

AN ANALYSIS OF THE RELATIONSHIP BETWEEN WORK
EXPERIENCE AND THE CHANGE IN GOALS
OF TECHNICAL EMPLOYEES
OF AN OIL COMPANY

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PREFACE

This study is concerned with an analysis of the relationship between work experience and the change in goals of technical employees of an oil company. The objectives are to determine if these changes in goals could be measured and if goals could be used as a basis for motivation by management of individuals to higher performance. A model is used to demonstrate the different career phases of technical trained individuals.

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TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
II. SURVEY OF LITERATURE	7
III. RESEARCH DESIGN	31
IV. ANALYSIS OF DATA	44
V. SUMMARY AND CONCLUSIONS	58
A SELECTED BIBLIOGRAPHY	65

LIST OF TABLES

Table	Page
I. Motivation and Maintenance Needs of Technical Employees	9
II. Most Important Goals of Engineers as a Function of Age	11
III. Herzberg's Satisfiers and Dissatisfiers for Engineers	14
IV. Myer's Satisfiers and Dissatisfiers for Engineers	15
V. Landis' Factors Influencing Effective Performance for Engineers	27
VI. Landis' Factors Contributing Toward Promotion for Engineers	28
VII. Distribution According to Job Titles in Engineering Group	33
VIII. Educational Level of Engineering Group	34
IX. Classification of Engineering Group by Job Title and Work Experience	35
X. Average Ranking of Goals by Engineers	44
XI. Characteristics of an Ideal Engineering Organization	45
XII. Work Related Goals of Engineers	54
XIII. Effective Methods of Motivation by a Supervisor	55

LIST OF FIGURES

Figure	Page
I. Organization Chart for Special Engineering Group	32
II, Ranking of Job Related Goals	36
III. Sample of Main Survey Questionnaire	37
IV. Technical Employees Motivation Model	58

CHAPTER I

INTRODUCTION

This study is an analysis of the relationship between work experience and the changes in goals of technical employees of an oil company. The most difficult part of this project is to define what a goal is.

A goal is an end, a result, not just a task or a function to be performed. It is a place in space and time that describes the condition we want to achieve. It is a standard of achievement, a criterion of success, something tangible, measurable, and valuable that we are motivated toward. It is concrete and explicit, definitive and desirable and predetermined. It guides our actions and helps us plan as individuals and managers.

The company does not set goals. Only people can do that, although they are influenced by their perception of the company's philosophy. Giving men goals worth going after is the chief responsibility of a good manager. A few men will do this job for themselves, but most men won't make the effort. If men are to be raised above the levels of mediocrity, managers must assume the responsibility.

The eight essential elements of manpower motivation are as follows:

1. Structured involvement -- Decisions that call for action involve men.

2. Defined requirements -- A basic element in maintaining good rapport between men and management is mutual agreement about what is expected in the way of performance.
3. Positioned potentials -- The targets placed before the men are attainable targets.
4. Identified results -- Acknowledge results.
5. Measured performance -- Rate performance.
6. Coordinated programming -- All plans must be put in the perspective of long range plans.
7. Integrated innovation -- Men want to be able to express themselves in their activities.
8. Capitalized capacities -- Programs must be responsive to change to hold the interest of the men.

Some people are task-oriented rather than goal-oriented. The goal-oriented person seeks feedback and knowledge of results. He constantly puts himself into the position of being evaluated not only by his supervisor but by himself and the results of his work. He wants the feedback to be individualized; that is, he wants his own performance and not that of the group to be evaluated. The goal seeker is bound to see that one route to his personal goals is through the achievement of company objectives and to cooperate accordingly.

Most performance appraisal and review programs are concerned with acceptance of responsibility and accountability. Supervisors are aware that some people will not tackle a job unless they have a good chance of succeeding. This is a characteristic of goal seekers. Management must recognize that along with his addiction to challenge that is achievable, the goal oriented employee or manager also seeks

responsibility for the work,

To a goal seeker money is a standard of achievement, rather than an incentive to work harder. This is not to be interpreted to mean that the goal seeker is indifferent to salary raises, or discretionary rewards; it is simply that he uses money as a way of knowing how he is doing in relation to his personal goals and to company objectives. It is a form of feedback to which he looks for reflection of his individual effectiveness.

A person who prefers goals with either very high or very low risk is not actually motivated. We see that selecting an objective that has a high risk of failure and little chance of being achieved is a way for a person to avoid personal responsibility. A task seeker shuns feedback, evaluation, and personal responsibility. He prefers routine type jobs. The goal seeker prefers work that involves a moderate risk. The difference between a moderate risk and a high risk is in the perception of the individual making the judgement. What is a high risk to a task seeker may very well be perceived as a moderate risk to the goal seeker.

One of the most dangerous persons in an organization is one who follows the pattern of always taking on jobs that he does not have the ability to complete and then blaming others he has no control over for his failures. This type of malignancy in an organization should be compared with cancer in the human body.

The goal seeker gets much satisfaction from solving difficult problems; whereas, the task seeker gets satisfaction from completion of job. The task seeker does not want to complete the job with excellence, but simply to get the work out. He sees problems not as challenges,

but as threats to his security. The goal seeker likes problems that carry with them a moderate risk, but gives him a chance to prove himself and obtain feedback on his performance.

The strongly motivated person will come into occasional conflict with other people. If a company places a high value upon docile followers who respond well to suggestions and like to be told how to do their jobs, then it has no place for the goal-oriented manager or employee.

When the goal seeker wins, he aims a little higher the next time. When he loses, he will choose a more moderate goal with less risk.

There is no real black or white picture between the goal seeker and task seeker. The purpose here is only to focus on the differences in motivation patterns between individuals. We find people with all degrees of motivation who move in one direction or another during their life time.

A man must also maintain himself physically and feel safe and secure. Group administered benefits, automatic raises, working conditions, and job security are ways to serve employee maintenance needs. Low level maintenance needs must be fairly well satisfied before motivation needs emerge. Motivation needs are the factors that can produce effective job performance, because most of them are satisfied through work itself. Motivation seeking individuals may ignore a degree of dissatisfaction with physical conditions or security as long as the sense of achievement is high. Maintenance seeking people are never really satisfied, they only temporarily reach a level of no dissatisfaction. That is, if life and work are not satisfying, they will find a host of things to complain about.

The purpose of the study was to examine the relationship between age or work experience and the changes in goals of technical employees of a large oil company. The first objective was to determine if a change in goals could be measured for both supervisors and non-supervisors. The second objective was to develop a motivation model based on work experience of a technical employee's career from college to retirement.

The results of this study could be used as a plan for motivation of these employees to greater accomplishments. These accomplishments should lead to new and better individual and organization goals.

The scope and limitation of the study is limited to a group of seventy-two engineers in one work area of one specific oil company. The first requirement of the research design was to select a group that was large enough to get representative sampling and still have the advantages of many of the same environmental factors. The major differences within this group of engineers were length of work experience in both supervisory and non-supervisory positions and the individual goals of each member of the group.

A general outline of the study consists of five chapters. The introduction in the first chapter includes a general theoretical overview, purpose of the study, scope and limitations, and an outline of the study.

A survey of the literature available was summarized in the second chapter. The literature survey served as a basis for the research design. Certain conclusions of the study were also substantiated in this chapter.

The third chapter was about the research design. The fourth chapter was an analysis of the data secured from the study. Summary and conclusions were included in the fifth chapter. The major conclusion was the development of a technical employees motivation model.

CHAPTER II

SURVEY OF LITERATURE

One of the major finds in the technical literature is that for better utilization of technical persons, managers must know more about what motivates technical people. Age or work experience is an important factor in what motivates technical type people.

Landis beleives that the focal point should be the individual engineer concerned.¹ Here we should start with the young college graduate whose first job will prove to be a "culture shock" which requires one to two years in industry for acclimatization. By that time the young engineer will learn that his possible earlier fears are not justified; he will not become a cog in an impersonal machine. He will see that his contributions do influence the whole. The young engineer will have a high learning curve during his first few years on the job and he will be fairly well challenged.

In addition, he will be kept very busy. He will learn rapidly that the real engineering world is not as analytical as his college experience would have suggested and his science-based background will become tempered by engineering "know-how". During his first five to eight years he will also find his intellectual center of gravity; he will tend to drift into positions where the intellectual demands match his capabilities.

¹Fred Landis, "What Makes Technical Men Happy and Productive," Research Management, XIV (May, 1971), p. 25.

However, starting at about age 30, the attitude of the engineer tends to change. He will have to decide whether he hopes to enter management or, alternately, to become a technical specialist. His attitude will become more company and less professionally oriented. Family pressures, and with them financial pressures, start to build up. Any tendency for job-hopping is likely to have disappeared. The engineer in his 30's is actually more job-conscious than the man in his 40's.

There are also other factors entering at that age. The individual may well go through a crisis regarding the value of engineering to himself and to society. He will find it more difficult and less rewarding to work with "ideas" alone and will try to substitute working with "things" and "people", both of which tend to make him more visible in his organization.

