SUMMARY

Some Determinants Of Job Satisfaction

For a sample of 50 managerial-supervisory, 30 workstudy practitioners and 285 semi-skilled operators, data were collected concerning job satisfaction using 31 items from a questionnaire. Ten firms manufacturing different products and operating various types of financial incentive schemes were sampled. Data from operatives and reflecting five determinants were intercorrelated and analysed. Of the four determinants correlated with operator satisfaction, management controls and work study controls made the most significant contribution indicating that as these controls increased in effectiveness so did satisfaction. The level of replies from the three groups of respondents were measured and analysed to determine levels of communication but little relationship was found.

A high negative correlation was found to exist between satisfaction and labour turnover thus supporting previous research (Blum 1968). Other characteristics such as age, sex, length of service were not found to be significantly associated with satisfaction.

It was felt a relationship existed between satisfaction - certainty and alienation and efforts were made to measure these relationships. It was not possible to be too categoric and alienation and certainty reflected a state of mind nevertheless the results appeared to support assumptions made and alienation and uncertainty appeared to have causal relationships with management
and work study controls which correlate with satisfaction. In conclusion the results appear to substantiate this somewhat new approach and would present an interesting area for future research.
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**ABSTRACT**

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ABSTRACT

The aim of this research was to examine whether a number of selected variables contributed to operator satisfaction (OS). The variables were contained within specific factors, five variables within each factor, and the factors were:

- Operator Understanding (OU)
- Operator Satisfaction (OS)
- Work Study Control (WSC)
- Operator Control (OC)
- Management Control (MC)

Three groups in ten companies were asked to answer questionnaires, the groups were:
- Management
- Work Study
- and Operatives

In order to obtain a representative sample, companies using different financial incentive schemes were chosen. The replies were analysed in relation to the companies in each scheme. The schemes were:

- Regressive
- Straight Proportional
- Graded Measured Day Work
- Measured Day Work (No scheme)

The theory stated:--

"Workers like certainty and dislike uncertainty in some aspects of their working environment".
Prediction I

The more effective management and work study controls are seen to be by the operators, the higher the operator satisfaction and their certainty.

Prediction II

If management and work study controls are low then operator satisfaction will be high only if operator control is high.

Prediction III

The higher the level of communication as seen by operatives the higher the level of operator satisfaction and certainty.

All the independent variable mean scores were measured against OS, the dependent variable factor, using multiple regression analysis and Pearson's product moment correlation programme. An analysis of variance found the answers to be meaningful. The assumption and Prediction I were substantiated and Prediction II and III refuted.

OS was found to have a high negative correlation with Labour Turnover, and Productive Effectiveness was found not to correlate with any other variable. Background information, i.e. age, sex, length of service etc. was not significantly associated with any other factor in this research.

It is therefore possible to state that workers like certainty and dislike uncertainty in some aspects of their working environment and that as management and work study controls increase in effectiveness then so does OS. That generally the level of MCs and WSCs are predictors of the level of OS. That alienation and uncertainty have causal relationships with the levels of MCs and WSCs.
CHAPTER I

INTRODUCTION
The majority of people spend a large proportion of their lives at their place of work and thus the nature of the working environment is of great importance to them. In the past the working environment has been structured according to the needs of management alone: the criteria for success have been economic and technological rather than the needs of the individuals mainly responsible for achieving management's needs. In recent years, however, because of pressure from Trades Unions, individuals and some levels of management, industrialists have become receptive to the idea of producing a working environment in which both the economic and human needs can be fulfilled. The aims are to produce an environment which allows for high efficiency and a high level of worker satisfaction. It has been stated that these two aims appear to be incompatible, (Blum and Naylor, 1968) and although concerned with the relationship between satisfaction and performance the primary aim of this research is to relate certain aspects of the working environment to the prevailing level of operator satisfaction.

There has been a considerable amount of research concerned with operator satisfaction and a number of theories advanced. In general however these theories have been limited in their use to industry as they cannot be easily and unambiguously translated into practical policy. The aim of this thesis is to produce a theory which is both empirically testable and which can be of use to management and workers in pursuit of the aim of increasing operator satisfaction. It must be pointed out at this stage that the proposed theory (Chapter III) does not attempt to
be complete in the sense that all the determinants of operator satisfaction will be specified; indeed this would be almost impossible in one piece of research. Of the many important determinants of operator satisfaction that will not be examined are those concerned with social relationships at work and external factors and influences. The present theory is only concerned to discover the determinants of operator satisfaction within the working environment. It is felt preferable to produce an explicit if incomplete theory rather than an all embracing but necessarily more complex theory. As theories become more complex they tend to become more difficult to invalidate and it is hoped that the present theory is sufficiently simple and explicit not to suffer this defect. This therefore is the reason for excluding other variables from this research.

In this introduction the theory will be outlined together with the methods to be used in testing hypotheses generated by the theory. All the relevant points will be discussed in more detail later. It is thought useful, however, to present an overview of the project at this stage.

This research will be restricted to ten companies, where possible manufacturing different products or processes. It is also intended to select companies operating different types of financial incentive schemes in order to obtain a more representative sample.

Three specific groups will be identified—management, work study and operatives. The level of management selected will be that level of management who implement the policies at the company and exercise the controls considered necessary to achieve the required objectives and goals of the organisation.
Work Study Practitioners and Industrial Engineers are those specialists responsible for the application of economic and effective method study, and the compilation of standard times for each task. They are also seen to be responsible for the monitoring and control of existing financial incentive schemes. Work Study are also involved in dealing with queries that directly and indirectly affect productivity.

