Other Interesting Information

In addition to the hypotheses that could be statistically tested, the data revealed other interesting information about the sample.

When factor analysis was used to investigate interrelationships among the factors with positive influence on perceived motivation, an interesting observation can be made. Table 4.27 illustrates the result of the factor analysis on the thirteen factors that have had a positive influence on motivation with 2 factors retained. With two factors loadings, variables number 2 (Good supervisor or leader), 4 (Job satisfaction), and 5 (Feeling of accomplishment) have relatively large positive values (0.5013, 0.4785 and 0.3603 respectively), but variables numbers 6 (Pay raises), 11 (Benefits), and 12 (Bonuses) have relatively large negative values (-0.4134, -0.3817 and -0.5485 respectively). This result implies that the sampled management personnel can be distinguished into two groups according to the type of rewards, namely intrinsic and extrinsic. There are those whose motivation can be effectively influenced by the intrinsic rewards (i.e., good supervisor or leader, job satisfaction and feeling of accomplishment), but not by the extrinsic rewards (i.e., pay raises, benefits and bonuses). *Vise versa*, there are others whose motivation can be effectively influenced by the extrinsic rewards (i.e., pay raises, benefits and bonuses), but not by the intrinsic rewards (i.e., good supervisor or leader, job satisfaction and feeling of accomplishment).

Table 4:27: Factor Analysis of 13 Factors that Positively Influence Motivation

<i>(principal factors; 2 factors retained)</i>				
<i>Factor</i>	<i>Eigenvalue</i>	<i>Difference</i>	<i>Proportion</i>	<i>Cumulative</i>
1	4.5105	3.1557	0.6719	0.6719
2	1.3548	0.4920	0.2018	0.8737
3	0.8628	0.3895	0.1285	1.0022
4	0.4733	0.1719	0.0705	1.0728
5	0.3014	0.2333	0.0449	1.1177
6	0.0682	0.0719	0.0102	1.1278
7	-0.0037	0.0427	-0.0006	1.1273
8	-0.0465	0.0206	-0.0069	1.1203
9	-0.0670	0.0477	-0.0100	1.1103
10	-0.1147	0.0710	-0.0171	1.0933
11	-0.1857	0.0182	-0.0277	1.0656
12	-0.2039	0.0326	-0.0304	1.0352
13	-0.2365		-0.0352	1.0000

<i>Factor Loadings</i>			
<i>Variable</i>	<i>1</i>	<i>2</i>	<i>Uniqueness</i>
1	0.5470	-0.0608	0.6971
2	0.3906	0.5013	0.5961
3	0.4030	-0.0368	0.8362
4	0.6577	0.4785	0.3385
5	0.5706	0.3603	0.5446
6	0.6653	-0.4134	0.3864
7	0.6650	0.2122	0.5127
8	0.5487	0.0041	0.6989
9	0.5772	0.0793	0.6606
10	0.6475	-0.0738	0.5753
11	0.7695	-0.3817	0.2622
12	0.6437	-0.5485	0.2848
13	0.4396	0.2558	0.7413

Factor analysis was also used to investigate interrelationships among the thirteen factors that have negative influence on motivation, but its result revealed no interesting observation.

When interaction expansion technique was used to create indicator (also called dummy) variable sets from a categorical variable, many interesting observations were uncovered. For example, a tabulation of perceived motivation

and education was created to examine their relationship as illustrated in Table 4.28. It is observed that the two middle levels of education have relatively a low mean of motivation score. When regression was performed on the perceived motivation variable and education variable and the education variable was expanded into dummies, one could conclude that at a 0.05 significance level (or at 95% confidence) management personnel who received additional education beyond a high school diploma, but have not earned any graduate degrees (master's or doctoral), perceived themselves to be the least motivated. The result of this regression with interaction expansion is illustrated in Table 4.29.

Table 4.28: Tabulation of Perceived Motivation and Education

Education	Summary of Motivation		
	Mean	Std. Dev.	Freq.
High School Diploma	2.50	0.65	14
Tech School Cert/Degree	2.00	0.93	8
Bachelor's Degree	2.05	0.79	43
Graduate Degree	2.48	0.69	29
Total	2.24	0.77	94

Table 4.29: Regression of Perceived Motivation and Education Dummies

Source	SS	df	MS	No. of obs = 94	
Model	4.724	3	1.575	F(3, 90)	2.8
Residual	50.648	90	0.563	Prob > F	0.0446
Total	55.372	93	0.595	R-squared	0.0853
				Adj R-squared	0.0548
				Root MSE	0.7502

perceived motivation	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
Tech School	-0.5000	0.3325	-1.50	0.136	-1.1605 0.1605
Bachelor	-0.4535	0.2308	-1.96	0.053	-0.9121 0.0051
MA/MS/phD	-0.0172	0.2441	-0.07	0.944	-0.5023 0.4678
_cons	2.5000	0.2005	12.47	0.000	2.1017 2.8983

Another tabulation of job satisfaction and education was created to examine a relationship between job satisfaction and education as illustrated in Table 4.30. It is observed that the respondents who have earned a bachelor's degree as the highest level of education also have the lowest mean of job satisfaction score. When regression was performed on the job satisfaction variable and education variable and the education variable was expanded into dummies, it could be concluded that at a 0.05 significance level (or at 95% confidence) management personnel who have earned a bachelor's degree as the highest level of education have the lowest level of job satisfaction. The result of this regression with interaction expansion is illustrated in Table 4.31.

Table 4.30: Tabulation of Job Satisfaction and Education

Education	Summary of Job Satisfaction		
	Mean	Std. Dev.	Freq.
High School Diploma	2.36	0.50	14
Tech School Cert/Degree	2.25	0.71	8
Bachelor's Degree	1.88	0.70	43
Graduate Degree	2.28	0.70	29
Total	2.11	0.70	94

Table 4.31: Regression of Job Satisfaction and Education Dummies

Source	SS	df	MS	No. of obs = 94		
Model	4.010	3	1.337	F(3, 90)	2.94	
Residual	40.926	90	0.455	Prob > F	0.0374	
Total	44.936	93	0.483	R-squared	0.0892	
				Adj R-squared	0.0589	
				Root MSE	0.6743	

job satisfaction	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
Tech School	-0.1071	0.2989	-0.36	0.721	-0.7009 0.4866
Bachelor	-0.4734	0.2075	-2.28	0.025	-0.8857 -0.0612
MA/MS/PhD	-0.0813	0.2195	-0.37	0.712	-0.5173 0.3547
_cons	2.3571	0.1802	13.08	0.000	1.9991 2.7152

When regression was performed on the perceived motivation variable or the perceived productivity variable against the age group variable and the age group variable was expanded into dummies, no significant age pattern for either perceived motivation or perceived productivity was observed. However, when regression was performed on the job satisfaction variable against the age group variable and the age group variable was expanded into dummies, it could be observed that there was a significant difference for job satisfaction between age groups 45-54 and 55-64 (illustrated in Table 4.32).

Table 4.32: Regression of Job Satisfaction and Age Group Dummies

Source	SS	df	MS	No. of obs = 94		
Model	2.732	3	0.911	F(3, 90)	1.94	
Residual	42.205	90	0.469	Prob > F	0.1285	
Total	44.936	93	0.483	R-squared	0.0608	
				Adj R-squared	0.0295	
				Root MSE	0.6848	

job satisfaction	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
ages 35-44	0.0170	0.1897	0.09	0.929	-0.3597	0.3938
ages 45-54	0.3295	0.2021	1.63	0.107	-0.0720	0.7311
ages 55-64	-0.1705	0.225	-0.76	0.451	-0.6175	0.2765
_cons	2.0455	0.146	14.01	0.000	1.7554	2.3355

Upon further regression analysis only between the job satisfaction variable and these two age groups as dummies, one could conclude that at a 0.05 significance level (or at 95% confidence) there was a significant difference between ages 45-54 and ages 55-64 for job satisfaction. The result of this regression with selective interaction expansion is illustrated in Table 4.33.

Table 4.33: Regression of Job Satisfaction and Selective Age Group Dummies

Source	SS	df	MS	No. of obs =	40
Model	2.400	1	2.400	F(1, 38)	4.27
Residual	21.375	38	0.563	Prob > F	0.0457
Total	23.775	39	0.610	R-squared	0.1009
				Adj R-squared	0.0773
				Root MSE	0.7500

job satisfaction	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
ages 35-44	(dropped)				
ages 45-54	0.5000	0.2421	2.07	0.046	0.0100 0.9900
ages 55-64	(dropped)				
_cons	1.8750	0.1875	10.00	0.000	1.4954 2.2546

The aforementioned interesting observations are useful for top management when making decisions about hiring or promoting management personnel in their company. All of these observations as well as the tested hypotheses, nevertheless, are based merely on statistical analyses of this sample that are governed by various assumptions as previously explained. There is other collected information pertaining to company policy from the open-ended questions in the questionnaire that must be analyzed non-statistically. Readers will find this information in the next chapter very interesting.