By age forty the engineer will feel a lot better. Perhaps he has become more sure of himself, perhaps he has learned to live with limitations. Except when he is promoted, he is unlikely to voluntarily change his working patterns or his interests. He works hard, usually effectively, and has become completely enmeshed in the establishment. For many engineers, the forties and fifties represent their peak.

The motivation scientist has broken down the needs of individuals working for a large company into two definite groups. These are maintenance needs and motivation needs.

The needs have often been represented by inner and outer circles and are so depicted by Dr. M. Scott Myers in his article, "Who are Your Motivated Workers?",² These two types of needs are broken down further in Table I.

TABLE I

MOTIVATION AND MAINTENANCE NEEDS OF TECHNICAL EMPLOYEES

Motivation Needs

1. Delegation
2. Access to information
3. Freedom to act
4. Freedom to make mistakes
5. Goal setting
6. Problem solving
7. Performance appraisal
8. Discretionary awards
9. Profit sharing
10. Merit increases
11. Promotions
12. Job Transfers
13. Educational opportunities
14. Membership

Maintenance Needs

1. Automatic salary increases
2. Social security
3. Workman compensation
4. Fairness
5. Friendliness
6. Seniority on the job
7. Bulletins and handbooks
8. Job titles
9. Relationship with the company
10. Work rules
11. Lunch facilities
12. Restrooms
13. Temperature and lighting
14. Noise

Gomersall stated that where motivation needs are not fulfilled, the individual overwhelming concern is focused on maintenance needs,³ Before the motivational needs can be applied with full efficacy, it is necessary to satisfy, at least minimally, the maintenance needs of the individual. The two concepts of maintenance and motivation is not mutually exclusive. The lack of certain motivation needs can have a high backlash effect.

Continued ignorance of the motivational aspects of technical administration could lead to something less than the full bright

²M. Scott Myers, "Who are your Motivated Workers?," Harvard Business Review, (January - February, 1964), pp. 73-78.

³Earl R. Gomersall, "Current and Future Factors Affecting the Motivation of Scientists, Engineers and Technicians," Research Management, XIV (May, 1971), pp. 43-50.

future predicted for the engineering profession.

Recognition should be given to the fact that technical personnel are neither going to be motivated through films, memorandums demanding that everyone look motivated, nor through the hiring of an outside consultant to make the "one and lasting" inspirational speech on motivation.

Motivation must come from within the individual. The challenge for engineering management is to create the conditions for motivation. The challenge for industry is the creation of an atmosphere where emphasis can be placed on the motivational needs of the individual. The thought that lavish and extravagant maintenance needs will somehow compensate for individual desires to create something more than an opportunity to spend eight hours away from home to achieve a degree of financial security is as outmoded as the alchemist.

A bright future for the engineering profession through motivation can be a legacy, but only if it is made to happen through study, understanding, and intelligent application.

There is a direct relationship between goals and achievement needs. Achievement needs overshadow all other motivating factors with monetary rewards and non-monetary recognition ranking second and third. There may be a strong suspicion that the motivating factors normally associated with professionals (achievement needs, non-monetary recognition, challenging work, personal growth and responsibility) are considered so important because they are only partially satisfied.

The effects of age on goals was illustrated by Landis in Table II.⁴

⁴Fred Landis, "What Makes Technical Men Happy and Productive?", Research Management, XIV (May, 1971), p. 38.

TABLE II

MOST IMPORTANT GOALS OF ENGINEERS AS A FUNCTION OF AGE

Age - Years	Ranking of Goals
<u>Under 30</u>	<ol style="list-style-type: none"> 1. Work on projects requiring new technical learning. 2. Live in a desirable location. 3. Become more involved in decision making process. 4. Work on projects that influence business success of company. 5. Help company increase its profits. 6. Become more involved with technical aspect of work.
<u>35 - 39</u>	<ol style="list-style-type: none"> 1. Live in a desirable location. 2. Have employment stability. 3. Work on projects requiring new technical knowledge. 4. Work on projects that influence business success of company. 5. Help company increase its profits. 6. Work for a company with a good reputation.
<u>45 - 49</u>	<ol style="list-style-type: none"> 1. Help company increase its profits. 2. Live in a desirable location. 3. Have employment stability. 4. Work on projects that influence business success of company. 5. Gain knowledge of company management practices. 6. Work for a company with a good reputation.

As might be expected, the young generation is not concerned about job security; it wants to be challenged by technical problems. Employment stability is somewhat more important for the thirty-five to thirty-nine age group than the forty-five to fifty-five age group. This indicates the feeling of insecurity that many men in their thirties exhibit. On the other hand, older and established engineers associate fully with their company. They believe what is good for the company is good for them.

Herzberg found that engineers are not motivated by job security.⁵ However, the greater part of the research was carried out during a period of relative economic stability. There is definite evidence that engineers were not strongly motivated by job security during stable or expanded economics. However, when security seemed threatened by a deteriorating economics, it becomes an active motivator.

Responsibility has been found by other researchers to be an important motivator in itself.⁶ Assignment of responsibility should be accompanied by as many of the more important motivators as possible. A demanding job, heavy with responsibility, but not accompanied with appropriate material and psychological rewards, can easily lead to frustration and demotivation.

Managers can enhance the feeling of motivation in engineers by making individual job assignments interesting and challenging, by formulating significant milestones and end points into job content to promote a sense of accomplishment, by providing means to obtain

⁵F. Herzberg, B. Mausner and B. B. Snyderman, The Motivation to Work, (Wiley and Sons, Inc., New York, 1959).

⁶Ibid.

recognition within the organization as well as outside and by assigning ample rewards with corresponding responsibility.⁷

Early motivation studies were summarized in a 1971 article by Bucher and Gray.⁸ These motivation studies were performed by Herzberg, Myers and Hachman.

From 1954 to 1958, Frederick Herzberg and his associates at the Psychological Service of Pittsburgh interviewed a number of engineering personnel employed in industrial firms.⁹ The primary purpose was to study the relationship between job attitudes and performance.

Information was gained by asking each individual to discuss a time when he felt exceptionally good or exceptionally bad about his job. Each response was analyzed to identify the factor (or factors) that was the source of the respondent's feelings. After the source of his feelings or attitude were identified, the individual was asked to define the duration of the attitude. In this manner, the most significant cause, or factor, for a satisfying or dissatisfying attitude and the duration of the attitude was determined.

In Table III, Herzberg arranged satisfiers and dissatisfiers in an order which indicated their frequency of occurrence. The factors named most frequently are listed first. Numbers in parentheses denote the relative duration of the attitudes held by the respondents with (1) indicating the longest duration and (5) indicating the shortest

⁷George C. Bucher and John E. Reese, "What Motivates Researchers in Time of Economic Uncertainty?", Research Management, XV (Jan, 1972), pp. 19-31.

⁸George C. Bucher and Richard C. Gray, "The Principals of Motivation and How to Apply Them," Research Management, (May, 1971), pp. 12-23.

⁹F. Herzberg, B. Mausner and B. B. Snyderman, The Motivation to Work, (Wiley and Sons, Inc., New York, 1959).

duration.

TABLE III

HERZBERG'S SATISFIERS AND DISSATIFIERS FOR ENGINEERS

Ranking of First Level Factors	Duration
<u>Satisfiers (Motivators)</u>	
1. Achievement	(5)
2. Recognition	(4)
3. Work Itself	(2)
4. Responsibility	(1)
5. Advancement	(3)
<u>Dissatisfiers</u>	
1. Company Policy	(3)
2. Technical Supervision	(2)
3. Salary	(1)
4. Supervisory Relationships	(5)
5. Working Conditions	(4)

Dissatisfiers, as defined by Herzberg, are those factors that create dissatisfaction if they are not adequate in the eyes of the respondent. If they are not adequate, however, they do not necessarily produce satisfaction by themselves; but they eliminate dissatisfaction. They are necessary conditions that must exist before motivation can be attained through the presence of adequate satisfiers.

Another survey that yielded information pertinent to motivation

was conducted by M. Scott Myers at Texas Instruments Incorporated in the 1960's.¹⁰ Myers set out to determine the following:

1. What motivates employees to work effectively?
2. What dissatisfies workers?
3. When do workers become dissatisfied?

This study was initiated from the knowledge of Herzberg's earlier work and was conducted using the same interview techniques. It is not surprising that the results are compatible with Herzberg's findings. Myers findings are shown in Table IV.

TABLE IV

MYERS' SATISFIERS AND DISSATIFIERS FOR ENGINEERS

Ranking of First Level Factors	
<u>Satisfiers (Motivators)</u>	
1.	Achievement
2.	Recognition
3.	Advancement
4.	Responsibility
5.	Work Itself
<u>Dissatisfiers</u>	
1.	Company Policy
2.	Competence and Friendliness of Supervision
3.	Salary

¹⁰M. Scott Myers, "Who are your Motivated Workers?," Harvard Business Review, (January - February, 1964), pp. 73-78.