The operatives selected will be those of a semi skilled nature and working mainly on assembly and similar type work. The reason for selecting this type of operator is that they have more control over their respective output, as compared to operators working on machines or conveyor type work who have little or no control over their output. Operators in the first case are controlled by the machine speeds and horsepower, and in the latter case by the speed of the conveyor which is linked to the group performance. The term unskilled, semi skilled and skilled operatives will be used in a way recognised by industry. Whilst many people loosely associate skill with almost any person and situation, the more specific definitions recognised by industry are:

An unskilled operator requires no specific training, only an identification of duties or tasks, for example a labourer — sweeping up a prescribed area, pushing a barrow, loading and unloading material. A semi-skilled operator is one who requires from two weeks upwards in training — assembling components, operating a piece of equipment or a machine. A skilled operative — generally a tradesman, toolmaker, a machine tool setter — fitter — maintenance engineer — electrician. The latter are jobs that require a number of years training, often an apprenticeship.
The broad objectives having been identified, the area selected for each company will be that of a department involved mainly in assembly work and consisting of a selection of about twenty to thirty operatives; two to six work study practitioners, and two to twelve management.

The author has worked for over twenty years in industry from shop floor through various levels of management. He has also experienced the role of shop steward and been involved in an organisation where industrial unrest and a number of failures to agree occurred. The author has been made aware on numerous occasions of the reasons for satisfaction and dissatisfaction in the industrial situation, almost participant observation in hindsight. In his experience the most common complaints by workers and operatives have included the following:-

(1) 'You never know where you are; one moment you are working on one job and there is a material shortage so you have to wait, and when transferred to another job, there is confusion over the method.'

(2) 'Management often haven't a job to transfer us to so we can't earn bonus.'

(3) 'Inspection often pass work one day and reject it the next; you'd imagine they worked for another firm.'

(4) 'The supervisor has to be found when booking off one job and on to another and he is often out of the department.'
(5) "On many occasions you haven’t much idea what job you’ll be on the next day."

(6) "What with stop that job and start this one because it is more urgent you get fed up with the system, management and the job."

In contrast, the most satisfied operatives often had a foreman who:

'........ was a stickler for regulations but you knew where you were with him. He would chase production control for material, chase work study for methods and time standards, and monitor our earnings under the financial incentive scheme. He was certainly not liked but was respected for his efficiency."

It is from these remarks and others like them that the central assumption of the theory is induced. It is not claimed that the above statements were collected in any systematic manner but rather that their sheer frequency of occurrence in all manner of firms and from all types of operatives convinced the author that they are the most common expressions of operator dissatisfaction and satisfaction.

The central assumption of the theory is:— 'Workers like certainty and dislike uncertainty in some aspects of their working environment.' The central concept in this assumption is 'certainty' and although a full discussion of the concept will be reserved until later, it is appropriate here to say a few words about its meaning.
Psychologists have used the concept "uncertainty" with various degrees of preciseness, since Shannon (1948) derived a measure of uncertainty in the context of telecommunications. The measure was that $H_o = \log_2 N$, where $H_o$ is the uncertainty and $N$ is the number of possible outcomes or alternatives. In this research the term uncertainty will be used in the same qualitative sense. Uncertainty will be said to be proportional to the number of alternative events which could reasonably occur at any given moment. (Reasonably in the sense that the events are likely to occur.)

For example, if an operative knows that for the whole of a particular day, he will be on a given job, then his uncertainty about the nature of his work will be very low. On the other hand, if management are always making him change work without warning and have given him no assurance about his present job, then his uncertainty will be high. It should be noted that his uncertainty is not a function of how often he is switched from job to job but rather, how often he is switched without prior warning. If he knows that after lunch he will be put on a different job, then he has no uncertainty about this aspect of his environment.

Even though the meaning of the central concept of the theory has now been clarified, it will not generate testable hypotheses until the domain for which the assumption is claimed to be true is stated. The assumed domain of the central assumption will be derived from the author's industrial experience. It will be these assumptions that will be tested, in fact unless every possible aspect of the working environment were investigated, the central assumption, as for most theories, cannot be empirically discredited.
The particular aspects of the working environment in which the operatives like certainty and dislike uncertainty are assumed to be the following:

(1) **The Supply and Allocation Of Jobs**

Most operatives like to be gainfully employed especially if they are applied with a financial incentive scheme. Even if they are not, it is not unusual for operatives to make a job last if there does not appear to be work in the pipeline. Plenty of work generally reflects a busy organisation with a full order-book.

(2) **The Supply of Material**

This is not the same as supply of jobs. Jobs may be plentiful, but if there is a material shortage, idle and waiting time emerges. Operatives would be unable to maintain earnings under a financial incentive scheme. Apart from this factor boredom could set in, for not having work is quite often far more boring than working on a supposedly boring job.

(3) **The Control Of Scrap and Rectification**

There are many aspects that contribute to scrap and rectification which are beyond the control of the qualified operative. For example poor quality material supplied, tolerances unnecessarily applied that are difficult to maintain. Inspection whose subjective judgment differs from that of production.
(4) The Quality of Inspection

Inspectors are often seen by operatives as working for a different organization. To operatives they have two judgments, the product or component either passes or fails, there is no in between. Quite often their measurement is only their opinion - for example the finish of an article or its appearance.

(5) Machine Breakdown — Faulty Equipment

This type of occurrence also means frustration for operatives. They often cannot maintain any form of output and again if they are working to a financial incentive scheme their earnings are affected. It also produces a poor opinion of management and the department.

(6) The Setting of Time Standards

This is one of the most important areas of the industrial environment. Operatives often compare the time standard they are working to with that of their fellows. If any anomalies exist they are quick to recognise them. They are also as quick in recognising work study practitioners who do not understand their job.

(7) The Dealing with Queries

Operatives that are held up on a job because a query has arisen that could be related to material, inspection, supervision, planning, work study and so on become extremely frustrated. It is a situation they generally have no control over.
This depends considerably upon the type of financial incentive scheme in operation. Often operatives can calculate boms without understanding formula. Where they cannot it leads to frustration and acts as a disincentive.