CHAPTER FIVE

CONTENT ANALYSIS OF COMPANY POLICIES

5.1 Introduction

In the previous chapter, the hypotheses and other insights were tested or explained using statistical analyses. However, the collected data can still provide other information by means of content analysis - specifically for the four open-ended questions:

- Please list up to 5 items in your company policy that you find the most rewarding – boost your motivation and morale. List them in order starting from the most rewarding item. Briefly explain why such items affect you the way they do.
- Please list up to 5 items in your company policy that you find the least rewarding – reduce your motivation and morale. List them in order starting from the least rewarding item. Briefly explain why such items affect you the way they do.
- What could your company add to the benefits package or change in the general policy that you feel would increase your motivation?
- Do you feel that your company created a positive atmosphere at your work place? What made you feel that way or why did you not feel that way?

All of the above questions pertain to company policies and practices. The responses not only revealed the presence of specific policies or practices, but also uncovered the respondents' preference on such policies and practices.

The following section will familiarize readers with some of the standard company policies found in most mid-size companies and corporations. A content analysis of selected participating companies will follow.

5.2 Company Policies

A policy is a predetermined guideline providing a specified course of action for dealing with prescribed circumstances. For a small organization, a company policy can be as short as a sentence. However, most organizations establish a policy containing definitions, procedures, rules, interpretive guidelines, and sometimes sample forms. A policy becomes more important as an organization grows in size. Although the absence of policies allows flexibility, flexibility can lead to favoritism or discriminatory practices. Moreover, the absence of policies permits individual employees to negotiate with companies. Those who believe that they have received a worse deal become dissatisfied because they think the company is treating them unfairly. The nature of this phenomenon was explained by the equity theory.

A policy can be in the form of a procedure guideline or an employee handbook. It should address issues such as overtime pay, pay day and pay periods, raises or promotions, bonuses, vacation, holidays, sick leaves, leave of absence, benefits and eligibility for benefits, specified misconduct issues, terminations, suspensions, reprimands, sexual harassment, grievance or complaint procedures, substance abuse, discrimination, safety rules, standard of conduct, etc.

A company policy or a personnel policy manual has many benefits. These benefits are as follows (Hubbartt, 1993):

- Minimizing the need for management staff meetings to resolve routine policy questions

- Promoting fair and uniform administration of company policies
- Permitting routine matters to be handled by supervisors
- Providing a ready reference for orientating new employees
- Serving as an aid in recruiting new employees
- Helping to control costly absenteeism, tardiness, accidents, or sick leave abuse
- Promoting compliance with government employment and wage hour laws
- Defining authority and responsibility for supervisory personnel
- Providing a basis for defense against legal claims made by employees or former employees

However fair policies seem, a motivational work environment cannot be achieved unless the policies are strictly enforced. The law also ensures that employees are treated fairly by enforcing the doctrine of good faith and fair dealing. The doctrine asserts that every contract contains an unwritten provision that the parties will deal with each other fairly. However, this doctrine is usually enforced only when an alleged discharge in bad faith or for a bad cause occurs. Moreover, this doctrine is not enforceable in all states. According to the Bureau of National Affairs, only 13 states currently recognize the good faith and fair dealing covenant in the employment relationship (Hubbart, 1993); they are Alabama, Alaska, Arizona, California, Colorado, Connecticut, Delaware, Idaho, Iowa, Massachusetts, Montana, Nevada, and New Hampshire.

There are many issues that should be addressed in a company policy. Each issue should be addressed with some recommendations to help promote a motivational work environment.

5.2.1 Promotions

Companies offering a high career advancement opportunity tend to attract potential employees who are highly motivated. For this reason, companies should favor employees with advancement potentials over recruiting outsiders whenever there is a job opening. The companies should focus on cultivating their employees by training and developing them for advancement to higher-level positions. Policies should give employees the opportunity to apply for job vacancies above the entry level before outside recruitment is used.

Promotion should never be tied to seniority. However, when there is more than one candidate for the promotion, seniority can be used as a deciding factor to promote employees after job performance, skills, and abilities have been considered.

Job bidding may also be employed to allow employees to seek consideration for job openings. With job bidding, job openings can be posted on a bulletin board or electronically mailed to potential employees. Employees who are interested in the positions then bid on the job by following specified procedures.

In general, a pay raise should accompany promotion because it usually reflects an increase in duties or responsibilities. Promotion to a higher-paying job with greater responsibilities is an excellent way to reward an outstanding employee who is qualified.

5.2.2 Salary Review

Companies should establish a salary review policy that specifies a period during each calendar year in which employees' salaries shall be reviewed. Salary adjustments should be based on several factors such as employee's performance records for the previous year, changing economic conditions, inflation, and performance and profitability of project or company.

5.2.3 Performance Appraisals

A performance appraisal allows employees' achievements to be recognized by their supervisors. More importantly, a performance appraisal should be used to justify a pay adjustment or merit pay. Policies should clearly provide supervisors with guidelines to conduct effective performance appraisals for their subordinates. For example, a performance appraisal should be based on objective performance results of individual employees and not on subjective opinion. For poorly performing employees, the performance appraisal enables supervisors to address performance problems and sometimes to suggest improvements. This will send a message to the poor performers that the company cares about their jobs and performances.

Unlike a salary review, which usually takes place once a year, employee job performance should be evaluated more frequently by supervisors.

5.2.4 Bonus Incentives

A bonus incentive is commonly used in the construction industry to improve productivity and quality of construction projects. A bonus incentive plan should be contingent upon profitability for the year of the projects and recognition of individual performance. It should be a discretionary payout based upon individual employees' base pay.

Another type of bonus incentive is a group bonus. In group bonus schemes, groups of employees receive bonuses based on the achievement of group performance objectives or targets. These schemes tend to encourage teamwork and are useful for jobs that rely on joint effort. However, group bonus schemes can cause ill-directed peer group pressure and cause diffusion of individual motivation.

5.2.5 Overtime Pay

A company policy should clarify when premium pay is provided. This issue is very important since the Fair Labor Standards Act enforces rules and regulations for employers to provide overtime pay to certain employees. A policy should define the beginning and the end of a workweek period, seven consecutive 24-hour periods. The company should pay its employees for all hours worked in a workweek. Unless stipulated by state law, employees are paid at least one and one-half times the employees' regular straight time pay rate for all hours worked over 40 hours in a workweek. Most companies, however, do not compensate their management personnel with overtime pay. Nevertheless, there should be other

forms of remuneration to award those employees who regularly work beyond the norm.

5.2.6 Vacations

The vacation policy should define an annual paid absence benefit as well as provide guidelines for scheduling employee absences. In most companies, the amount of vacation time varies depending upon employees' seniority and/or rank. Some companies even prepare a vacation pay advance and issue an early paycheck prior to their employee's vacation. Companies should also verify which state and federal Equal Employment Opportunity laws could affect vacation policy. An approval process should be established, and supervisors should be able to follow the guidelines should conflicts on requested dates arise. Supervisors should refrain from disapproving a vacation request or discouraging any employee from taking a vacation when requested. This particular policy is of vital importance as management personnel usually have to deal with problematic or stressful situations and should leave work to rejuvenate themselves periodically.

5.2.7 Leaves of Absence

A leave of absence policy should include different types of absences including jury service, medical leave, maternity leave, personal leave, family leave, medical leave, military leave, funeral leave, and sick leave. For jury service, the Jury System Improvement Act requires companies to permit employees a leave of absence for jury service, reinstate the employee without loss

of service or seniority credit, and provide benefits in the same manner as for other leaves of absence. Employees should also be paid without a deduction if the absence is less than a week. Medical leaves should cover absences for medical reasons such as hospitalization, accidents, prolonged illness, work injury, pregnancy, in-patient substance abuse treatment, and other health-related conditions. A policy should define the circumstances under which an employee may be placed on a medical leave of absence. It should also include requirements for notification of absence, allowable duration of absence, and eligibility for benefits during the period of leave. Companies should refer to the Family and Medical Leave Act when writing a policy. By law, maternity leave, personal/family leave, family and medical leave, and military leave must be provided by companies. To a certain extent by law, employees must also be allowed funeral leave for their religious beliefs.

A paid sick leave benefit, however, is not a requirement by law. Most companies, however, offer a sick leave benefit to their regular employees. A sick leave policy should discuss the allowable number of days of sick leave per calendar year. Some companies do not offer sick leave benefit for fear that people will abuse it. To minimize the abuse, most policies require that employees submit a doctor's certificate if the absence is at least three consecutive days. Unused sick days may or may not be banked for future use. If the unused sick days can be banked, a policy usually caps the unused sick days to 20.