Ray C. Hackman of the Psychological Service of Pittsburgh began his research by re-evaluating the Herzberg data and attempting to improve upon the instruments for evaluating the motivation of workers.¹¹ He developed the Hackman Job Satisfaction Schedule, a motivation questionnaire, and used it in conjunction with personality and temperament tests to form a methodology for evaluating the motivational limits of individuals. Hackman surveyed hundreds of engineers. His results essentially confirm the relative importance of the Herzberg motivators for engineers. Hackman emphasized that it must be recognized that all workers are different and so are their work related motives. Management should recognize this fact, determine the motivational characteristics of each worker, and attempt to reinforce the work motives of each individual.

Cartwright attempted to relate motivation structure to goals.¹² The principles he proposed were as follows:

1. To induce a given action by mass persuasion, this action must be seen by the person as a path to some goal that he has.
2. A given action will be accepted as a path to a goal only if the connections fit the person's larger cognitive structure.
3. The more goals which are seen as attainable by a single path, the more likely it is that a person will take the path.
4. If an action is seen as not leading to a desired goal or as

¹¹Ray C. Hackman, The Motivated Working Adult, American Management Association, (New York, 1969).

¹²Dorwin Cartwright, "Some Principles of Mass Persuasion," Human Relations, 2 (1949), pp. 253-267.

leading to an undesired end, it will not be chosen.

5. If an action is seen as leading to a desired goal, it will tend not to be chosen to the extent that easier, cheaper, or otherwise more desirable actions are also seen as leading to the same goal.

Maslow suggested the following classification of motivation, proceeding from the lowest order of motives to the highest:¹³

1. Physiological -- the fundamentals of survival, including hunger and thirst.

2. Safety -- concern over physical survival, ordinary prudence which might be overlooked in striving to satisfy hunger or thirst.

3. Belongingness and love -- striving to be accepted by intimate members of one's family and to be an important person to them. This could also include others toward which the person feels close.

4. Esteem and status -- striving to achieve a high standing relative to others, including desires for mastery, reputation, and prestige.

5. Self actualization -- a desire to know, understand, systematize, organize, and construct a system of values.

This classification comprehends three essentially different types of motives:

1. Motives related to physiological needs.
2. Motives related to interactions with others.
3. Motives related to competence and self.

Each higher order of motive will not function until lower levels are satisfied.

¹³A. H. Maslow, Motivation and Personality, Harper & Row, (1954).

McClelland believed that the measure of motives should meet the following criteria:¹⁴

1. The measure should reflect the presence or absence of a motive, as well as variations in its strength. This generally requires an independent measure of the motive against which the measure in question can be compared and validated. Needless to say, this can be extraordinarily difficult to attain.

2. The measure should reflect variations only in the motive under analysis, without contamination from other psychological variables. The various tests used often are not pure indicators in this sense and, as a result, contain considerable bias.

3. The measure should give the same reading for an individual at many points in time under approximately the same conditions. If this criterion is met, it can be said that the measuring instrument is reliable.

Engle, Kollat and Blackwell believes that everyone has motives and goals stored in their memory.¹⁵ The unknown here is how the motive or goal will be activated in a given situation.

The two factors that are of special importance in this area are as follows:

1. Motive and goal strength.
2. Situational cues.

Some motives or goals are sufficiently strong that they will dominate

¹⁴David C. McClelland, Methods of Measuring Human Motivation, D. Van Nostrand Company, (1958), pp. 7-42.

¹⁵James F. Engel, David T. Kollat and Roger D. Blackwell, Consumer Behavior, Holt, Rinehart and Winston, (1968), pp. 61-70.

in many seemingly unrelated situations. One determinant of motive or goal strength is the frequency it has been reinforced by positive outcomes in the past in similar situations. A second determinant is the proportion of favorable to unfavorable outcomes. The higher the ratio of favorable outcomes, the greater the likelihood of motive and goal activation in a given situation.

Situation cues serve as triggers. Inputs from the environment activate an expectance that the goal will be satisfied.

A model of goal behavior was proposed by John Howard in 1963.¹⁶ According to the model, behavior begins with a felt need or drive represented as a goal. The individual then is attentive to some triggering cue which indicates that some alternative or alternatives will satisfy the aroused drive. The triggering cue activates the choice process, which in turn is affected by a state of predisposition to take the action under consideration. If this predisposition is low, then information search is activated from both personal and impersonal sources.

The more favorable experience with like actions in the past, the greater the chance of the primary action being taken to try to satisfy the goal. All cues have what Howard calls perceptual bias. This means that the process of perception or sizing up various environmental stimuli is likely to be distorted by an individual's attitudes or other psychological characteristics. In simple words, people tend to see what they want to see.

¹⁶ John A. Howard, Marketing Management Analysis and Planning, Richard D. Irvin, (1963), Chaps. 3-4.

A different view on goals was expressed by writer Joanna Barnes.¹⁷ She believes that nobody ever gets where he wants to go. Even those who get where they thought they wanted to go, quickly discover that it isn't enough; there's always something glimmering distantly on the road ahead, if only they can reach it. Even the achiever is doomed to failure, and each of us is forced to rely on the journey itself for an affirmation of his own worth.

Hughes considered the application of the goal-setting model to the individual.¹⁸ The eight steps that define this model are as follows:

1. Specific objectives -- The achievement-oriented person who constantly seeks goals must define his career objectives as well as his immediate, shorter range tasks and work objectives.

2. Importance of goals and motivation -- The individual must reaffirm his goals and review his strategies. He must be persuaded that his goals will meet his needs for achievement, growth, recognition, and responsibility. He must want to reach his goals.

3. Plans for action -- The plan prepared by the individual describes the process he will use to reach his goals.

4. Performance standards and measurement criteria -- Yardsticks and target dates must be determined before the work has actually been finished; otherwise it will be impossible for the individual to know when he has done a good job.

¹⁷Joanna Barnes, "Are We Turning the Pursuit of Happiness Into a Mindless Footrace?", Family Weekly, (August, 1974), pp. 4-16.

¹⁸Charles L. Hughes, Goal Setting, American Management Association, (1965), pp. 113-117.

5. Anticipated problems -- The individual must recognize that there will be barriers to achieving his goals. These obstacles in his way may be personal or organizational.

6. Required assistance -- No one achieves his goals entirely by himself; invariably he has some degree of assistance from others.

7. Organizational and individual goal reaction -- Ideally, the goals of the individual and the goals of the organization should interact so effectively that all become more achievable.

8. Actual performance measurement and evaluation -- The cycle starts with performance planning and ends with performance review.

The success of the performance review discussion between employee and supervisor will depend on the interpersonal competence of both, but particularly the supervisor. His role here is essentially that of a mediator between the individual and the organization; that is, he aids in the effective implementation of both the individual and the organizational goal-setting system.

Hughes attempted to answer the question, "What can the supervisor do for the individual employee?" as follows:¹⁹

1. Take responsibility for results and push the limits -- Supervisors who resist accepting the blame for failure to reach goals get the same response from employees. The healthy, creative organization accepts responsibility for its actions and habitually pushes the limits of acceptable practice. Creativity will survive only where policies and precedents are flexible.

2. Set challenges and targets -- Goal setting is more likely

¹⁹Charles L. Hughes, Goal Setting, American Management Association, (1965), pp. 56-59.

to occur when work is described in terms of opportunities to set goals-- in contrast to work which is defined as tasks to be performed, activities to be continued and processes to be administered.

3. Expose the employee to competition at his own level -- One of the factors in goal setting is the establishment of standards of performance. Employees should be encouraged to use other people as a means of comparison, to tell how well they are doing. Standards which are primarily determined by the individual himself are more meaningful to him and are sources of tremendous motivation.

4. Make feedback and evaluation available -- This will give people an external reference for their progress toward goals as well as the means of achievement. It has long been traditional for performance appraisals to dwell on personal attributes rather than progress toward goals. In control-oriented firms, high-level managers use merit rating as a lash to punish or threaten their subordinates.

5. Urge people to increase their abilities continually -- The rapid development of technology has caused anyone who is not continually increasing his ability to do his job to fall behind its requirements. Supervisors must assist people by stating work objectives in a way that indicates what new skills will be required of them.

6. Be sensitive to people and their work environment -- Sensitive supervisors are aware of their own needs and goals and thus recognize those of others. This can be depended on to have a significant impact on organizational effectiveness.²⁰ Insensitive managers using restriction, threats of punishment, and psychological distance to control

²⁰ Chris Argyris, Interpersonal Competence and Organizational Effectiveness, Richard D. Irvin, Inc., (1962).

employee behavior, cannot help but increase feelings of guilt and hostility toward management which results in interpersonal conflict.

7. Strive for balance between the long-range goals of the individual and those of the organization -- Short-term work-oriented goals must not conflict with long-term aspirations that are private as well as personal. While people are very likely to reach their personal goals through helping to achieve the company's goals, an individual must remain an individual.

One of the problems in raising performance of individuals to higher levels is the supervisor's failure to make the transition from a technical specialist to more senior responsibilities as a manager of men. They haven't accepted their responsibilities as developers of manpower.