Much of the material discussed previously could well be reflected in policies. The operatives form impressions of management and quite often it is as a result of being subjected to rules and regulations with which they do not agree that management are viewed with disapproval.

Pride and self respect are so often affected by the working environment. Many variables contribute to this area, but for this research it is deemed to be orderliness, cleanliness, temperature, hazards, etc.

People invariably respect fairness and impartiality, these factors coupled with ability tend to contribute to the operatives well being in the industrial environment.

Generally ranked first by many researchers into operator satisfaction, this factor must in consequence have considerable important connotations with certainty and uncertainty.
These factors can be usefully categorised according to the people responsible for controlling the degree of uncertainty. Thus for factors 1 - 5 and 9 - 12 management are responsible and for factors 6 - 7 work study are responsible. Although it could be argued that planning departments, inspection departments and maintenance departments contribute to some of the management areas, nevertheless management as a whole bear the final responsibility. Ultimate responsibility cannot be delegated. Thus the degree of uncertainty which the operative experiences in the above areas can be said to be directly proportional to the degree of management and work study control. (MC and WSC respectively). The higher the degree of control exercised by these groups in these situations the less uncertainty the operatives will experience.

This leaves the 8th item which does not fall naturally into either of the two categories. The degree to which an operative can calculate his bonus will be a function of two factors: the complexity of the financial incentive scheme employed and the degree to which he understands the scheme. All financial incentive schemes are essentially a function relating the amount an operative produces to the amount he earns. Some schemes are very simple as in the case of piece work where an operative receives a fixed amount for each item produced. Others are extremely complex often having discontinuous functions relating earnings to the amount produced. Thus any one operative might be able to calculate his bonus precisely under a simple scheme but be unable to do so with a complex one. Further, for any given type of scheme, operatives will differ in their ability to understand it.
In order to obtain a wide range of scores of operator understanding (OU), firms with different types of financial incentive schemes will be sampled.

Thus two areas have been isolated in which it is claimed operators dislike uncertainty. These are those controlled by management and work study whilst operator understanding is probably the prerogative of both.

Operator satisfaction in this theory assumes the role of a dependent variable and the levels of management control, work study control and operator understanding are independent variables which it is assumed will predict the level of operator satisfaction.

The more effective the above variables are seen to be, the less uncertainty, and therefore the less need or indeed ability of operatives to change the situation. If MC and WSC are ineffective then the resulting uncertainty will cause operatives to be dissatisfied. However it is well known that operatives frequently use the existence of ineffective or poor controls to manipulate the uncertainty themselves (Roethlisberger and Dickson, 1964, Donald Roy 1952). In order to obtain a measure of the prevailing uncertainty, it is necessary to measure the degree of this manipulation by operatives or as it will be termed here, operator control (OC).

We now have four independent variables:--

OU
WSC
OC
MC

As previously stated these will be measured against O.S.
Uncertainty will not be measured directly but will be a reflection of the operators identification of the level of controls effected by management and work study in their working environment. If the level of controls are seen to be high then it will be assumed that the operators have certainty and therefore high satisfaction. If management and work study controls are low, then the operators will have uncertainty if operator controls are also low. If they have uncertainty and high satisfaction we would expect operator controls to be high.

One final cog in this industrial research wheel is required. In the discussion of the meaning of uncertainty, it was stated that prior knowledge of future events reduces uncertainty. Firms differ widely on the degree to which they keep operatives informed of current policies, procedures and decisions. In other words communication is a most important factor that also contributes to the state of operator satisfaction. Thus it is assumed that the higher the level of communication the higher the level of satisfaction.

Before ending this introduction the theory will be restated.

(1) Workers like certainty and dislike uncertainty in some aspects of their working environment.

(2) The more effective management and work study controls are seen to be by the operatives, the higher the operator satisfaction and their certainty.
(3) If Work Study and Management Control are low then Operator Satisfaction will be high only if Operator Control is high.

(4) The higher the level of communication as seen by operatives the higher the level of operator satisfaction and certainty.

The next chapter will be devoted to research contributions into operator satisfaction and motivation and the results discussed in the context of the present theory.
CHAPTER II
RESEARCH REVIEW

Status Of Job Satisfaction

According to Blum (1968), job satisfaction is the result of various attitudes possessed by an employee. That these factors are related to the job and are concerned with specific factors such as: wages, supervision, steadiness of employment, conditions of work, advancement opportunities, recognition of ability, fair evaluation of work, social relations on the job, prompt settlement of grievances, fair treatment by employer and others. He then identifies other factors that contribute to job satisfaction, such as family relationships, social status, recreational outlets and politics. It is the intention within this chapter to examine specific research areas related to job satisfaction, to comment upon them, to examine the factors that have contributed and finally compare these factors with those selected for this research.

A wide range of research has been conducted within the areas of job satisfaction and motivation, culminating in many different assumptions and theories. Those researchers that have achieved recognition and eminence in this area are many and a review will now be made of some of the most prominent:

F.W. Taylor

Commonly called the 'Father of Scientific Management', one of the first to break a job into constituent parts known as the elements of the job. Emphasised the need for effective method study and developed principles of management.
(4) Full Hospital Insurance
(5) Closed shop
(6) Extra Vacation

Hospital insurance was preferred followed by closed shop principle, 6 per cent pay rise came third.

It must be concluded that money is not a sole motivator or satisfier.

**Maslow's Motivation/Job Satisfaction Theories (1954)**

Maslow's model can be illustrated thus:
A hierarchy or needs structure. Maslow states that man is continually in a state of imbalance or disequilibrium. To correct this imbalance man is motivated to satisfy the current need, and when satisfied he obtains a state of equilibrium.