5.2.8 Insurance Benefits

Most companies offer group insurance to their employees. In most cases, employees pay less for group insurance premiums than individual premiums because companies usually pay a portion of insurance premiums for their

employees; thus, employees are likely to participate in group insurance plans when offered. A group insurance policy should explain what types of insurance plans are offered. Insurance plans commonly offered include medical insurance, life insurance, dental insurance, vision insurance, prescription drug insurance and disability insurance. The policy should also provide eligibility requirements and enrollment requirements and procedures. Employees should be given a current booklet or plan description and a contact when any questions arise.

Pursuant to the Consolidated Omnibus Budget Reconciliation Act of 1986, all terminating employees, with the exception of those terminated for misconduct are eligible for continuation of their health insurance coverage, paid by the employee, for a period of up to 18 months following the termination.

5.2.9 Educational Programs or Benefits

Properly selected educational benefits can improve employee knowledge and skill, thus increasing the employee's value to the company. For this reason, companies should view educational benefits as an investment rather than a cost. An educational program policy should clarify whether education benefits are limited to employee's job-related topics. It should also define eligibility requirements for the educational benefit. The policy should also distinguish between required job training that occurs on paid work time and employee-elected educational programs that are considered non-work time. A guideline for handling of educational costs should also be included in the policy.

5.2.10 Retirement Plans

A large number of companies provide some form of retirement benefit for their employees. Basically, retirement plans can be divided into two major categories: benefit pension plans and contribution plans. The benefit pension plans use defined formulas based on salary prior to retirement, years of service, or both, to calculate a retirement benefit. These plans can highly motivate employees, yet they are quite costly to employers so companies rarely offer them.

The contribution plans specify the level of employer and employee contributions to the plan without specifying the eventual benefits. Instead, individual accounts are set up for participants and benefits are based upon the amounts accumulated in the accounts, plus investment earnings or minus investment losses. There are a number of contribution plans; these include deferred arrangement plans or 401(K) plans, savings or thrift plans and profit sharing plans.

A retirement benefits policy should provide eligibility requirements and types of plans being offered. The policy should also specify the level of company contribution to the retirement account. In most cases when the retirement benefits are offered, a company will match 50 per cent of participant's contributions but only up to 5 per cent of participant's compensation.

5.2.11 Complaint and Grievance

An effective complaint and grievance policy can help employees retain their level of motivation. A grievance is an employee's formal statement of dissatisfaction with an employment policy, practice, condition, or supervisor's

decision or action. Not only can a grievance policy provide an outlet for employee complaints and resolve the matter, it also can reduce the likelihood of employees seeking a legal claim against the company.

A good company policy is not difficult to create. People need to be treated fairly and humanely; therefore, the policy should be written with these considerations. The policy should be reserved as guidelines when issues arise and should never be used strictly as a tool to demean valuable employees. People do make mistakes and management should accept this fact by giving its employees a chance to correct their mistakes. The policy should also be reviewed periodically to incorporate comments and needs of employees. A successful implementation and maintenance of a good company policy will help create a motivational environment.

Because each company develops its own policy and policy evolves over time, there is no standard policy for all companies. A comparison of policies of one company to another may provide information into developing the kind of company policy that best promotes a positive, motivational work environment for this group of management personnel.

The next section will analyze the policies of three chosen participating companies. The identity of these companies will remain anonymous to ensure confidentiality. They were selected based on the average score of their employees' level of motivation: company B with its relatively low score, company A with its norm score, and company C with its relatively high score.

5.3 Content Analysis of Selected Companies

In order to establish a baseline to benchmark other company policies, the company policies of company A, its employees' level of motivation being the norm, will be analyzed first. Then, it will be compared with the policies of company B, whose level of employee motivation was relatively much lower. Finally, it will be compared with the policies of company C, whose level of employee motivation was relatively much higher.

5.3.1 Company A and Its Policies/ Culture

The participants from company A range from 24 to 62 years of age, with an average of 39 years and one standard deviation of 10.3 years. The most experienced person has been in construction for 39 years compared with only 9 months for the least experienced one. The average work experience for the participants is 14 years, with one standard deviation of 10.7 years. On average, the participants have been in their current position for 3 years, with one standard deviation of 2.7 years. Figure 5.1 is a chart summarizing age, work experience, and time in current position characteristics.

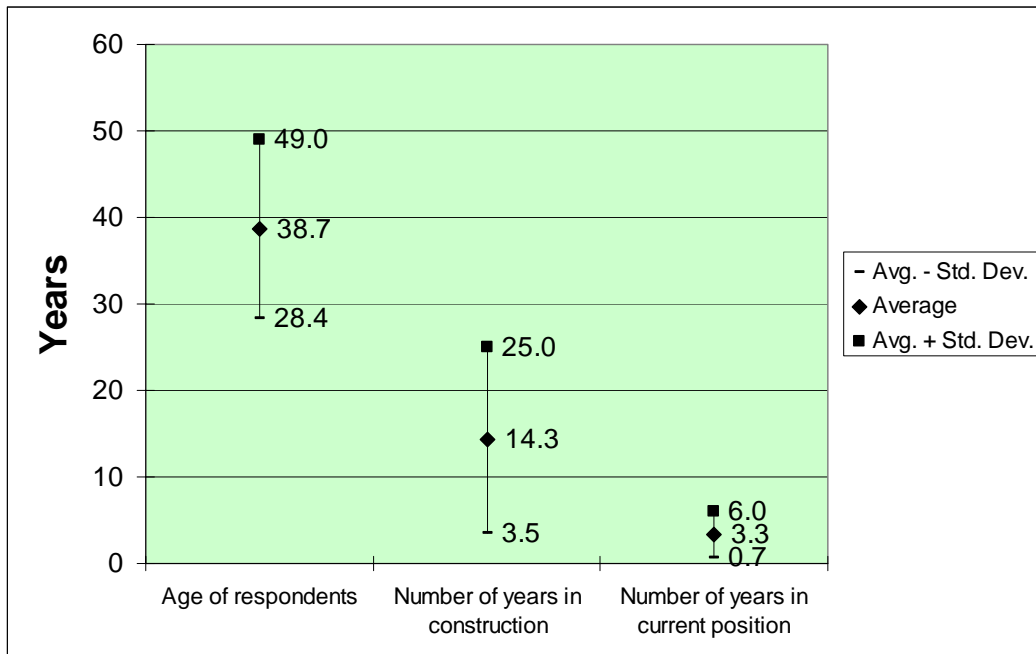


Figure 5.1: Age, Work Experience, and Time in Current Position Characteristics of the Sampled Employees of Company A

In terms of education, most participants have earned a bachelor degree, with approximately one-third of the participants earning at least a master's degree as illustrated in Figure 5.2.

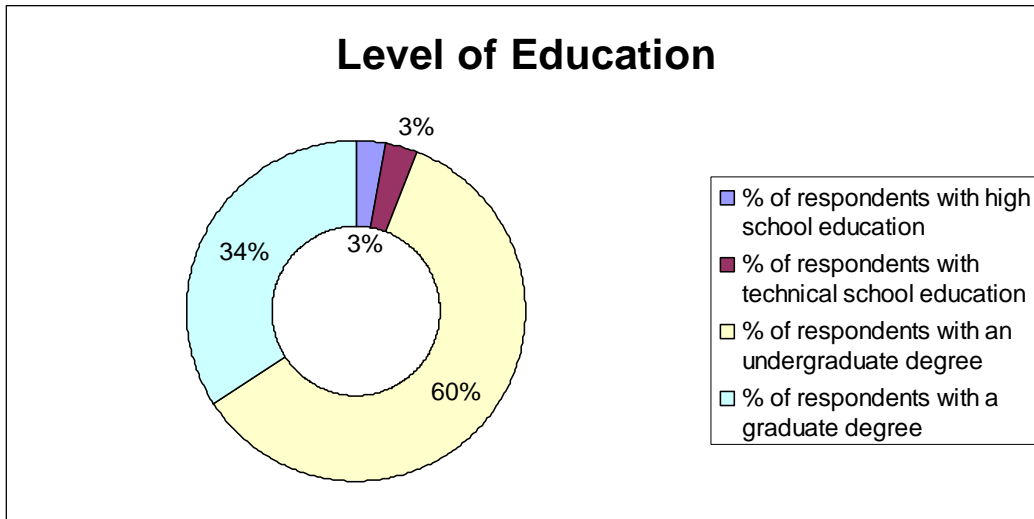


Figure 5.2: Age, Level of Education of the Sampled Employees of Company A

From the information given thus far, one can observe that the prevailing type of management personnel in company A is educated, experienced, and in lower middle age. Out of the three representative companies, the management personnel of company A are in the middle in terms of their level of perceived motivation. The company offers a standard benefit package for the industry with excellent medical and dental coverage. Company ownership is offered after a certain period of continuous employment. Incentives such as annual bonuses and end-of-the-project bonuses are offered to the employees. However, the annual bonuses are based on seniority rather than performance and the end-of-the-project bonuses are offered only to project managers. Company A has no comprehensive written company policy except for its open-door policy. The upper management empowers project managers with authority to carry out their responsibilities. The project managers feel that the upper management trusts them to make critical decisions. Because the upper management allows projects to run autonomously, communication between the home office and project sites is very minimal. Often, employees at project level are forced to be repositioned with very little

notification. The company has no training program for inexperienced new hires, which has resulted in discharging them on grounds of incompetence. Moreover, the company does not offer flextime or a compressed workweek, which many over-worked employees would like to see offered.