Marvin believed any effective management development program that will lead to more productive executive performance must start with the establishment of mutually agreed-upon performance achievement responsibilities.²¹ The overall objective of a performance achievement responsibilities plan is to improve organizational performance by improving the performance of each individual in the organization. The performance achievement responsibilities plan focuses attention on the following:

1. Formalized goals -- If formal goals are not formulated, men set up informal goals that at best turn out to be inadequate, but often are incompatible with organizational needs. The plan itself

²¹Philip Marvin, Management Goals, Dow Jones-Irwin, Inc., (1968), pp. 116-122.

should provide a procedure for structuring formalized goals.

2. Individual involvement -- Men perform most effectively when they participate in planning programs whose success depends upon their involvement. Most men know more about the details of their own assignment than the men they report to. Their participation in planning is essential to the development of effective programs.

3. Attainable targets -- The best way to arrive at attainable goals is by teaming men and their managers together for the purpose of establishing short-, intermediate-, and long-range performance achievement requirements. Goals that don't have a reasonable chance of being met are meaningless for all purposes. The end results of effective goal negotiations is characterized by identifiable, understandable, reasonable, feasible, and supportable goals.

4. Integrated objectives -- For full effectiveness, short-, intermediate-, and long-range goals should be integrated. A man will do a better job, and his organization will benefit greatly, if what he's doing today is part of a plan for his longer range future. The mere attempt to tie immediate goals to future goals makes most men aware of their lack of long-range goals.

5. Mutual rapport -- Men and their managers can't get this far along in formulating performance achievement requirements without arriving at a mutual understanding. Understanding and respect go hand in hand, and both are important in developing good working rapport between a man and his manager.

6. Measurable criteria -- Managers must measure performance. If they don't, they can't distinguish between effective and ineffective performance. Managers should try to inform the men they evaluate

of the criteria they use for evaluation. Since managers always measure performance against some standards, criteria should be mapped out with men prior to the commencement of each phase of a program. There shouldn't be any secret about the measures of outstanding performance or mediocre performance. These tell a man what a manager expects of him in terms of quantity and quality. They also give a man, who is more familiar with the details of what he's doing than anyone else, an opportunity to contribute to the development of the criteria used to evaluate his contribution.

7. Focused action -- Knowledge of what is expected gives a man guidelines for focusing his efforts in directions where the rewards will be the greatest. The greatest single cause of poor performance is the lack of certainty about where to apply one's efforts.

8. Positioned performance -- A man not only wants to know what is expected of him. He also wants to know how good a job he is doing.

9. Programmed development -- The man on the move always wants to know what steps he should take to further strengthen and develop his capabilities. He wants to get ready today for tomorrow's opportunity. He is willing to invest his own time and money in his own future.

10. Management sponsorship -- One of the best ways for managers to show that they are interested in the man who is willing to work at developing his capabilities is to provide adequate assistance to individuals in helping them achieve their goals.

Home study, attendance at seminars, and classroom courses, for example, are only rewarding when they are part of an integrated program aimed at well-thought-out goals. Too many men are short-changed

in their advanced study because the things they are doing don't really contribute to their future progress. After a lot of time and effort has been spent on poorly-thought-out programs, it is frustrating for men to watch others who haven't worked as hard move forward faster.

Schleh listed the requirements of a good supervision as follows:²²

1. Set up objectives -- Employees are more effective when they know exactly what is expected of them in a particular period. The supervisor must sit down with each employee and come to a complete understanding as to what is expected of him.

2. Train his people -- Most people are willing to do a good job if they know what is expected of them and if they know how to do it. Training is a prime responsibility of a supervisor at any level.

3. Develop men -- Any firm must provide for replacements on key jobs and for promotions in periods of expansion. It generally requires time and patience for the supervisor to assign work that will allow the man to exercise judgement and thus develop himself.

4. Check and follow up on his people -- People may make errors. The supervisor must develop some plan whereby he checks periodically. Much of the follow-up has to be done in a fairly personal way to be sure that misunderstanding is minimized.

5. Discipline his people -- Any cooperative enterprise needs laws. The supervisor must police these laws or rules.

6. Stimulate his people -- Human beings do not react like machines. They react well to attention. The fact remains that people produce

²²Edward C. Schleh, Management by Results, McGraw-Hill Book Company, (1961), pp. 82-87.

more when they are constantly encouraged.

7. Install new methods -- There seems to be a natural inclination on the part of all employees to oppose new methods. It is the responsibility of the supervisor to install new methods and to get them into operations.

8. Call his people to account -- In order to stimulate people soundly in the right direction, they must have the feeling that they get the complete credit or discredit if a result is or is not accomplished. They must have a sense of accountability.

Each supervisor should approach his job with the feeling that it is his function is to make the man successful. He should be interested in getting each person to achieve the results that are expected.

Landis compared the factors that influence effective performance for engineers with the factors that contribute toward promotions for engineers. This comparison is shown in Table V and Table VI.²³

TABLE V

LANDIS' FACTORS INFLUENCING EFFECTIVE PERFORMANCE FOR ENGINEERS

Ranking in Order of Importance

1. Ability to get along with people
 - 2/3. Technical growth and development since college.
 - 2/3. Ability to express ideas well - orally and in writing
 4. Ability to sustain a continued effort
-

²³Fred Landis, "What Makes Technical Men Happy and Productive?", Research Management, XIV, (May, 1971), pp. 39-41.

TABLE V (Continued)

5. Ability to form rapid and effective judgements
 6. Ability to sell ideas to boss
 7. Business and management experience since college
 8. Material learned in college
 - 9/10. Encouragement and guidance from superiors
 - 9/10. Encouragement and guidance from co-workers
-

TABLE VI

LANDIS' FACTORS CONTRIBUTING TOWARD PROMOTIONS FOR ENGINEERS

Ranking in Order of Importance

1. Ability to get things done on time
 2. Ability to communicate both verbally and in writing
 3. Ability to get others to work effectively for you
 4. Willingness to assume additional workload
 5. Ability to form rapid and effective judgements
 6. Provide technical leadership
 7. Technical competence in specialty
 8. Broad technical competence in terms of company products or processes
 9. Knowing all aspects of the "business"
 10. Seniority
-

Perhaps the clearest impression about the actual workings of an engineering group in a company can be obtained from Table VI that ranks the factors contributing towards promotions. Ability to get things done on time, ability to communicate both verbally and in writing, ability get others to work effectively for you, willingness to assume additional workload and ability to form rapid and effective judgements can be categorized by a single phrase called high visibility.

Technical leadership and technical competence were only in sixth and seventh place. As long as the engineer is technically competent enough, the visibility factors will bring him to the foreground in the organization. Technical competence is assumed as a necessary but not sufficient condition for promotion.

Landis learned in interviews that the lack of technical competence at the first and second level of supervision proved frequently to be a bottleneck in managing men with ideas.²⁴ If a group is to be effective, the good technical supervisor should be able to serve both as manager and consultant.

Cronstedt contends that the sole objective of engineering management is to oblige the technical and scientific engineering personnel to fulfill its engineering responsibilities to the company.²⁵ The engineering manager must be an unusually perceptive engineer, quick to pick up new trends and forever on the alert to new developments.

²⁴Fred Landis, "What Makes Technical Men Happy and Productive?", Research Management, XIV, (May, 1971), pp. 39-41.

²⁵Val Cronstedt, Engineering Management and Administration, McGraw-Hill Book Company, Inc., (1961), pp. 6-12.

In the breath of his technical knowledge, the engineering manager must never permit himself to lag too far behind engineers who are working for him. He must also realize that in a rapidly expanding technology it is impossible for him to maintain proficiency in every area and at the same time to retain his competence in administrative matters.

CHAPTER III

RESEARCH DESIGN

The objective of this study is to determine the relationship between age or work experience and the change in goals of technical trained employees of an oil company. The results of this study could be used as a plan for motivation of these employees to greater accomplishments. These accomplishments should lead to new and better individual and organization goals.

This study will develop into an economic problem. With a controlled or limited amount of resources (time and money) available to the manager, how should he distribute these resources to different experience level groups to obtain the maximum economic rate of return? Should the manager follow the normal plan and concentrate on the new employees and the supervisors with the greatest potential?