The most important are the basic needs, when these are satisfied man moves up the ascending scale to the higher order needs. It is homeostatic in that man is continually making the necessary adjustment to obtain equilibrium. An important concept of Maslow's is that:

"More basic need groups are said to be prepotent in that they will take precedence over all those higher in the hierarchy."

Porter (1961) applied Maslow's model to industry to see if it described different levels of management. His assumption was the higher the level of management the more important the higher order needs became.

In his first study he surveyed 64 foremen and 75 middle managers from three different companies. The questionnaire contained 15 items designed to provide information about five different motivational need classes derived from Maslow. The respondents were asked:

(a) How much of this need is there in your present job?
(b) How much should there be?
(c) How important is it to you?

A seven point rating scale was used. Range, minimum 1 --- to --- maximum 7.
Both groups identified security and self actualisation as having a high relative importance. Middle management reported a large deficiency in self actualisation only, whereas the foremen reported a large deficiency in esteem, autonomy and self actualisation. Thus the basic level of satisfaction was found to be lower for foremen than for middle management. Maslow's theory predicts that the most deficient needs should also be the most important. This prediction is not borne out in this research. For example foremen reported.

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<tr>
<th>Need</th>
<th>Relative Deficiency</th>
<th>Relative Importance</th>
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<td>Esteem</td>
<td>Large</td>
<td>Small</td>
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<tr>
<td>Autonomy</td>
<td>Large</td>
<td>Moderate</td>
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Porter (1962)

In his next study Porter surveyed a nationwide sample of 6,000 managers and executives. The results from 1916 usable returns indicated a strong relationship between the levels in management and the need deficiencies, with self actualisation and autonomy being the least fulfilled.

In a further study Porter examined need fulfillment and need importance as a function of horizontal relationship between line and staff managers. He found a greater need fulfillment was required by line managers than by staff management. Summary of Porters application of Maslow's theory.

(1) Results show that peoples evaluation of needs do not match Maslow's entirely.
(2) Self actualisation and autonomy are respectively 1 and 2.

(3) Security tends to come before Esteem and Social needs.

(4) The homeostatic cycle did not seem to operate.

None of the results emerging give any indication of what motivates a man to perform well at his job. It must also be asked whether an emotional state alone can be a determinant of behaviour? In this research satisfaction has the status of an independent variable.

**Vroom's Model of Motivation: A Decision Theory Approach**

Vroom's basic assumption is that an individual's motivation to carry out an action will depend on his view of the consequences of that and alternative actions.

This is very much in line with a commonsense view of human behaviour; people only do what they do because they think it will have certain consequences for them. However Vroom has attempted to formalise and quantify this idea and, as a result, his language is sometimes less than clear.

The basic propositions of his theory set out in Blum can be expressed as follows:-

(1) Every action is instrumental in producing consequences for an individual.

If I change my job - (a) I earn more money

(b) I have further to travel
People evaluate the consequences of their actions in the following way:

Firstly they judge whether it is pleasant or unpleasant.
Secondly they make some quantitative assessment of the degree of unpleasantness or pleasantness involved.
Thirdly they make some estimate of how probable each consequence is.

(a) I earn more money. Pleasant +9/10: probability certain 1.0.
(b) I travel further. Unpleasant -6/10: probability not quite sure 0.7.

The value of each consequence for the individual can then be estimated by multiplying its probability by its attractiveness.

(a) I earn more money. +9 times 1.0 p. = +9.0
(b) I travel further. -6 times 0.7 p. = -4.2

And the value of the action for the individual, can be estimated by adding up the values of its consequences.

I change my job = (a) more money i.e. +9.0 plus
(b) longer travel i.e. -4.2
= +9.0 + -4.2
= +4.8

The total value of the action i.e. +4.8 is called the valency of the action.

An individual's motivation to perform an action is directly proportional to the valency of the action for him; low valency = low motivation and high valency = high motivation.
(6) Given a choice between actions - going to the pub +7 or washing the car - 2 - the individual will choose the one with the highest valency - going to the pub.

Before leaving the basic propositions of the theory, it is important to note that the entire decision making process represents the individuals subjective estimate of what is going to happen.

- I may think I will get a higher salary in my new job though in fact I do not. The truth of my beliefs is irrelevant; what makes me take the job is the belief that I will get a higher salary if I do.

Another consequence of the subjective nature of these decisions is that the way people evaluate the consequences of their actions and the importance they attach to them will be determined by their personality makeup, attitudes and personal history. So the same decision will result from a very different process from one person to the next.

- One man may judge having to work hard as a challenging and favourable consequence to an action, while another may judge it to be very unpleasant.

- One man may judge the use of the firm's car as a favourable consequence to his job, while another may judge it to be unfavourable because that particular make of car is in his experience highly unreliable.

In the industrial setting, Vroom's theory would predict that a man's motivation to do the job will be directly proportional to the valency of that job for him i.e. how attractive that job is to him in terms of its consequences.
A second tempting inference to draw is that a man's motivation to do the job will be reflected in his performance on the job; one would suppose that the motivational factors that lead a man to do a job will at least be related to the factors that determine whether he does it well or badly. If one could not say this, we should have to say that there are at least two types of motivation — motivation to do something and also motivation to do that something well. On the face of it a distinction like this seems rather odd, but later discussion will lead us to a conclusion of this kind.

Before discussing research on Vroom's theory, it is important to make note of one assumption that all investigators have made.

It was noted earlier that Vroom's theory describes a highly subjective process of reasoning that varies for each individual. Any research on this process would entail interviewing each individual to find out his subjective assessment of the consequences of his actions for him.

In contemporary research this time consuming approach has been avoided by assuming that there are certain objective features of the work environment, which have roughly the same subjective values for all workers. Whether this assumption is legitimate is questionable.