The culture within the company may be undergoing several changes due to the recent recruitment of younger top managers. This has made the company more dynamic and flexible. However, the company decided to reengineer by hiring outsiders rather than using internal recruitment, leaving senior employees with resentment. Many employees want to see more experienced top managers to balance the younger less experienced ones.

It appears that company A should develop some guidelines or a formal company policy. This will give the company the structure that most employees seem to desire. Additionally, unless the new, younger top managers are able to gain trust from the employees, or senior employees are promoted to be additional top managers, company A may face uncertainties in the near future. Also, the company should consider offering flextime or a compressed workweek to certain employees when appropriate. Finally, individuals who are familiar with the job requirements or responsibilities of the new hires should handle hiring so that only competent personnel may be hired. Otherwise, the company should provide necessary training to help those who need it. The company should refrain from discharging personnel if possible because it can cause the morale of other employees to decrease.

5.3.2 Company B and Its Policies/ Culture

The participants from company B range from 24 to 64 years of age, with an average of 42 years and one standard deviation of 11.1 years. The most

experienced person has been in construction for 46 years compared with only 1 year for the least experienced one. The average work experience for the participants is 18 years, with one standard deviation of 12.5 years. On average, the participants have been in their current position for 4 years, with one standard deviation of 4.2 years. Figure 5.3 is a chart summarizing age, work experience, and time in current position characteristics.

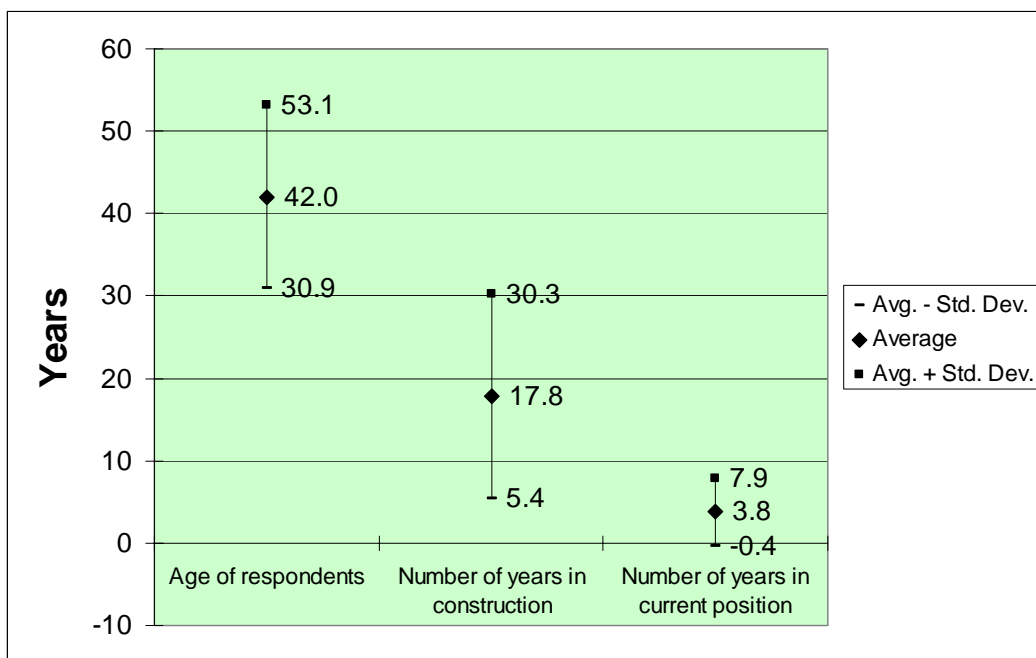


Figure 5.3: Age, Work Experience, and Time in Current Position Characteristics of the Sampled Employees of Company B

In terms of education, half of the participants have earned at least a master’s degree, one-fourth have earned a bachelor degree, with the remainder of the participants earning no college degrees as illustrated in Figure 5.4.

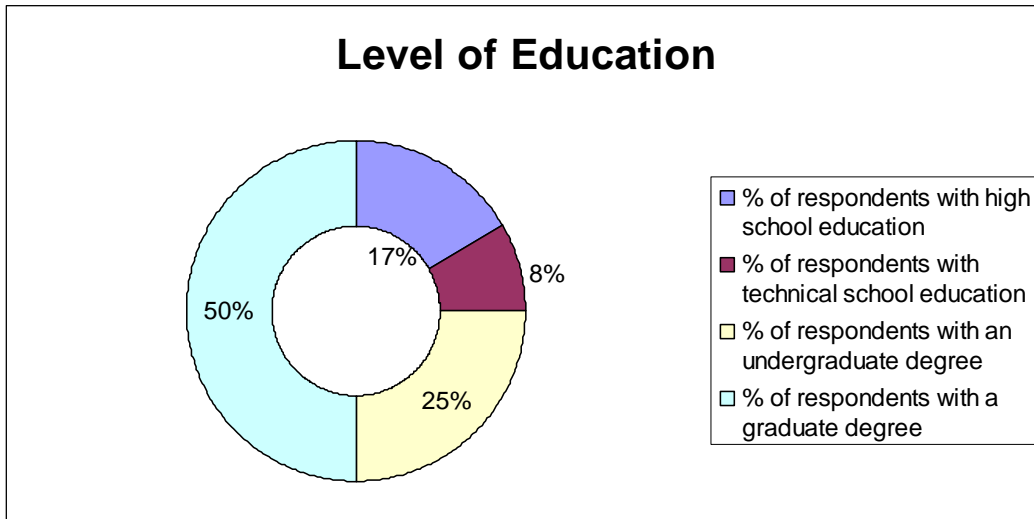


Figure 5.4: Age, Level of Education of the Sampled Employees of Company B

From the information given thus far one can observe that the prevailing type of management personnel in company B is relatively highly educated, experienced, and in middle age. Out of the three representative companies, the management personnel of company B are relatively low in terms of their level of perceived motivation. The company has a formal company policy and enforces it very strictly. Company B also offers standard benefit packages to its employees, with only 1% matching for 401K plan instead of the standard 5% matching offered by most companies. Also, the company recently required the employees to co-pay insurance premiums for their family due to increases in premiums by the insurance company. Vacation is accumulated up to only 20 days, at which time the employees start to lose vacation days. Project managers and project engineers usually lose several vacation days each year, because they cannot take their vacations; the top management occasionally rejects their vacation requests.

Either upper management at the home office or project managers at the project level handles hiring, which is not based solely on qualification of the applicants. The upper management also makes critical decisions for the project

instead of empowering project managers to make those decisions. The project managers feel that they do not have full authority to carry out their responsibilities. They also feel that the upper management does not trust them.

Like company A, company B does not offer any training program. The company does not offer tuition reimbursement if its employees personally decide to pursue higher education. The company believes that education is not important, thus decisions for employee advancement are based entirely on the individual's ability to perform. Some employees, however, feel that the company does not want to invest in its personnel.

Unlike company A, company B has no profit-sharing plan. This makes project personnel feel less responsible for the outcome of their projects. Annual bonuses are offered but they are relatively minimal and insignificant, failing to show any proper appreciation for those who really deserve it. The bonuses are given based on the overall profit of the company. Personnel working at projects that do well receive the same bonus amounts as those who work at projects that lose money.

Overall, the employees do not feel that the company creates a positive work atmosphere. They feel that the company spends too much time focusing on reducing employee costs and not enough time on motivating its personnel to perform better in order to increase profits and reduce costs. More importantly, several respondents agree that the company thinks everybody is the same; therefore, it treats good workers the same way it treats bad workers. The company believes that every employee is readily replaceable.

Company B is less likely to be successful unless the top management changes its mentality toward workers. The company should understand that people are not just bodies and that they are not equal in their ability and performance. The company needs to focus on coaching its personnel and raising their morale rather than cutting costs by decreasing employee benefits. Most

importantly, it needs to earn the trust of its employees by empowering them to do their jobs.