The first requirement of the research design was to select a group that is large enough to get representative sampling and still have the advantage of many of the same environmental factors. The people used in this study consisted of a special engineering group of seventy-two engineers for an oil company. The reason for selecting this group of engineers to survey were as follows:

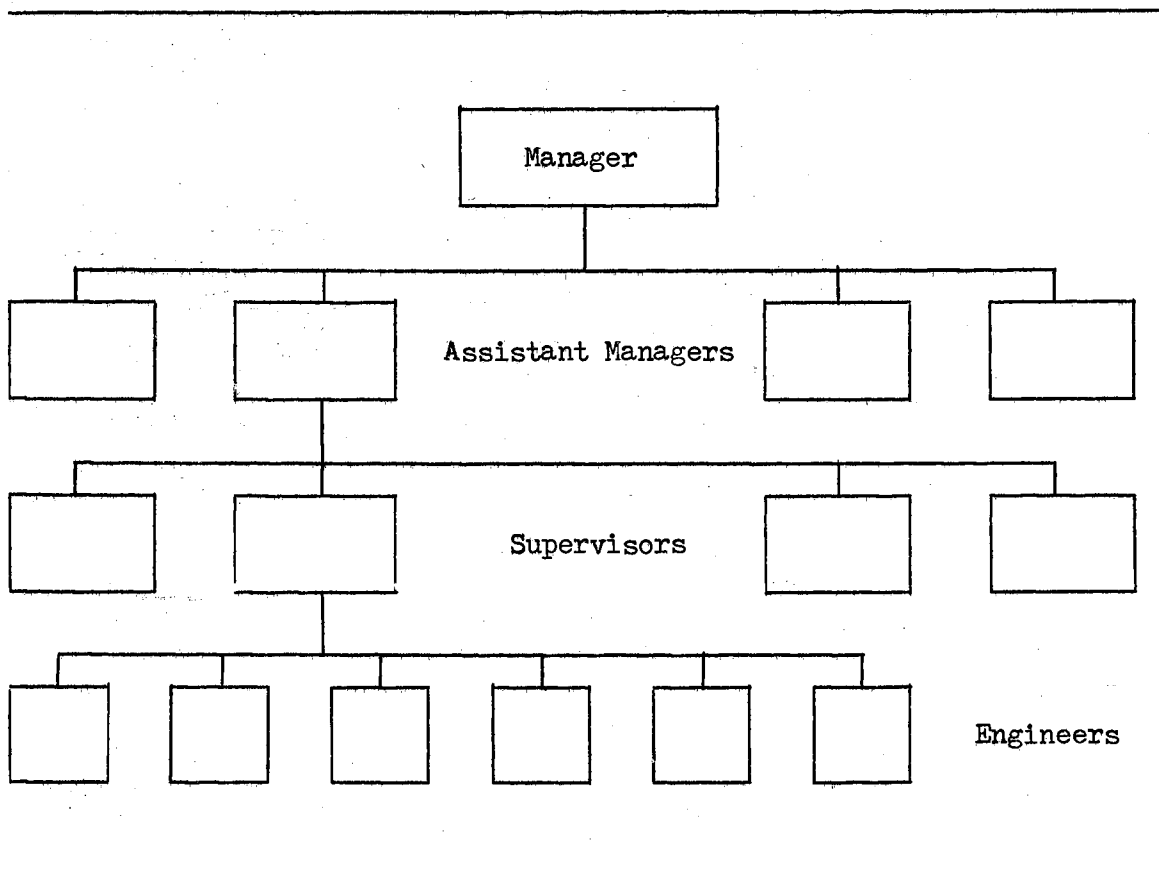
1. Engineers all live in the same geographical location.
2. Management of group has been constant for a number of years.
3. Similar work requirements for all engineers.
4. Level of education is uniform.

5. Work facilities are the same.
6. Large amount of movement from work unit to work unit reduces effects of different supervisors.
7. Uniform company program of benefits to meet group maintenance needs.

The major differences in this group of engineers were length of work experience in both supervisory and non-supervisory positions and the individual goals of each member of the group. An organization chart of the group is shown in Figure I.

FIGURE I

ORGANIZATION CHART FOR SPECIAL ENGINEERING GROUP



The organization chart shown on the previous page as Figure I is for representation purposes only. Only the persons that report to one assistant manager and one supervisor were shown. The distribution of people according to job titles is shown in Table VII.

TABLE VII

DISTRIBUTION ACCORDING TO JOB TITLES IN ENGINEERING GROUP

Job Title	Number
Manager	1
Assistant Managers	4
Supervisors	10
Engineers	55
Contract Consultant	1
Summer Employee Engineer	1
Technical Assistant	1
Total	73
Total Engineers	72

The next step in the research design would be to provide a brief history of the group. The special engineering group was organized eleven years ago when the company centralized its engineering services at one location at the company headquarters. From the group conception, the number of engineers has remained almost constant between sixty-five and seventy-five people. Of the original sixty-five engineers,

only about twenty-five remain in the group. The average turnover per year is in the eight to ten percent range. The present manager has been in charge of the group for seven years.

The building and office equipment were new when the group was organized. The office layout is based on an "open look", with only a private office for the manager. All employees are located on one floor, with facilities specially designed for an engineering group. A combination of dividers, carpets and sound proof tile makes the noise level very low. Three computer terminals and about forty electronic desk type calculators are available on the floor for engineers' use. Two conference rooms are available on the floor for meetings and private supervisor-engineer conferences.

All engineers in the group have at least a college education. The educational level of the engineers is given in Table VIII.

TABLE VIII

EDUCATIONAL LEVEL OF ENGINEERING GROUP

Educational Level	Number
Doctors Degree	2
Masters Degree	6
Bachelors Degree	64
High School	1

According to job title and work experience, the group can be

divided into four different classifications. The classification according to job title and work experience is shown in Table IX.

TABLE IX

CLASSIFICATION OF ENGINEERING GROUP BY JOB TITLE AND WORK EXPERIENCE

Job Title	Number	Work Experience
Managers	5	20 to 40 years
Supervisors	10	15 to 30 years
Senior Engineers	44	15 to 35 years
Junior Engineers	13	0 to 3 years

The next step was the selection of a preliminary survey to determine the feasibility of the final survey. The preliminary survey or pilot program was adapted from a test by David Sirota and J. Mitchell Greenwood. Sirota and Greenwood evaluated the difference between United States and foreign engineers. A large electrical manufacturer was evaluated.

A preliminary pilot program study was conducted on the special engineering group. The purpose of this study was to determine if it was possible to measure the differences between goals of a supervisor and non-supervisor related to age or work experience.

The people in the special engineering group were asked to rank their job-related goals. A sample of the questionnaire that requested ranking of job-related goals is shown in Figure II.

FIGURE II

RANKING OF JOB RELATED GOALS

Please rank the following (1 to 14)		
Rank	Goals	Description
_____	Training	Have training opportunities to improve your present skills.
_____	Challenge	Have challenging work to do - work that gives you a personal sense of accomplishment.
_____	Autonomy	Have considerable freedom to adopt your own approach to the job.
_____	Earnings	Have an opportunity for high earnings.
_____	Advancement	Have an opportunity for advancement to higher level jobs.
_____	Recognition	Get the recognition you desire for doing a good job.
_____	Security	Have job security.
_____	Friendly Department	Work in a department where the people are congenial and friendly to one another.
_____	Personal Time	Have a job which leaves you sufficient time for your personal and family life.
_____	Company Contribution	Have a job which allows you to make a real contribution to your company success.
_____	Efficient Department	Work in a department which is efficiently run.
_____	Benefits	Have good fringe benefits.
_____	Physical Conditions	Have good physical working conditions.
_____	Successful Company	Work for a company which is regarded in your country or community as successful.

The results of the pilot study indicated that there were definite measurable differences between the goals of supervisors and non-supervisors according to age and work experience. The next phase of the program was the preparation of a more compensative questionnaire to evaluate further the differences in individual goals.

The main survey consisted of the following sections:

1. Information
2. Instructions
3. Information Data Sheet
4. Q Sort Answer Sheet - Characteristics of an Ideal Organization
5. Ranking of Work Related Goals
6. Ranking of Effective Methods of Motivation by a Supervisor

A sample of the survey questionnaire is shown in Figure III.

FIGURE III

SAMPLE OF MAIN SURVEY QUESTIONNAIRE

I, INFORMATION

The attached survey is part of the research that I am doing to complete by December of 1974, a MBA from Oklahoma State University. I would appreciate your assistance and about one hour of your free time to complete the research survey.

Attached are the following:

1. Information data sheet
2. Q sort cards for an ideal organization
3. Q sort board
4. Q sort answer sheet

FIGURE III (Continued)

5. Goal ranking chart
6. Motivation ranking chart

II. INSTRUCTIONS

1. Fill out the information data sheet
2. Sort the 60 Q sort cards on the Q sort board into 9 columns to describe an ideal and effective work organization. The order of the cards in the separate columns is not important. Write the number of the Q sort cards on the Q sort answer sheet.
3. Rank the goals on the Goal Ranking Chart. The highest ranking is 1 and the lowest ranking is 6.
4. Rank the most effective method of motivation by a supervisor on the Motivation Ranking Chart. The highest ranking is 1 and the lowest ranking is 6.
5. Return the completed survey forms by company mail to C. A. Ayres, 10A1PB. Do not sign the survey forms as I do not wish to know who filled out what forms.