In Blum is found a description of representative research on Vroom's theory.

In this study, motivation to do the job was operationally defined in terms of measures of absenteeism and labour turnover.
Valency or attractiveness of the job was operationally defined in terms of a measure of job satisfaction.

According to Vroom's theory, motivation to do a job is directly proportional to its valency; and Blum reports that a moderate correlation obtained between absenteeism/turnover (motivation) and job satisfaction (valency).

But what about the second inference that motivation will be directly proportional to performance or productivity on the job? Blum reports here that no relationship was found, which is not surprising since it is known that no consistent relationship between job satisfaction and productivity has been found.

But the problem is how does Vroom's theory explain the lack of such a relationship. According to Blum, Vroom's theory can account for this by specifying that motivation to do a job simply means 'motivation to work sufficiently hard to keep the job' but not motivation to do well on the job.

As stated earlier the discussion now leads to the conclusion that there are at least two types of motivational factor; the first is Vroom's motivation 'to work sufficiently hard to keep the job' and the second factor is that which motivates men to high performance and productivity on their job. And since it is the second factor that management is predominantly interested in, Vroom's theory is apparently of little help.
It is certainly useful to have a theory which suggests a way of analysing the motivational process, but if this theory can only explain the occurrence of absenteeism and labour turnover we are left with a somewhat negative approach to the problems of human motivation and work.

It was noted earlier that for reasons of experimental convenience investigators have assumed that certain features of the work environment such as pay, have a consistently high subjective value for all subjects.

Thus in the above study, the valency of a job was defined in terms of a measure of job satisfaction, and it is the case that many objective features of the work environment show a positive correlation with job satisfaction e.g. job interest, social acceptance, attitudes of supervision, status.

To this extent the assumption in question is legitimate.

However it does rule out possibility of investigating individual differences e.g. personality factors, and Vroom's theory would suggest that individual differences have a very strong influence on valency.

Vroom himself reports evidence which bears out the last point.

Supervisors were measured on the personality variable of authoritarianism - respect for authority - on an attitude questionnaire.

Their satisfaction with their jobs (valency) was also measured. And finally they were asked to estimate the degree of influence they could exert over their superiors.
Supervisors who scored high in authoritarianism, showed no relationship between job satisfaction and the amount of influence they could exert over their supervisors.

On the other hand, supervisors who scored low in authoritarianism, showed a positive correlation between the amount of influence they could exert over their superiors and their job satisfaction i.e. if they could exert a great deal of influence they were job satisfied and if their influence was small, they were extremely dissatisfied.

Personality variables can then influence the valency of an action or job.

In conclusion, three questions are left concerning Vroom’s theory:

(1) To what extent does he explain motivation to do well on a job i.e. performance and productivity, - if at all?

(2) Valency as he defines it is a subjective concept - to what extent can it be made objective for research purposes?

(3) Is it plausible to believe that people consciously or unconsciously go through a process of addition and multiplication of variables when they decide to do something e.g. get married?

Thus Vroom’s theory is untestable therefore is of little practical use.
Herzberg's Two Factor Model Of Motivation

This theory emphasizes the contribution of job satisfaction to motivation, and can be stated in terms of three main principles.

(1) Motivation is determined by two types of factors:
   (a) Hygiene factors which lower satisfaction when poor, but cannot increase it.
   (b) Motivators which enhance job satisfaction.

(2) Each factor affects performance and output in different ways:
   (a) Hygiene factors can increase dissatisfaction and lower output.
   (b) Motivators can increase satisfaction and so increase performance and output.

(3) Job enrichment will increase the motivators, satisfaction and output.

Thus the theory makes a specific statement about the motivational factors underlying performance and output.

Initial Research

In this study Herzberg interviewed 200 engineers and accountants. Subjects were asked to describe critical incidents at work that led to high or low job satisfaction.

Their replies had to satisfy certain restrictions.

(1) They had to be in the past.

(2) They had to be related to job satisfaction.

(3) It had to result in extremely high or low job satisfaction.

(4) They had to be objective events in the work situation.
They were also asked to estimate the duration of their feelings of satisfaction or dissatisfaction.

476 critical incidents were analysed for their causes, and two types of factor emerged from the analysis:

(a) Hygiene factors which led to dissatisfaction and were temporary.

(b) Motivators which led to satisfaction and were longer lasting

Typical of hygiene factors were - company policy
supervision
social relationships
working conditions

Typical of motivators were - achievement
recognition
the work itself
responsibility
advancement

Salary was an ambiguous factor which occurred in both categories.

It is important to note however that Herzberg's theory can be interpreted in two ways yielding two types of prediction.

<table>
<thead>
<tr>
<th></th>
<th>Low Job Satisfaction</th>
<th>High Job Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygiene Factors</td>
<td>A low</td>
<td>A High</td>
</tr>
<tr>
<td>Motivators</td>
<td>B low</td>
<td>B High</td>
</tr>
</tbody>
</table>

Two interpretations or sets of predictions can be made for the conditions described in the above matrix.
The first interpretation involves a vertical comparison.

(a) In conditions of low job satisfaction, hygiene factors will be more frequent than motivators (A low greater than B low)

(b) In conditions of high job satisfaction, motivators will be more prevalent than hygiene factors (B high greater than A high)

The second interpretation involves a horizontal comparison.

(a) Hygiene factors will be more prevalent in conditions of low job satisfaction than high job satisfaction. (A low greater than A high)

(b) Motivators will be more prevalent in conditions of high job satisfaction than low job satisfaction. (B high greater than B low).

Both interpretations could be true, or either one could be true independently of the other.