5.3.3 Company C and Its Policies/ Culture

The participants from company C range from 27 to 49 years of age, with an average of 39 years and one standard deviation of 7.9 years. The most experienced person has been in construction for 30 years compared with 12 year for the least experienced one. The average work experience for the participants is 19 years, with one standard deviation of 6.7 years. On average, the participants have been in their current position for 5 years, with one standard deviation of 2.8 years. Figure 5.5 is a chart summarizing age, work experience, and time in current position characteristics.

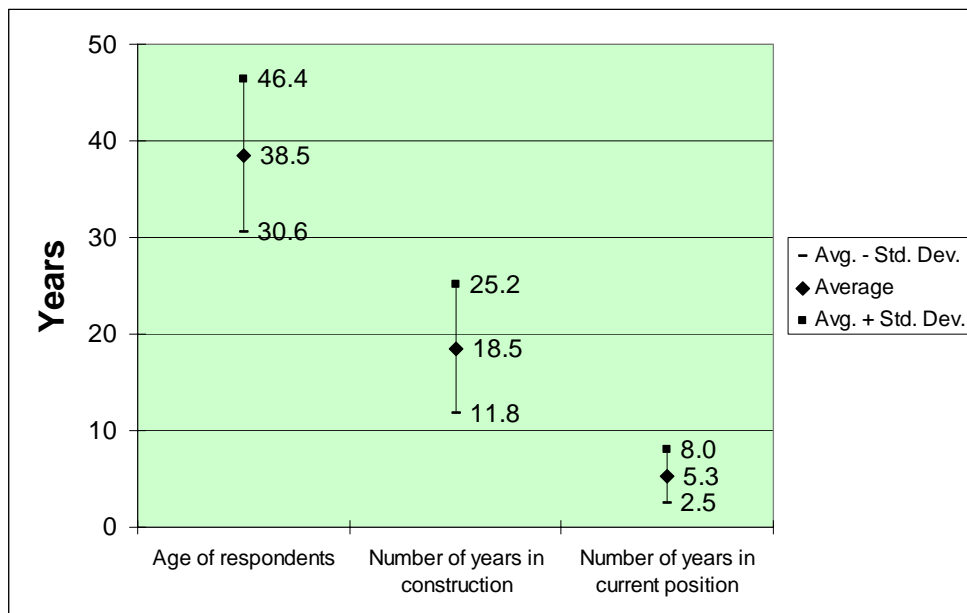


Figure 5.5: Age, Work Experience, and Time in Current Position Characteristics of the Sampled Employees of Company C

In terms of education, one-third of the participants have earned at least a master's degree, one-third have earned a bachelor degree, with one-third earning no college degrees as illustrated in Figure 5.6.

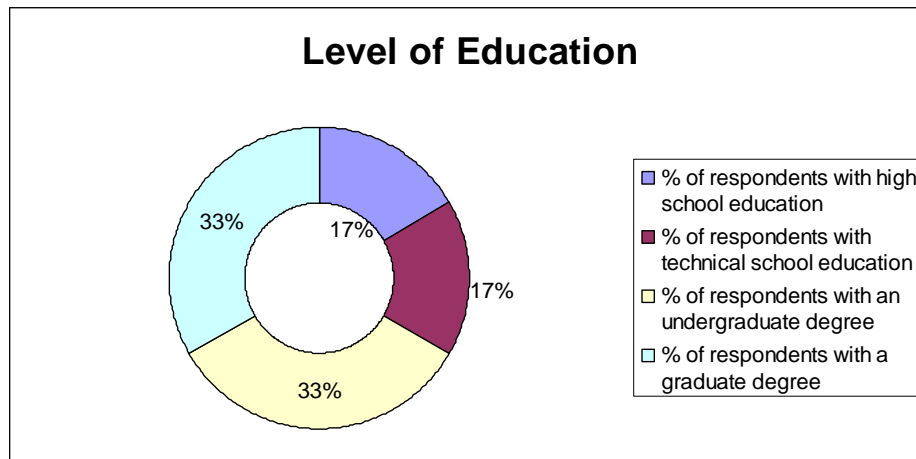


Figure 5.6: Age, Level of Education of the Sampled Employees of Company C

From the information given thus far one can observe that the prevailing type of management personnel in company C is relatively highly educated, highly experienced, and in middle age level. Out of the three representative companies, the management personnel of company C are relatively high in term of their level of perceived motivation.

Company C has a formal company policy except for a pay raise issue. It also has a highly structured hierarchy of personnel, thus employees can easily seek help and support from their supervisory personnel. The upper management trusts the employees to make nearly all decisions on their own. Each project manager is given full authority within his project, and is also held accountable for the success or failure of his project. The company offers excellent benefits and allows its employees to choose their own medical and dental coverage. However,

the company requires a co-pay for the employees who select the best insurance coverage (with the freedom to choose physicians/dentists and no deductible).

The company intensively screens its personnel upon hiring. Screening is performed by a group of experienced, competent personnel. Because of this practice, virtually every employee is competent. Moreover, the company tends to only select those who are optimistic, resulting in a positive and fun work atmosphere. Conversely, the company cannot acquire enough personnel for its work due to its strict screening process. Training is regularly provided to the employees who are interested for the purpose of career advancement. The company does not offer education reimbursement; however, it encourages the employees who seek higher education to do so. Many employees are allowed to take college level courses that require attendance several hours per week during regular work hour, and the company still offers them full salary.

Company C does not offer monetary bonuses to its employees; however, it has a profit sharing plan that rewards project personnel annually based on their project performance. The employees also receive expensive gifts annually as bonuses based on their individual performance.

All of the respondents feel that the company creates a positive atmosphere. They also feel that the company trusts and cares about them. Company C can be more open by disclosing the information on profitability to its employees (it currently does not disclose this information) because the profit sharing program is directly related to this information. Although the company rewards its employees very well, most employees wish that the top management would praise them verbally as well. The company should also increase its feedback/review to at least two times per year instead of having it annually.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The data confirmed the author's expectation to find the management personnel in the heavy construction to be predominately males with college education. The sample showed that 97 percent of respondents were male and 76 per cent have received at least one college degree. However, the author's expectation for percentage of those with postgraduate education such as Master's or doctoral degree was much lower than the 31 per cent found in the sample. The average age of the sample was 42, with an average work experience of 19 years. From the sample, 45 per cent perceived themselves to be highly motivated, yet 56 per cent perceived their work productivity level to be "medium." This means that 55 percent of the sample believed they could have been more motivated and 77 per cent could have increased their work productivity. These findings agreed with the author's expectation that the level of management personnel's perceived motivation and work productivity could have been improved. It is very important to note that percentages found in this research only describe the sample and cannot be expanded to the larger population.

How can motivation and work productivity be improved? The author was satisfied with the information revealed by the collected data, which offers some understanding as to how the management personnel's perceived motivation and work productivity may be boosted. From studying a sample of management personnel in the heavy construction industry, several conclusions for this study can be summarized as follows.

1. There is no association between perceived motivation and age group.
2. There is no association between perceived motivation and work experience.
3. There is no association between perceived motivation and time in current position.
4. There is no association between perceived motivation and education level.
5. There is no association between job satisfaction and age group.
6. There is no association between job satisfaction and work experience.
7. There is no association between job satisfaction and time in current position.
8. There is no association between job satisfaction and education level.
9. There is a positive association between perceived motivation and perceived work productivity.
10. There is a positive association between perceived motivation and job satisfaction.
11. There is a negative association between age and preference for opportunities for promotion. In other words, promotion opportunities are more important to those who are younger.
12. There is a negative association between age and preference for comradeship among co-workers. In other words, comradeship is more important to those who are younger.
13. There is a negative association between work experience and preference for opportunities for promotion.
14. There is a negative association between work experience and preference for comradeship among co-workers.
15. There are two groups of management personnel; there are those whose motivation can be effectively influenced by the intrinsic rewards (i.e., good supervisor or leader, job satisfaction and feeling of accomplishment),

but not by the extrinsic rewards (i.e., pay raises, benefits and bonuses).
Vise versa, there are others whose motivation can be effectively influenced by the extrinsic rewards (i.e., pay raises, benefits and bonuses), but not by the intrinsic rewards (i.e., good supervisor or leader, job satisfaction and feeling of accomplishment).

16. Management personnel who received additional education beyond a high school diploma, but have not earned any graduate degrees (master's or doctoral), had the lowest level of perceived motivation.
17. Management personnel who have earned a bachelor's degree as the highest level of education have the least level of job satisfaction compared to those who have either lower or higher education.
18. There is a significant decrease in job satisfaction between ages 45-54 and ages 55-64.
19. The top five factors that positively influence motivation are feeling of accomplishment, job satisfaction, good supervisor or leader, pay raises, and being informed, consecutively.
20. The top five factors that negatively influence motivation are bad supervisor or leader, not being informed, job dissatisfaction, insignificant pay raises or no pay raises, and insignificant bonuses or no bonuses, consecutively.