Thank You

III. INFORMATION DATA SHEET

(Check only one item in each section)

1. Current Job Description

- a. Technical
- b. Technical and Supervisory
- c. Supervisory
- d. Administrative

☐☐☐☐

FIGURE III (Continued)

Information on Q Sort Cards

1. Recognition and Appreciation
2. Self Respect
3. Creativity and Self Expression
4. Freedom and Independence of Action and Planning
5. Participation in Decisions
6. Pride in Accomplishment
7. Availability of Supervisors for Support and Consultation
8. Encouragement and Cooperation
9. Delegation of Authority by Supervisors
10. Consideration and Fairness in Dealing with Supervisors
11. Technical Competence and Ability of Supervisors
12. Adequate Recreational Facilities
13. The Geographical Location and the Community in which the
Organization is Located
14. Attractive and Clean Organization Surroundings
15. Temperature and Ventilation of Work Area
16. Adequacy and Condition of Organization Facilities
17. Convenient and Adequate Parking Facilities
18. Relationship of Organization Position to Personal Factors,
Motives and Values
19. Competitive or Market Orientated Wage
20. Frequency and Predictability of Wage Increases
21. Fairness or Equitableness of Compensation
22. The Amount of Pay, Income, Salary or Earnings Derived From
an Organization Position

FIGURE III (Continued)

Information on Q Sort Cards (Continued)

23. Opportunity for Professional Development
24. Overall Promotion Policies
25. Opportunity for Advancement in Rank Upon Merit
26. Promotion from Within the Organization
27. Opportunity for Advancement in Social Position
28. The Stability of the Organization as a Work Environment
29. A Feeling of Being Valued by the Organization
30. An Ability to Influence the Administrative Process of the
Organization
31. Tenure of Job Position
32. Steadiness of Employment
33. The Structure and Size of the Organization
34. Cooperation and Assistance of the Management
35. The Interest of the Management in the Individual
36. An Interpretation of the Fairness, Intentions and Good Sense
of the Management
37. Administrative Procedures and Policy
38. The Organization Foresight and Planning
39. Work Which is Undertaken in an Atmosphere of Cooperation
and Group Effort
40. Inter and Intra Departmental Relations
41. A Work Effort Which is Characterized by a Team Balance
42. Congenial Co-Workers on and off the Job
43. Competent Co-Workers
44. Pride in Belonging to a Balanced Work Group

FIGURE III (Continued)

Information on Q Sort Cards (Continued)

45. Availability of Information Dealing with New Organizational Developments
46. Manner and Fashion in Which Instructions and Orders are conveyed
47. Availability of Information on Organization Personnel Policies and Procedures
48. Availability of Information on Organization Lines of Authority and Policy
49. Provisions made by the Organization for Vacations and Holidays
50. Provisions made by the Organization for Meeting Personal Emergencies
51. Organization Structured Retirement Programs
52. Organization Programs Which Provide for Illness, Accident and Income Protection
53. Computer Time and Programming Assistance for Job Activity
54. Secretarial Help
55. Technical Assistants to Lighten the Routine Portion of Work
56. Leaves for Further Professional Development
57. Private Office Facilities
58. Organization Program of Assistance to Professional Societies
59. Organization Support of Professional Meetings
60. Organization use of Consultation Opportunities

V. RANKING OF YOUR WORK RELATED GOALS

(Please rank the following 1 to 6)

FIGURE III (Continued)

<u>Rank</u>		<u>Goals</u>
_____	Advancement	Have opportunity for advancement to higher level jobs
_____	Earnings	Have opportunity for higher earnings
_____	Security	Have job security
_____	Recognition	Get the recognition you desire for doing a good job
_____	Challenge	Have work that gives you a personal sense of accomplishment
_____	Training	Have training opportunities to improve present skills

VI. RANKING OF EFFECTIVENESS OF METHODS OF MOTIVATION BY A SUPERVISOR

(Please rank the following 1 to 6)

<u>Rank</u>	
_____	Fear
_____	Promotion
_____	Earnings
_____	Interest in work
_____	Challenging work
_____	Credit for good work

CHAPTER IV

ANALYSIS OF DATA

The data collection was divided into two phases. The pilot study and the general study. A summary of the data collected in the pilot study is shown in Table X.

TABLE X

AVERAGE RANKING OF GOALS BY ENGINEERS

Goals	Non-Supervisors	Supervisors	Data from Sirota and Michael
Training	10	9	3
Challenge	1	1	1
Autonomy	3 or 4	4	5
Earnings	2	2 or 3	6
Advancement	3 or 4	2 or 3	7
Recognition	5	5	2
Security	6	6	4
Friendly Department	13	10	8
Personal Time	9	7	10
Company Contribution	7	8	11
Effeciency of Department	12	11 or 12	9

TABLE X (Continued)

Benefits	8	13	14
Physical Conditions	14	14	12
Successful Company	11	11 or 12	13

The above test was originally used by David A. Sirota and J. Michael Greenwood to evaluate differences between United States and foreign engineers. The data shown in Table X is the average for United States engineers only.

The main study consisted first of a design of an ideal and effective work organization by use of the Q sort method. These characteristics of the organization were ranked from more important to less important. The tabulated results of the Q sort study are shown in Table XI.

TABLE XI

CHARACTERISTICS OF AN IDEAL ENGINEERING ORGANIZATION

Characteristics	Rank (1 to 60)
1. Recognition and Appreciation	
Junior Engineers	12
Senior Engineers	9
Supervisors	1
All Engineers	4
2. Self Respect	
Junior Engineers	7
Senior Engineers	3

TABLE XI (Continued)

Supervisors	3
All Engineers	2
3. Creativity and Self Expression	
Junior Engineers	27
Senior Engineers	6
Supervisors	18
All Engineers	15
4. Freedom and Independence of Action and Planning	
Junior Engineers	25
Senior Engineers	11
Supervisors	14
All Engineers	12
5. Participation in Decisions	
Junior Engineers	18
Senior Engineers	7
Supervisors	8
All Engineers	7
6. Pride in Accomplishment	
Junior Engineers	15
Senior Engineers	4
Supervisors	11
All Engineers	6
7. Availability of Supervisors for Support and Consultation	
Junior Engineers	9
Senior Engineers	16
Supervisors	7
All Engineers	9
8. Encouragement and Cooperation by Supervisors	
Junior Engineers	13
Senior Engineers	2
Supervisors	2
All Engineers	3
9. Delegation of Authority by Supervisors	
Junior Engineers	5
Senior Engineers	5
Supervisors	12
All Engineers	5

TABLE XI (Continued)

10. Consideration and Fairness in Dealing with Supervisors

Junior Engineers	41
Senior Engineers	14
Supervisors	13
All Engineers	17

11. Technical Competence and Ability of Supervisors

Junior Engineers	21
Senior Engineers	12
Supervisors	9
All Engineers	10

12. Adequate Recreational Facilities

Junior Engineers	54
Senior Engineers	56
Supervisors	55
All Engineers	58

13. The Geographical Location and the Community in which the Organization is Located

Junior Engineers	30
Senior Engineers	18
Supervisors	54
All Engineers	32

14. Attractive and Clean Organization Surroundings

Junior Engineers	36
Senior Engineers	41
Supervisors	45
All Engineers	46

15. Temperature and Ventilation of Work Area

Junior Engineers	41
Senior Engineers	46
Supervisors	42
All Engineers	47

16. Adequacy and Condition of Organization Facilities

Junior Engineers	28
Senior Engineers	35
Supervisors	41
All Engineers	36

17. Convenient and Adequate Parking Facilities

TABLE XI (Continued)

Junior Engineers	57
Senior Engineers	60
Supervisors	60
All Engineers	60
18. Relationship of Organization Position to Personal Factors, Motives and Values	
Junior Engineers	37
Senior Engineers	39
Supervisors	39
All Engineers	42
19. Competitive or Market Orientated Wage	
Junior Engineers	20
Senior Engineers	22
Supervisors	22
All Engineers	22
20. Frequency and Predictability of Wage Increases	
Junior Engineers	49
Senior Engineers	21
Supervisors	26
All Engineers	26
21. Fairness or Equitableness of Compensation	
Junior Engineers	22
Senior Engineers	10
Supervisors	16
All Engineers	14
22. The Amount of Pay, Income, Salary or Earnings Derived from an Organization Position	
Junior Engineers	23
Senior Engineers	13
Supervisors	20
All Engineers	19
23. Opportunity for Professional Development	
Junior Engineers	11
Senior Engineers	15
Supervisors	17
All Engineers	13
24. Overall Promotion Policies	

TABLE XI (Continued)

Junior Engineers	31
Senior Engineers	19
Supervisors	24
All Engineers	24
25. Opportunity for Advancement in Rank upon Merit	
Junior Engineers	6
Senior Engineers	1
Supervisors	4
All Engineers	1
26. Promotion from Within the Organization	
Junior Engineers	33
Senior Engineers	25
Supervisors	10
All Engineers	20
27. Opportunity for Advancement in Social Position	
Junior Engineers	55
Senior Engineers	59
Supervisors	59
All Engineers	59
28. The Stability of the Organization as a Work Environment	
Junior Engineers	26
Senior Engineers	32
Supervisors	33
All Engineers	28
29. A Feeling of Being Valued by the Organization	
Junior Engineers	24
Senior Engineers	8
Supervisors	6
All Engineers	8
30. An Ability to Influence the Administrative Processes of the Organization	
Junior Engineers	29
Senior Engineers	34
Supervisors	40
All Engineers	35
31. Tenure of Job Position	
Junior Engineers	56