Wall and Stephenson in a review (1970) cites a view in favour of Herzberg's hypotheses from studies on managers, scientists, supervisors, engineers, assembly line workers, technicians and nurses. This constitutes an impressive cross sectional sampling of social class, occupational and salary groups.

However it is not clear which interpretation of Herzberg's theory they claim to support. The results of the female assemblers indicated that only two motivating factors were significant - achievement and recognition.
162 professional and non-professional workers in an aerospace plant, were assessed for high or low job satisfaction.

One hygiene factor (company policy) and one motivator (achievement) were compared for their relative contribution to high or low job satisfaction. The results show that the motivator, achievement, was the more important determinant of both high and low job satisfaction.

Thus interpretation 1. which predicts that the hygiene factor should be more important for low job satisfaction was refuted.

Dunnette (1967) et al.

Secretaries, storemanagers, research scientists, salesmen and clerks were all assessed in terms of satisfaction with their jobs.

Dunette found that three motivators and one hygiene factor were the biggest determinants of both satisfaction and dissatisfaction.

But he also found that the motivators were more important than the hygiene factor for low and high job satisfaction. This again refutes interpretation 1. which predicts that the hygiene factor should have been more important in cases of low job satisfaction.

Hinrichs (1967) et al.

600 technicians were assessed for satisfaction with their jobs. Hinrichs found that hygiene factors were more important than motivators for cases of low and high job satisfaction.
Again interpretation 1. is refuted but for the opposite reason; it predicts that motivators should be more important in conditions of high job satisfaction, and they were not.

Hinrichs did find that interpretation 2. was supported; that hygiene factors were more prevalent in conditions of low job satisfaction than high, and motivators were more prevalent in conditions of high job satisfaction than low.

In general the data refute interpretation 1. (the vertical comparison) and they support interpretation 2. (the horizontal comparison)

A general review of the literature shows that while there is considerable support for Herzberg's theory, the studies which support him tend to have used Herzberg's procedures, while those which do not support him have used other methods.

This suggests that Herzberg's results were biased by the interview techniques that he used, and it is necessary to examine his techniques a little more closely.

(1) Vroom suggests that the technique of asking for critical incidents may have biased the answers; - with events leading to low job satisfaction workers will naturally tend to blame outside factors i.e. hygiene factors and on the other hand with events leading to high job satisfaction workers will naturally attribute the causes to themselves i.e. motivators.

Wall and Stephenson set out to test Vroom's criticism.
They assumed that in a selection interview people will naturally want to present themselves in the best light possible, and the type of critical incident collected in a selection interview should support Herzberg's theory.

On the other hand people interviewed at work are not particularly concerned with the impression they make, and, if Vroom's criticism is correct, critical incidents collected in a relaxed working environment should not support Herzberg.

These predictions were verified; data obtained from selection interviews did support Herzberg's two factor theory, while data obtained in relaxed working conditions did not.

(2) Another problem with Herzberg's technique is that of scoring critical incidents as being due to either hygiene or motivational factors, and the reliability of the scorer is always in question.

(3) Again Herzberg used a very simple method of scoring; he simply counted the number of times a factor of either type occurred in the story. But when people scored each others account, they expressed a desire to use a weighting system which allowed them to say that one factor was twice as important as another.

(4) Again Wall has asked whether the perceived causes of low job satisfaction were in fact the real causes of their low morale - men whose motivation is low will be more ready to find fault with and blame their environment, than men whose motivation is high.
Consider the incident of wild cat strikes where the ostensible reason for stopping work is often very different from the genuine grievances the men have.

(5) One final problem is more a comment on Herzbergs theory than his techniques, but it raises the question of how hygiene factors and motivators interact. It is quite possible for working conditions (hygiene factors) to be very bad, while the motivators present are very good as for example in nursing. How do these two types of factors interact in this situation, and what will be their final effect on performance and productivity? The theory provides no clear answer.

Dollard, Doob, et al. (1939)

Frustration — Aggression Hypothesis

According to Blum—

a revised hypothesis concerning the above generally suggests that aggression is typically produced by frustration, but that being frustrated does not necessarily result in an aggressive response. Responses to frustration are now considered to be of four basic types:


This would appear to indicate that frustration causes dissatisfaction, although Scott (1966) suggests the activation theory wherein the human organism needs stimulation and variety in its environment and frustration might satisfy these needs. The author feels that this statement will only be true if the individual has some control over his working environment.
If the individual accepts frustration as a challenge then there must be some identifiable way in which he can surmount these obstacles. Surely only this would cause satisfaction. Much will depend upon the personality and requirements of the individual, and indeed the areas of frustration.

Hoppock

A community wide survey conducted by Hoppock (1935) where eighty per cent of the 351 employed adults answered the questionnaire showed that only 15 per cent of the sample had job dissatisfaction. Robinson and Hoppock (1952) have since collected data on 191 assorted studies reporting percentages of job dissatisfaction. The median figure is 18 per cent dissatisfied. These results would seem to indicate that only a small proportion of workers are really dissatisfied with their jobs. One would of course need to know more about the sample.

In this chapter a considerable amount of research has been cited and reviewed. The objective has been to identify the various types of research, the factors selected, and the contribution of these factors to job satisfaction and/or job dissatisfaction. Herzberg's two factor theory will be used to identify the factors as either hygiene or motivators.