It is worth noting that these conclusions were derived from a sample of 94 cases. The sample represented only ten heavy construction companies, thus this is a weighted sample. In other words, there may be bias in data sampling. This small sample size is a result of a high non-response rate, which is attributable to the way in which data was requested from the companies. Thus, it is possible that a finding of "no association" such as those stated in conclusion numbers 1

through 8 is attributable to the small sample size. There is also probable bias in the respondents since a high percentage of them is highly educated.

Conversely, the sample size of 94 are relatively much larger than the sample size of other studies done within a construction setting, all of which were conducted on the Australian professionals. This is the first research conducted on the management personnel in the heavy construction industry in the U.S. in an attempt to understand how to motivate them. These findings are of invaluable contribution to the body of knowledge to the academic realm as well as to the construction industry.

Like the studies of the construction workers and low-level supervisory staff by Borcharding and Oglesby (1977) and Borcharding et al. (1980), unsatisfactory or negative work environment can have adverse effects on employee motivation. The management personnel may not require the kind of supervision the construction workers need, but both groups of people still need psychological nourishment. To create a motivational work environment, top management should ensure that a proper psychological environment exists. Both the management personnel and blue collar workers share similar psychological needs: the need to belong to a well-run construction project, the need for self-esteem and the esteem of fellow workers and supervisors, and the need for the recognition that comes with accomplishment.

It appears that the management personnel in the heavy construction industry are motivated intrinsically, which coincides with the author's expectation. This finding is also similar to the conclusion of the study of the managers and front-line workers of other industries by the American Management Association. Companies should empower their employees, allow them to learn necessary work skills and give them a sense of ownership or being a part of a team. These will indirectly promote a feeling of accomplishment for the employees.

In regard to company policies and practices, several suggestions can be made from the study. A company not only needs to have and to enforce its policies to avoid litigation, company policies provide a structure most employees need. Company policies can be written to emphasize trust from the upper management to the employees, to devise appropriate rewards and punishments and, most importantly, to promote a positive work environment for the employees. For many of us, our motivation and morale are greatly influenced by the people around us. For this reason, a company's hiring policies can directly help create a positive work environment by carefully selecting energetic, self-motivated, qualified and somewhat optimistic personnel.

In addition to having company policies that promote a positive work environment, top management should be open with the employees and empower them to perform the duties with which they are entrusted. To give the employees a sense of belongingness, a profit sharing plan should be established whether in a form of company shares or project-end bonuses or both. Communication should also be encouraged including regular praise and feedback.

All of these suggestions can be traced back to the golden rule – treat others just as you want to be treated – nevertheless, there are companies that fail to embrace this rule. Unfortunately, these companies hurt their own profitability beginning with the subsiding of employee morale, leading to decrease in employee motivation and work productivity and the loss of self-motivated employees.

6.2 Recommendations

This section consists of two parts: the recommendations to companies and the recommendations to future researchers.

The top management of any company should understand that most management personnel are greatly motivated by their feelings of accomplishment, which is a form of self-actualization. Therefore, they need to be given authority along with the responsibilities assigned to them. The top management should also do their best to remove strong dissatisfiers such as bad supervisors or lack of communication. They can themselves exemplify good management strategies for lower level supervisors by constantly giving their support and praises. They can also keep their line of communication open, thus eliminating surprises for their employees. A company should have formal policies written not for the interest of avoiding litigation, but for the purpose of ensuring that a positive work environment is created. By keeping the employees motivated, the company will remain competitive and highly productive.

As for the recommendations for future researchers, this research (though based on more respondents than any other research in the subject of motivation and management personnel in construction) should be further investigated with even a larger sample size. A much greater sample size can be accomplished easily by inviting more companies to participate and by not requesting more than one or two respondents from each company. An appropriate sample size can be determined by a statistical calculation. Once the sample size is determined, data should be collected until the desirable sample size is accomplished. With the recommended approach by the dissertation committee, the author believes this research would not have been possible without the acquaintance of colleagues and friends in the heavy construction industry with whom the author worked during the 5 years he spent in the industry. However, this approach allowed comparison

of policies and culture among companies. The author's initial method of collecting data by requesting only one or two participants from a large pool of heavy construction companies could have resulted in a much larger sample size; however, these data might not have allowed comparison of policies and culture among companies.

In addition to the aforementioned recommendation, this study only collected the information on preference of factors that positively and negatively influence motivation; future researchers may consider collecting information about the presence of these factors. It will be interesting to see the difference between the preference and the presence of each influencing factor.

The questionnaire itself can be improved by reducing the number of scales for perceived motivation level and perceived work productivity level. This will eliminate some of the reclassification processes that were necessary. All of the questions in the questionnaire proved themselves to be very useful and effective in collecting the data. The future researchers are welcome to use this final version of the questionnaire with the recommended modifications.

Appendix A
Final Paper Formatted Questionnaire

Company _____

The contents of this form are absolutely confidential. Information identifying the respondent will not be disclosed.

PAPER FORMAT QUESTIONNAIRE
An Exploratory Study of Motivation of Management Personnel in the Heavy Construction Industry

Name: _____ Gender: ____ Age: _____ Time in industry: _____ year(s).
Position /Title: _____ Time in current position: _____ year(s).
Position /Title of your supervisor (if applicable): _____
Highest degree received: High school Technical school Undergraduate Graduate
If you received (a) college degree(s), what was your highest degree in?: _____

INSTRUCTIONS: Check the bracket [] that applies to your answer or enter a number in the box .

MOTIVATION : a desire to complete a project as quickly and as well as possible
With this definition in mind, please answer the following questions as honestly as possible.

1. How motivated are you at work? (1 = not at all, 2 = not much, 3 = somewhat, 4 = quite, 5 = highly)
2. How productive are you with your time at work? (use the same scale in question no. 1)
3. Do you see yourself being promoted to another position with more responsibilities within 5 years?
PROBABLY [] PROBABLY NOT [] NOT APPLICABLE []
4. How often do you look forward to going to work?
EVERY DAY [] MOST DAYS [] SOME DAYS [] NEVER []
5. How often do you desire to leave work early?
EVERY DAY [] MOST DAYS [] SOME DAYS [] NEVER []
6. How often, after suggesting a better way of doing something, is your idea implemented?
OFTEN [] SOMETIMES [] RARELY [] NEVER []
7. Do you agree or disagree that the following factors have had a positive influence on your level of motivation?
On each line, enter a number (1 = "strongly disagree", 2 = "somewhat disagree", 3 = "neutral", 4 = "somewhat agree", 5 = "strongly agree"). **Enter "N/A" if the item does not apply to you.**

- | | | |
|-----------------------------------|-------|---|
| 7.1 Opportunities for promotion | _____ | |
| 2 Good supervisor or leader | _____ | |
| 3 Compressed workweek or flextime | _____ | .8 Job security _____ |
| 4 Job satisfaction | _____ | .9 Pleasant work in itself _____ |
| 5 Feeling of accomplishment | _____ | .10 Comradeship among co-workers _____ |
| 6 Pay raises | _____ | .11 Benefits (insurance, training, 401K, vacation) _____ |
| 7 Being informed | _____ | .12 Bonuses _____ |
| | | .13 Specific responsibilities (incept. to completn) _____ |
| | | .14 Other (Specify) _____ |

8. Please list up to 5 items in your company policy that you find the most rewarding – boost your motivation and morale. List them in order starting from the most rewarding item. Briefly explain why such items effect you the way they do.

9. Do you agree or disagree that the following factors **have had a negative influence** on your level of motivation? On each line, select a number (1 = “strongly disagree”, 2 = “somewhat disagree”, 3 = “neutral”, 4 = “somewhat agree”, 5 = “strongly agree”). **Select “N/A” if the item does not apply to you.**

9.1 No opportunities for promotion	_____	.8 No job security	_____
.2 Bad supervisor or leader	_____	.9 Unpleasant work in itself	_____
.3 No compressed workweek or flextime	_____	.10 No comradeship among co-workers	_____
.4 Job dissatisfaction	_____	.11 Bad benefits or no benefits	_____
.5 No feeling of accomplishment	_____	.12 Insignificant bonuses or no bonuses	_____
.6 Insignificant pay raises or no pay raises	_____	.13 No specific responsibilities	_____
.7 Not being informed	_____	.14 Other (Specify) _____	_____

10. Please list up to five aspects of your company’s policies that you find the least rewarding – reduce your motivation and morale. List them in order starting from the least rewarding item. Briefly explain why such items affect you the way they do.