TABLE XI (Continued)

Senior Engineers	47
Supervisors	44
All Engineers	51
32. Steadiness of Employment	
Junior Engineers	39
Senior Engineers	28
Supervisors	32
All Engineers	33
33. The Structure and Size of the Organization	
Junior Engineers	14
Senior Engineers	52
Supervisors	58
All Engineers	52
34. Cooperation and Assistance of the Management	
Junior Engineers	2
Senior Engineers	27
Supervisors	21
All Engineers	21
35. The Interest of the Management in the Individual	
Junior Engineers	10
Senior Engineers	23
Supervisors	5
All Engineers	11
36. An Interpretation of the Fairness, Intentions and Good Sense of the Management	
Junior Engineers	50
Senior Engineers	26
Supervisors	31
All Engineers	30
37. Administrative Procedures and Policy	
Junior Engineers	19
Senior Engineers	51
Supervisors	34
All Engineers	39
38. The Organization Foresight and Planning	
Junior Engineers	1
Senior Engineers	17

TABLE XI (Continued)

Supervisors	19
All Engineers	16
39. Work which is Undertaken in an Atmosphere of Cooperation and Group Effort	
Junior Engineers	8
Senior Engineers	33
Supervisors	23
All Engineers	25
40. Inter and Intra Departmental Relations	
Junior Engineers	3
Senior Engineers	48
Supervisors	38
All Engineers	29
41. A Work Effort which is Characterized by a Team Balance	
Junior Engineers	32
Senior Engineers	24
Supervisors	55
All Engineers	40
42. Congenial Co-Workers on and off the Job	
Junior Engineers	16
Senior Engineers	49
Supervisors	51
All Engineers	43
43. Competent Co-Workers	
Junior Engineers	4
Senior Engineers	29
Supervisors	51
All Engineers	43
44. Pride in Belonging to a Balanced Work Group	
Junior Engineers	44
Senior Engineers	42
Supervisors	46
All Engineers	50
45. Availability of Information Dealing with New Organization Developments	
Junior Engineers	53
Senior Engineers	44
Supervisors	47

TABLE XI (Continued)

All Engineers	31
46. Manner and Fashion in which Instructions and Orders are Conveyed	
Junior Engineers	17
Senior Engineers	20
Supervisors	15
All Engineers	18
47. Availability of Information on Organization Personnel Policies and Procedures	
Junior Engineers	52
Senior Engineers	37
Supervisors	27
All Engineers	37
48. Availability of Information on Organization Lines of Authority and Policy	
Junior Engineers	43
Senior Engineers	40
Supervisors	28
All Engineers	38
49. Provisions made by the Organization for Vacations and Holidays	
Junior Engineers	45
Senior Engineers	53
Supervisors	37
All Engineers	48
50. Provisions made by the Organization for Meeting Personal Emergencies	
Junior Engineers	38
Senior Engineers	31
Supervisors	35
All Engineers	34
51. Organization Structured Retirement Programs	
Junior Engineers	51
Senior Engineers	36
Supervisors	43
All Engineers	45
52. Organization Programs which Provide for Illness, Accident and Income Protection	

TABLE XI (Continued)

Junior Engineers	34
Senior Engineers	30
Supervisors	29
All Engineers	27
53. Computer Time and Programming Assistance for Job Activity	
Junior Engineers	47
Senior Engineers	50
Supervisors	36
All Engineers	44
54. Secretarial Help	
Junior Engineers	48
Senior Engineers	43
Supervisors	30
All Engineers	41
55. Technical Assistants to Lighten the Routine Portion of Work	
Junior Engineers	42
Senior Engineers	58
Supervisors	50
All Engineers	54
56. Leaves for Further Professional Development	
Junior Engineers	46
Senior Engineers	38
Supervisors	49
All Engineers	49
57. Private Office Facilities	
Junior Engineers	58
Senior Engineers	55
Supervisors	48
All Engineers	55
58. Organization Program of Assistance to Professional Societies	
Junior Engineers	59
Senior Engineers	54
Supervisors	57
All Engineers	57
59. Organization Support of Professional Meetings	

TABLE XI (Continued)

Junior Engineers	60
Senior Engineers	45
Supervisors	52
All Engineers	53

60. Organization Use of Consultation Opportunities

Junior Engineers	40
Senior Engineers	55
Supervisors	53
All Engineers	56

Each engineer was asked to rank six work related goals. These goals were ranked from more important to less important. The tabulated results of this ranking is shown in Table XII.

TABLE XII

WORK RELATED GOALS OF ENGINEERS

Goals	Rank (1 to 6)
<hr/>	
1. Advancement	
Junior Engineers	4
Senior Engineers	3
Supervisors	2
All Engineers	3
2. Earnings	
Junior Engineers	5
Senior Engineers	1
Supervisors	3
All Engineers	2
3. Security	
Junior Engineers	6
Senior Engineers	5

TABLE XII (Continued)

Supervisors	6
All Engineers	6
4. Recognition	
Junior Engineers	3
Senior Engineers	4
Supervisors	4
All Engineers	4
5. Challenge	
Junior Engineers	1
Senior Engineers	2
Supervisors	1
All Engineers	1
6. Training	
Junior Engineers	2
Senior Engineers	6
Supervisors	5
All Engineers	5

The last study was the ranking of six effective methods of motivation by a supervisor. The tabulated results of this study is shown in Table XIII.

TABLE XIII

EFFECTIVE METHODS OF MOTIVATION BY A SUPERVISOR

Motivators	Rank (1 to 6)
1. Fear	
Junior Engineers	5
Senior Engineers	6
Supervisors	6
All Engineers	6

TABLE XIII (Continued)

2. Promotion

Junior Engineers	4
Senior Engineers	5
Supervisors	4
All Engineers	5

3. Earnings

Junior Engineers	6
Senior Engineers	4
Supervisors	5
All Engineers	4

4. Interest in Work

Junior Engineers	1
Senior Engineers	1
Supervisors	3
All Engineers	3

5. Challenging Work

Junior Engineers	2
Senior Engineers	2
Supervisors	1
All Engineers	1

6. Credit for Good Work

Junior Engineers	3
Senior Engineers	3
Supervisors	2
All Engineers	2

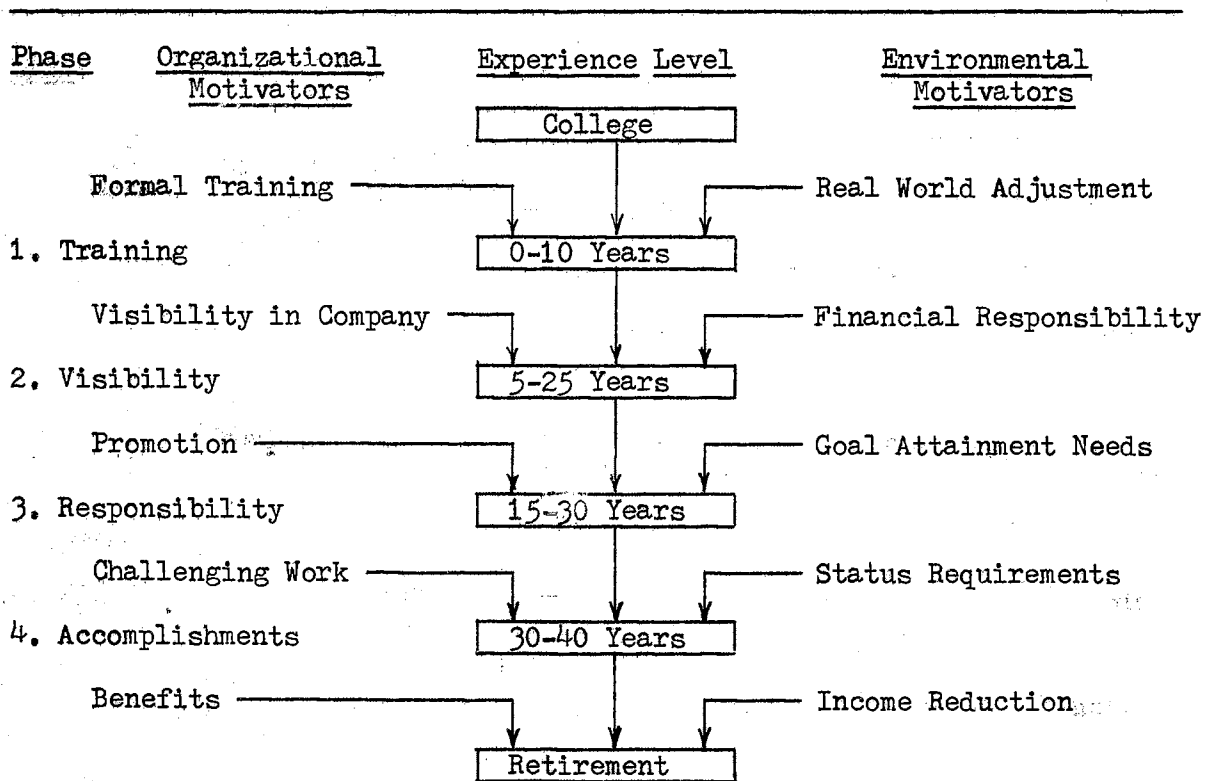
CHAPTER V

SUMMARY AND CONCLUSIONS

An Analysis of the total data shows that technical trained employees' goals do change with age and work experience. A model of the motivation behavior of technical employees in relationship to work experience is shown in Figure IV.