As reported in Blum (1968), Vroom (1964) factor analysed a number of studies in job satisfaction and listed the different dimensions of factors as follows:-
<table>
<thead>
<tr>
<th>Attitude Dimension</th>
<th>Number Of Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Attitudes towards the company and company management</td>
<td>7 H</td>
</tr>
<tr>
<td>(2) Attitudes towards promotional opportunities</td>
<td>3 M</td>
</tr>
<tr>
<td>(3) Attitudes towards job content</td>
<td>4 M</td>
</tr>
<tr>
<td>(4) Attitudes towards supervision</td>
<td>8 H</td>
</tr>
<tr>
<td>(5) Attitudes towards financial rewards</td>
<td>7 H</td>
</tr>
<tr>
<td>(6) Attitudes towards conditions</td>
<td>3 H</td>
</tr>
<tr>
<td>(7) Attitudes towards co-workers</td>
<td>3 H</td>
</tr>
</tbody>
</table>

Herzberg, Mausner, Peterson and Capwell 1957 report data compiled from 16 different studies and involving over 11,000 employees. The following shows how the workers ranked the factors according to their importance.

H — Hygiene
M — Motivators
### Relative Importance of Different Aspects of Job Satisfaction

<table>
<thead>
<tr>
<th>Job Factor Or Specific Job Aspect</th>
<th>Least Important</th>
<th>Most Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Interest (From intrinsic aspects of jobs)</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Opportunity for advancement</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Appreciation (From supervision)</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Company and management</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Intrinsic aspects of job (Excluding ease)</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Wages</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Supervision</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Social aspects of job</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Working conditions (Excluding hours)</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Hours (From working conditions)</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Base (From intrinsic aspects of job)</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Benefits</td>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>

**Legends:**
- Interquartile range
- Median rank
- H - Hygiene
- M - Motivators
Blum (1968) states that while these data may be used as an approximate indication of the overall importance of the various job factors, it is very important to keep in mind that this ranking is apt to be quite different from any particular class or group of workers. Herzberg et al. point this out clearly. For example, with people at higher occupational and/or educational levels intrinsic aspects of the job go up in importance, while security drops off considerably.

A further analysis of the relative importance of factors emanating from eight pieces of research into job satisfaction as reported in Tiffin and McCormick (1968) follows.
## Rank Order of Job Factors as Obtained from Various Studies

<table>
<thead>
<tr>
<th>Source</th>
<th>Chant Misc. Workers</th>
<th>Chant Dept. Store Workers</th>
<th>Wyatt et al. Women Factory Workers</th>
<th>Berdie Male H.S. Graduates</th>
<th>Blum and Russ Male</th>
<th>Blum and Russ Female</th>
<th>Jurgensen Male Applicants</th>
<th>England and Stein Male Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>150</td>
<td>100</td>
<td>325</td>
<td>150</td>
<td>181</td>
<td>105</td>
<td>3,345</td>
<td>3,207</td>
</tr>
</tbody>
</table>

- **Opportunity For Advancement**
  - M: 1
  - H: 2
- **Job Security**
  - M: 3
  - H: 4
- **Opportunity To Use Ideas**
  - M: 4
  - H: 8
- **Opportunity To Learn A Job**
  - M: 6
  - H: 7
- **Opportunity For Public Service**
  - M: 7
  - H: 8
- **Type Of Work Supervisor**
  - M: 9
  - H: 9
- **Company**
  - M: 10
  - H: 11
- **Pay**
  - M: 11
  - H: 10
- **Co-workers**
  - M: 12
  - H: 12
- **Working Conditions**
  - M: 13
  - H: 13
- **Clean Work**
  - M: 14
  - H: 14
- **Working Hours**
  - M: 15
  - H: 15
- **Easy Work**
  - M: 16
  - H: 16
- **Benefits**
  - M: 17
  - H: 17
- **Communications**
  - M: 18
  - H: 18
- **Recognition**
  - M: 19
  - H: 19

**Levels of Actual Satisfaction**
- **Male Applicants:**
  - M: 2
  - H: 11
- **England and Stein Male Employees:**
  - M: 3,345
  - H: 3,207

**H** = Hygiene

**M** = Motivators
The Factors

If we examine factors that appear important to workers, the following emerge:

<table>
<thead>
<tr>
<th></th>
<th>Motivators</th>
<th>Hygiene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vrooms Analysis</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Herzberg et al</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Tiffin and McCormick</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

Security was identified by most of the respondents as the more important. Opportunity for advancement was ranked jointly with security. Intrinsic aspects of the job were also ranked high, generally third. Further rankings contained more hygiene factors than motivators, and the hygiene factors were invariably ranked higher than the remaining motivators. In an analysis and evaluation of the two factor theory King (1972) generalises from five theories and concludes that although some research tends to support one or more of these theories, many of the results show experimenter coded biases and defensive biases. He also indicates that further research needs to be conducted patterned after Hulin and Smith (1967). Without discussing in depth King's analysis of Hulin and Smith's study, it is interesting to note that the hygiene factors correlated significantly more with overall satisfaction than with overall dissatisfaction. Although no direct overall comparison may be made with theories tending to support the two factor theory because only two motivators and three hygiene factors were used, it does nevertheless challenge the theory that motivators correlate only with satisfaction.
### Correlations Between Satisfaction with Each of Five Job Factors and Measures of Overall Job Satisfaction and Overall Job Dissatisfaction

(Hulin & Smith, 1967)

<table>
<thead>
<tr>
<th>Job Factor</th>
<th>Males Satisfaction</th>
<th>Males Dissatisfaction</th>
<th>Females Satisfaction</th>
<th>Females Dissatisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Itself ....</td>
<td>.68</td>
<td>.44</td>
<td>.45</td>
<td>.43</td>
</tr>
<tr>
<td>Promotion ....</td>
<td>.40</td>
<td>.38</td>
<td>.46</td>
<td>.14</td>
</tr>
<tr>
<td>Hygienes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pay</td>
<td>.39</td>
<td>.24</td>
<td>.12</td>
<td>.18</td>
</tr>
<tr>
<td>Supervision ....</td>
<td>.53*</td>
<td>.25</td>
<td>.31</td>
<td>-.03</td>
</tr>
<tr>
<td>Co-workers ....</td>
<td>.48*</td>
<td>.13</td>
<td>.20</td>
<td>-.08</td>
</tr>
</tbody>
</table>

* The difference between the correlation with satisfaction and with dissatisfaction is significant at the .05 level.