Appendix B
Accompanying Letter or Cover Letter

Pun Panthaworn
c/o Dr. John Borcharding
The University of Texas at Austin
ECJ 5.200, Austin, TX 78712-1076

Month Day, Year

Company and address

Dear Participant: (Or Name of Participant if available)

I am conducting a study concerning motivation of management personnel in the heavy construction industry in the U.S. with Dr. John Borcharding. I would appreciate very much if you could forward the enclosed materials to any management personnel at the home office and supervisors on construction projects. A potential participant's title might be general manager, human resources manager, accounting manager, estimator, president, vice president, project manager, project engineer, safety manager, engineer, etc. If you feel that there are many potential participants who might be interested in the study, please make copies of this letter and the questionnaire and forward them to those individuals.

The purpose of this study is to determine what motivates or de-motivates management personnel in this particular industry and to seek the kind of company policy that creates the best motivational environment. Opinions and comments that you are contributing to this study are invaluable for making the industry a better one. Your responses are absolutely confidential.

The survey is designed to be as concise as possible. It should take only 10-15 minutes of your time to complete. Although the survey is written as clear as possible, should you have any questions or simply want to discuss more about the study please do not hesitate to contact me and Dr. Borcharding via *fax (512-471-3191)* or by *electronic mail (pun@mail.utexas.edu)*. We will return to you as soon as possible. Please return the survey by *Month Day, 2001*. You can return the survey to us either by mail or facsimile whichever more convenient to you.

In appreciating your kindly help, we will be happy to send you an executive summary of the result when the study is completed if you wish to receive one. We thank you very much for your time by participating in this study and for your contribution to the construction industry.

Sincerely,

Pun Panthaworn

John D. Borcharding, PE, Ph.D.

Appendix C
First Version of the Questionnaire

<<The contents of this form are absolutely confidential. Information identifying the respondent will not be disclosed under any circumstances. >>

QUESTIONNAIRE SURVEY

Motivation of Management Personnel in the Heavy Construction Industry

Name: Mr./Ms. _____
 Title/Position: _____ Time with Company: _____ year(s).
 Title/Position of your supervisor (if any): _____
 Firm: _____ City: _____ State: _____
 Type of construction (i.e., tunnel, dam, highway): _____

 Fax:(_____) _____ - _____ Email: _____

INSTRUCTION: Please check (√) the box [] that applies to your answer.
 Would you like to receive an *executive summary of the study via fax/email*? YES [] NO []

MOTIVATION

- Given the following items, does it influence your motivation? Please check one.

	<i>Strongly disagree 0</i>					<i>5 Neutral</i>					<i>10 Strongly agree</i>										
	0	1	2	3	4	5	6	7	8	9	10										
Promotion	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Good supervisor/Fair leader	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Security	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Compressed workweek/Flextime	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Job satisfaction/Meaningful job	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Feeling of accomplishment	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Pay/Bonuses	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Participation/Being informed	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Job security	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Delegation/Controlling of work	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Work environment i.e., Co-workers	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Benefits (Insurance, training, 401K)	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Paid Leaves of absence/Vacations	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Pleasant work in itself (incl. Environment)	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
Other (Specify) _____	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]

- Could you accomplish more each day if you tried?
 Yes, definitely Yes, somewhat No Don't know

- How often do you put extra effort into your work beyond what is required of you?
 Almost everyday Many times a week Once a week
 Once every few weeks Never

- On most days on your job, how much of time seems to drag for you?
 Half the day or more One-third of the day One-quarter of the day
 One-eighth of the day Time never seems to drag

- To what degree you feel involved in your job?
 Very little involved Slightly involved Moderately involved
 Strongly involved Very strongly involved; work is of the most interest in my life

- If you could start your career all over again, would you still do what you are doing?
 Yes No Don't know

- Do you find your work interesting?
 Yes, very interesting yes, somewhat interesting No Don't know

- Do you find what you do challenging?
 Yes, very challenging yes, somewhat No Don't know

- Do you get a feeling of accomplishment from the work you are doing?
 Yes, strongly Yes, somewhat Not at all Don't know

- Do you feel you are compensated fairly for your work performance?
 Yes, very fairly Yes, somewhat fairly No Don't know

- Do you think of your compensation as something that reflects upon your ability and your worthiness to the company?
 Yes, very much so Yes, somewhat so Not at all Don't know

- Can you say your immediate supervisor is a good leader?
 Definitely yes Yes with some reserve No Don't know
 Not applicable

COMPANY POLICY

- Does your company have a formal grievance procedure? If so, please describe it.

- Are there employee pension funds? If so, what contribution is made by the company? Do they tie to the company's net profits?

- Does your company have a retirement plan? If so, what contribution is made by the company?

- Does your company have a profit-sharing plan? If so, please describe it.

- Does your company have a training program? If so, please describe it.

- Does your company have an educational program? If so, what provision does your company have? (i.e., time off, full/partial financial support, etc.)

- Does your company have a formal suggestion system? If so, please describe it.

- Please describe your company policy regarding vacations. Is there a cap on accumulative days?

- Please describe your company policy regarding time-off. (i.e., sick leave, personal leave, pregnancy leave, etc.)

- Does your company periodically evaluate your work performance? If so, what interval is used? What are the procedures?

- Does your company have established criteria for promotion? Please elaborate.

- Does seniority play an important part in advancement procedure? Please explain.

- Does education play an important part in advancement procedure? Please explain.

- Please list up to 5 items in your company policy that you find the most rewarding; therefore, boost your motivation and morale. List them in order starting from the most rewarding item. Briefly explain why such items motivate you the way they do.

- Please list up to 5 items in your company policy that you find the least rewarding; therefore, hinder your motivation and morale. List them in order starting from the least rewarding item. Briefly explain why such items demotivate you the way they do.

General Comments:

THANK YOU VERY MUCH FOR YOUR PRECIOUS TIME!

Appendix D

Thirteen Motivating (+) Factors and Thirteen Dissatisfying (-) Factors

Pay Raises (+)/Insignificant Pay Raises or No Pay Raises (-)

The role of extrinsic rewards, particularly financial rewards, continues to be an important motivator when used in conjunction with performance. The importance of outcomes such as pay undeniably varies as a function of the strength of a person's need at any given time and as a function of the kind of needs these outcomes can satisfy for the person. Pay may be first in importance for one person simply because it satisfies his strong need for security. For another person, pay may be first in importance because it satisfies his need for esteem. Conversely, pay may be last in importance to another person because it cannot satisfy his strong social needs. In order for employers to use pay successfully as a reward, they have to look at how important rewards such as pay are to their employees and why these rewards are important.

The motivation model presented earlier indicates that outcomes motivate performance only if they are important and thus tied to performance. For this to happen, the measures of performance must meet the following criteria (Lawler, 1994):

1. They must respond to the behavior of the individual;
2. They must include all behavior that needs to be performed;
3. They must be perceived by the people in the organization as valid measures of their behavior; and
4. They must involve goals that people feel are obtainable.

Research has shown that pay is important to most people in most situations. In the author's opinion, pay is important because it reflects his ability and worthiness. Therefore, when such rewards are tied to performance so that their attainment appears to be dependent on good performance, they should indeed drive good job performance.

In construction projects, pay is unique to each individual based on past performance and experience. The most effective pay plan and also the most frequently used incentive plan used in this industry is the merit raise based on individual job performance. In merit raises, an employee's salary is adjusted periodically, based on his performance during a preceding time period. This system works only for employees whose superiors are fair since performance is measured by superiors' evaluation.

Another pay plan used in the industry is group-incentive performance bonus. Under this system, individuals in a construction team assigned to a specific construction project are given the same percentage bonus based on the individuals' salaries when the project performance exceeds the projected performance or when the profit appears to surpass the estimated profit. From the author's personal experience this plan does not lead to as high productivity as the individual merit raises plan; nevertheless, it is far better at motivating productivity than pay plans that do not relate pay to performance.

Motivating employees with extrinsic rewards can be costly when the rewards are pay raises; however, it can be a strong motivator to employees when employers follow a number of guidelines (Hume, 1995):

- Important rewards can be given, and they must be tied to performance;
- Superiors are willing to explain the reward system to their subordinates and support the reward system;
- Meaningful performance-appraisal sessions must be established;
- Information must be made public about how the rewards are given;
- Rewards can vary widely based on the individual's performance;
- Performance can be objectively measured;
- High levels of trust exist between superiors and subordinates.

Opportunities for Promotion (+)/No Opportunities for Promotion (-)

Promotion is another form of an extrinsic reward, which is used extensively in most industries including the construction industry. For employers to use promotion successfully to motivate their employees, they have to consider individual differences in each of their employees. For some people, promotion is something to be avoided. Promotion is somewhat less flexible to use than the pay plans. In using pay as a reward, pay can be given on a group basis or an individual basis. However, promotion is solely given to employees on an individual basis. Also, promotion can be given only when an opening occurs in an existing position or a new position is created. Fortunately, the author received this reward when another brand new construction project had an opening for a position that required higher responsibility than his existing position. The author became highly motivated as he was looking forward to assuming the new position.