FIGURE IV

TECHNICAL EMPLOYEES MOTIVATION MODEL



The career of an engineer or other technical trained employee can be divided into four phases. These phases are as follows:

1. Training - The engineer needs to acquire the "tools of the trade" by both experience and formal training.

2. Visibility - The engineer needs to attain visibility and to build a reputation both in his work group and outside the work group in order to develop promotional opportunities.

3. Responsibility - The engineer needs either a promotion or a job assignment that he can take pride in. An engineer should either become a manager or a technical specialist.

4. Accomplishments - The engineer should be allowed wherever possible to complete projects and obtain a sense of pride in closure or completion. The engineer should be encouraged to take an active part in both community and professional organizations.

The number of years that a man spends in each phase depends both on the individual's goals and the promotional or technical specialist opportunities available within the organization. The performance that an individual makes in any one phase depends on the organizational motivators, the environmental motivators, and the phase interchange or feedback.

The phase interchange or feedback is the relationship between individuals in one phase of their careers with individuals in other phases of their careers. There appears to be considerable evidence that the assistance of supervisors and managers can be of primary importance to the individual's performance at different phases in his career.

It is important for an individual to have attainable goals, for

his goals to be known to his organization management, and for the management of the organization to both direct and inform the individual of the constraints on the opportunity available to him. The purpose of this study is to define the degree of change in attainable goals of individual engineers with change in age or work experience.

Certain conclusions were drawn based on data from the pilot study on goal ranking. The areas considered were training, earnings, benefits, job security and office facilities.

Training is a more important goal to junior engineers than older engineers. This is due to the fact that the only training that the junior engineer knows from his college experience is formal training. Formal training in junior engineers should be replaced as soon as possible by programmed experience or a "need to know" concept. Even informal training should be part of an overall organization personnel development program.

Earnings become a more important goal to non-supervisors than supervisors as they both grow older. Supervisors generally have higher earnings and more status benefits than non-supervisors. Higher earnings may be one of the primary methods of measure of value to the organization by the non-supervisor.

Benefits are more important to non-supervisors than supervisors. A non-supervisor may feel that benefits are a substitute for promotion or professional development. This is known as "the count your blessings approach".

Job security is higher for supervisors than non-supervisors. During periods of economic uncertainty, an organization may reduce

its number of members, but it will try to keep its basic supervisor structure or organization skeleton intact.

Physical work surroundings are more important to first line supervisors than non-supervisors and upper management. This is because the "open look" makes the private supervisor-employee conference more difficult.

A key point of any evaluation of goal ranking is that a goal becomes less important if you have achieved a satisfactory level in a given area. Some goals become important because you can never achieve them. An example of a goal that you may never completely achieve is challenge in your work. If you meet a certain challenge, you are always looking for a greater challenge. Maintenance-type goals will become the most important of all goals if you do not attain a satisfactory level.

A Q sort method was used to evaluate an engineer's design of an ideal and effective work organization. The purpose of this part of the study was to show the effects of age and work experience on the engineer's perception of an ideal and effective work organization.

Only a few of the sixty items evaluated in the Q sort study were selected for discussion. These items were selected to demonstrate differences between engineers based on age and work experience.

Opportunity for advancement in rank upon merit is the number one ranked item by all engineers. It is only slightly more important to senior engineers than supervisors. Most engineers feel that promotion is strongly interwoven with the fabric of goal achievement.

Self-respect is the number two ranked item by all engineers. Engineers as a professional group are more concerned about ethical

work practices than some other groups.

Encouragement and cooperation by supervisor is the number three ranked item for all engineers. This is more important to senior engineers and supervisors than to junior engineers. Older engineers develop a greater need for respect by their supervisors for above average work.

Recognition and appreciation is the number four ranked item for all engineers. This is the number one ranked item for supervisors. Supervisors may feel that the extra effort necessary to raise good work to excellent work is not always observed by upper management. Pride in work can only be satisfied by appreciation by someone else.

Delegation of authority by supervisors is the number five ranked item for all engineers. This is slightly more important for non-supervisors than for supervisors. Sometimes engineering organizations find it is easier to delegate responsibility than to delegate the corresponding authority. This policy leads to the development of a staff type organization instead of a line type organization.

Salary administration is characterized by items on competitive or market orientated wage, frequency and predictability of wage increases, fairness or equitability of compensation and the amount of earnings derived from an organization position. The average ranking of all engineers on salary administration was twentieth. Junior engineers found frequency and predictability of wage increase to be less important than did the senior engineers and supervisors. Senior engineers considered fairness or equitableness of compensation and the amount of earnings derived from an organization position to be more important than did junior engineers and supervisors. Salary

administration is usually consistent from engineering organization to engineering organization.

Promotional opportunities are characterized by items on overall promotional policies, opportunities for advancement in rank upon merit, promotion from within the organization and opportunities for advancement in social position. Opportunities for advancement in rank upon merit is the first ranked item for all engineers. Opportunity for advancement in social position is the fifty-ninth ranked item. Engineers believe that most engineering organization promotions are made on merit instead of social position.

Junior engineers consider items on the organization foresight and planning, competent co-workers, work which is undertaken in an atmosphere of cooperation and group effort, cooperation and assistance of management, and the structure and size of the organization more important than do senior engineers. These items all deal with the desire of the junior engineer to become a more productive member of the organization.

The purpose of the last study on ranking work related goals and ranking effective methods of motivation by a supervisor was to determine the relationship between a man's goals and the organization ability to help the man reach his goals.

Challenging work ranks first as both a goal and as a motivator for all engineers. The main problem here is to determine exactly what each person is searching for when he defines challenging work. This is an example of something that is important because it is never completely satisfied.

The number two goal for all engineers is earnings. As a motivator

earnings have a very low value. This is because of the difficulty for an individual to equate his performance with his earnings. Earnings are more important to non-supervisors than to supervisors. It is easier to equate performance with promotion than with earnings.

The third ranked goal by all engineers is advancement. Promotion is the sixth ranked motivator. Promotion has a very low value as a motivator because of the time interval between promotions. Advancement is not an important goal and motivator to junior engineers, older senior engineers and older supervisors. It is an important goal and motivator to young senior engineers and young supervisors.

Recognition is the fourth ranked goal by all engineers. Young engineers and senior engineers consider interest in work by supervisors the number one motivator. Supervisors consider credit for good work a more important motivator than interest in work by supervisors.

Training is very important to junior engineers. It is not so important to engineers with greater work experience. A formal training program is essential for the proper development of junior engineers.

My long range objective is to develop a type of performance evaluation using a combination of the following three methods:

1. Forced ranking evaluation by supervisors in a work group (Judgement Type).
2. Work output evaluation by use of detailed time sheets and charge numbers (Accounting Type).
3. Goal rating evaluation of individuals prepared by themselves (Goal Setting Type).

The problem of developing the above evaluation techniques is small compared with the problem of assigning relative weights to these

methods of evaluation. If any of the above methods of evaluation are used separately, certain types of individuals will tend to dominate the organization.

The forced ranking type of evaluation provides a measure of the political abilities of the individual. The work output evaluation method measures the working efficiency of an individual. The goal setting type of evaluation is a method of rating future potential of the individual.

The goal setting type of evaluation has the greatest potential of development of a balanced organization. A balanced organization is one in which you can control the future make-up of the organization.

For an effective goal setting type of evaluation, it will be necessary to develop a matrix type of different shading for evaluation of each specific type of goal. Individuals should be evaluated for extremes in either direction from the average in regard to given goals. Average relationships should be developed that relate age and experience to the specific job.

It is the individual that deviates from the normal that we are searching for. These individuals may be either our future problems or our future potential leaders.

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VITA

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Purpose of Study: The purpose of this study was to examine the relationship between age or work experience and the change in goals of technical employees of an oil company. The first objective was to determine if a change in goals could be measured for both supervisors and non-supervisors. The second objective was to develop a motivation model based on work experience of a technical employee's career from college to retirement.

Findings and Conclusions: It was found that the change in goals for supervisors and non-supervisors could be measured in relation to age or work experience. Evidence indicates that a technical employee in a large company goes through definite phases where training, visibility, promotion, and accomplishment each reach a maximum level of importance. The number of years that a man spends in each phase depends on the individual's goals and the promotional and technical specialist opportunities available within the organization. The performance that an individual makes in any one phase depends on the organizational motivators, the environmental motivators, and the phase interchange or feedback. The assistance of supervisors and managers can be of primary importance to the individual's performance at different phases of his career.

ADVISER'S APPROVAL

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