Promotion is distinctive from pay rewards in that it usually is not tied to job performance. Employers often promote people on the basis of potential rather than on the basis of past performance. If the individual believes that he is promoted on this basis, he will likely be motivated when his employer meets his esteem needs.

Benefits e.g. insurance, training, 401K, vacation(+)/ Bad Benefits or No Benefits (-)

To use benefits successfully as a motivator, companies must allow employees to pick the benefit package they want and modify it according to their needs. Benefits commonly offered in any industry include health insurance plan, dental plan, life insurance, disability income, retirement pension, 401K plan, capital account, educational programs, etc. Other types of benefits can be office

size and furnishings, length of lunch breaks, automobiles, or early quitting time. Benefits being offered in the construction industry, however, are not as creative as those in the high-tech industry, especially in the microprocessor and computer firms whose benefits may include housekeeping and a personal butler.

Other benefits such as leaves of absence and vacations can be rewarding to most people since most people want to be away from work for extended periods. It is important that the company is flexible when employees request a vacation or leave of absence. One person may want to go skiing in winter while the other may want to go sailing in summer. Some employees may want to take their entire vacation at one time while others prefer to use a few days here and there. Some companies allow a certain amount of personal business days, in which employees can use time without having to give any reasons to their supervisors.

Leave of absence and vacation policies are so commonplace in industry that most management and employees fail to recognize their highly individualized nature. The policies are usually designed to meet unique needs of individual employees. They typically have positive consequences for organizations; thus, they can have a positive effect on productivity in the long run.

Compressed Workweek/Flextime (+)/No Compressed Workweek/Flextime (-)

A compressed work schedule is a reallocation of work hours from regular five days to lesser days. The author had conducted research on this topic and found a strong relationship between compressed work schedules and productivity (Panthaworn, 1996). Productivity or job performance level increased due to an increase in employees' motivation when companies had offered compressed work schedules of 4-10 hour days. Most employees are motivated as they have longer weekends to rejuvenate. They can also take care of personal matters during regular weekday hours.

Job Satisfaction (+)/Job Dissatisfaction (-)

It is imperative to assign personnel to a meaningful piece of work. As a work team, the team can be intrinsically motivated to perform work if they receive a meaningful piece of work (project) to do, have considerable autonomy or discretion in how they carry out the work, and receive feedback about the effectiveness of their work. Job satisfaction, resulted from meaningful work, is perhaps one of the most important factors that influence motivation of the management personnel in any industry because for the types of people being investigated in this research, self-actualization needs are usually the ultimate goal being sought.

Feeling of Accomplishment (+)/No Feeling of Accomplishment (-)

Job characteristics can serve as a strong motivator since they can be intrinsic rewards to an individual who seeks higher-level needs. Job characteristics that tend to produce a feeling of accomplishment must have certain qualities (Hackman & Lawler, 1971). First, the job must allow an individual to feel personally responsible for a meaningful portion of his work. The individual must have a sense of ownership to his work. He must believe that he personally is responsible for whatever successes or failures occur as a result of his work. The individual can experience a feeling of personal success and gain self-esteem only when he sees what is accomplished as his own effort.

Second, the job must involve doing something that is intrinsically meaningful or otherwise experienced as worthwhile to the individual. The individual is unlikely to feel good if he works effectively when he feels that the results of his efforts are not very important. There are two characteristics that a job must have in order to be experienced as meaningful by individuals with

relatively strong desires for higher-level-needs satisfaction. First, the job must include a sufficiently whole piece of work to allow the employee to perceive that he has produced or accomplished something of consequence. Second, the job must provide the employee with the opportunity to accomplish something by using skills and abilities that he personally values.

Third, the job must provide feedback about what is accomplished. An employee cannot experience higher-level-needs satisfaction when he performs effectively unless he obtains some feedback about how he is doing. In many instances the feedback may come from doing the task itself. In most cases, performance feedback may come from another person such as a supervisor or an esteemed co-worker. Conditionally, the feedback must be believable to the employee so that a realistic basis exists for the satisfaction of needs.

In summary, the characteristics of jobs can develop motivational environments. On jobs that individuals experience as high on importance, autonomy, skillfulness, and feedback, they will be able to feel high accomplishment.

Comradeship Among Co-workers (+)/No Comradeship Among Co-workers (-)

Work environment can play an important role in employees' satisfaction. Based on Maslow's third and fourth levels of need, people need a feeling of belonging to the organization and the esteem of the others in the organization. Because peer-group relationships have a strong influence on the reception of intrinsic rewards, they also influence satisfaction. The peer group is simply the major source of friendship opportunities for an employee. The acceptance and support of peer-group members (co-workers) are often sufficient to satisfy an individual's social needs. Having supportive and esteemed co-workers creates a work environment that is likely to make the individual gain job satisfaction. This

is especially true in heavy construction where companies relocate individuals from project to project for periods of 1 to 2 years. The primary social outlet is activities with project personnel.

Specific Responsibilities (+)/No Specific Responsibilities (-)

Delegation and control of work is another factor that can influence motivation. When work is being delegated to a person who has full control of that work, that person is likely motivated. Specific responsibilities must come with some authority. The absence of authority makes the person to whom responsibility was assigned very frustrated because he/she was being held accountable without having real control over the work. A person cannot be responsible for something over which he/she has no authority from start to finish.

Job Security (+)/No Job Security (-)

As security is the second level of needs in Maslow's hierarchy of needs, an employee must believe that his or her employment is reasonably secure before pursuing higher levels of needs. It is unlikely that any individual can be highly motivated knowing that they may lose the job at anytime. On one particular construction project, the project manager terminated two management personnel within the first eight months of the project without giving any explanation to the rest of the management team of the reasons for both employment terminations. In such a situation, job security may become an issue and a mutual trust between the project manager and the management team may never develop. With a mind set that employment is no longer secure, individuals remaining on the project would find it difficult to be motivated.

Pleasant Work in Itself (+)/Unpleasant Work in Itself (-)

Pleasure is a feeling, thus presence of pleasant work is determined by individual's taste or preference. For example, work can be pleasant to one engineer, but stressful to another engineer who has the same responsibilities. Pleasant work can be influenced by factors other than work characteristics in itself. These factors include, but are not limited to, work environment, nature of work, and work hours.

Being Informed (+)/Not Being Informed (-)

Participation and communication give people a sense of ownership and belongingness. Referring to Maslow's third level of needs (belongingness and love needs), people feel that they are a part of a team when they are asked to give opinions or are informed of important information and decisions that will impact them. Communication also creates a mutual trust between the informer and the informed. Trust can help create a pleasant work environment that fosters morale among employees, which increases motivation.

Good Supervisor or Leader (+)/Bad Supervisor or Leader (-)

It is believed that motivation can be influenced by certain leadership behaviors. Since a subordinate is dependent upon his superiors for his job, for the continuity of his employment, for promotion or raises, and for other personal and social satisfactions, he needs fair treatment by his superiors. It is believed that the subordinate's dependence upon his superiors reawakens certain attitudes and emotions, which were part of his childhood relationship with his parents (Adair, 1983).

The role of leader can highly influence the individual's job satisfaction in many other ways. Leaders can behave in ways that set peers against each other or in ways that increase group cohesiveness and social-need satisfaction. In addition to influencing the outcomes individuals actually receive, leadership style can influence employee perceptions of what they should receive. Moreover, none of us can be highly motivated working for someone we do not respect. Good leaders do not possess respect; they can only earn respect from the subordinates.

From the author's personal experience, leadership style strongly effects the author's job satisfaction. In particular, a lack of many leadership characteristics of his former superiors made it hard for him to retain his high morale. Prejudice, bias, and favoritism are not characteristics of good leaders. Based on the equity theory, a person determines whether or not he is being treated in a fair and equitable way. He compares himself to others, especially those who work within the same environment.

Good leaders also possess empathy, which is a process in which leaders project themselves into the workers' feelings and ideas. When a person puts himself in the other's shoes, an understanding of the other's needs can be developed. Hence, by satisfying the other's needs, that person is motivated.

Most importantly, a good leader must be a good communicator. Several studies have shown communication (i.e., the ability to interact effectively with others at all levels within and outside the organization) as the most critical skills for project managers (Gushgar et al., 1997 and Odusami, 2002). A simple praise from a superior can effectively boost motivation.

Bonuses (+)/Insignificant Bonuses or No Bonuses (-)

Most construction companies give annual bonuses to their management personnel. To some people, bonuses are viewed as a compensation for

accumulated overtime work. To others, bonuses are viewed as a tradition that companies must offer to the employees regardless of merit. Bonuses can be used as an effective incentive when administered based on specific merit(s) that employees accept such as a project's profitability or individual performance.

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This dissertation was typed by the author.