The author feels that a considerable weakness exists in much of the research to date on job satisfaction, in that the most acclaimed research has mainly examined the areas of management, that is from line supervisor upwards, and also many staff positions. What appears to be required is more structured research into the higher density area of manufacturing organisations. The semi-skilled operators lack aspects of intrinsic satisfaction, opportunity for self development, advancement and other motivators. It is well known that people occupied in managerial and staff positions have invariably more variety in their jobs and indeed more opportunity for self actualisation and intrinsic satisfaction. It would therefore appear logical to concentrate upon the largest population area in manufacturing concerns.
To indicate an approximate ratio of this population area in manufacturing organisations, a typical assembly shop set up follows:

**Batch Production**

150 Semi-skilled operatives
10 Setters or Leading operators
10 Chargehands
2 Assistant foremen
1 Foreman
2 Labourers
10 Viewers
5 Inspectors
4 Stores Keepers
2 Wages clerks
2 Planning Engineers
2 Work Study Practitioners
1 Personnel Assistant
2 Production Control
4 Sales
4 Development and Design
3 Maintenance Engineers
4 Toolmakers

Ratio 150/68

It would probably be accepted that most of the service areas indicated have far more variety and inherent stimulation in their work than the semi-skilled operators. Another important point is that most industrial unrest, grievances and disputes, emanate from the semi-skilled operators in industry.
Operator Understanding

One of the basic requirements of a financial incentive scheme is that it should be simple and easily understood (Marriot's summarised principles). This requirement is based on the assumption that operatives who perceive higher personal productivity as a means to increased earnings perform more effectively than operatives who do not perceive this relationship (Georgopoulos et al. 1957). Other studies have reached a similar conclusion of which two investigations conducted by the Industrial Psychology Research Group merit attention. Both studies concerned forms of Bedaux payment systems; that is a type of premium bonus system where earnings vary proportionally less than output. The methods used were mainly personal interviews and analysis of factory records. Wyatt, Langdon and Marriot surveyed six factories in which 564 operatives were asked:

(a) Do you understand how your wages are calculated?

and

(b) Do you know when you have reached the point at which you start earning bonus?

The replies were tabulated under the headings of Yes, Roughly and No, as follows:

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>Roughly</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>Range</td>
<td>%</td>
</tr>
<tr>
<td>(a)</td>
<td>46</td>
<td>1 - 38</td>
<td>14</td>
</tr>
<tr>
<td>(b)</td>
<td>53</td>
<td>1 - 98</td>
<td>6</td>
</tr>
</tbody>
</table>
Thus only half of the number of operatives interviewed claimed to understand their wages calculation. The understanding varied between factories - 80% and above in two factories understood the calculation of wages, while in two others this fell to 5%. This was explained by the conditions of work, and to a lesser extent the amount of explanation given by management. In the factories which showed high operative understanding, the operatives were mainly on one type of work, and in one case management aided understanding by the provision of simple charts explaining the calculation of wages. In factories where operatives revealed low understanding, frequent changes in the work occurred and the mechanism for calculation was so complicated, that management found it difficult to give an intelligible explanation.

The second study by Shimmin 1959, was in six factories ranging from 300 - 3,000 operatives. In examining understanding, levels of comprehension of the schemes were distinguished and termed 'formal' and 'functional' understanding. The former was defined as understanding the principle of the wage incentive, methods of work measurement and the calculation of pay. The latter was defined as having a working knowledge gained from experience of cash bonuses related to some output level. 388 operatives were assessed, and the results summarised under good understanding, limited understanding and no understanding.
The conclusion to be drawn from these results is that over 40% of the operatives lack any useful understanding of the financial incentive schemes under which they work. Harriott argues that it is reasonably certain that productivity will be adversely affected where lack of understanding undermines the incentive effort. Also the full benefits of the incentive may not be achieved where lack of understanding exists. Thus the fact that plans exist which have increased production and lowered unit costs, despite a low level of understanding by employees does not disprove the premise.

Further criticism of much of the previous research is the apparent lack of structure in the questions asked. To ask someone to recall the good or bad moments of the job and expect an accurate and unbiased account specifically remembered and identified, in the author's opinion is just not feasible. As King (1972) states they are bound to contain biases of many kinds. Those respondents that cannot remember and are reasonably satisfied with their jobs are surely not going to disappoint the researcher! With these facts in mind the author has designed a number of questions within five factors as previously mentioned:

<table>
<thead>
<tr>
<th>Understanding</th>
<th>%</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>14</td>
<td>0 - 29</td>
</tr>
<tr>
<td>Limited</td>
<td>42</td>
<td>21 - 67</td>
</tr>
<tr>
<td>No</td>
<td>44</td>
<td>20 - 67</td>
</tr>
</tbody>
</table>
The questions are specific and designed to reveal job satisfaction amongst semi-skilled operators who have very little opportunity for job motivation as identified by previous researchers. The theory will be explained and developed in the next chapter.

This chapter has so far concerned itself with research associated with the satisfaction – dissatisfaction syndrome. Psychologists would argue that the domains have been mostly in their areas of discipline. The author however would contest this statement. For much of this research has been associated with groups – their attitudes, interactions, responses and involvement. In consequence we have moved into the domain of the Industrial Sociologist. A clear dichotomy appears irrational and impossible, perhaps we should now identify this research with Social Scientists and appreciate the necessity of the involvement of both the psychologist and sociologist in research of this nature. In view of this latter statement an examination of the concepts of dissatisfaction and the work of philosophers and sociologists with relation to dissatisfaction and alienation is thought to be useful.
Alienation/Dissatisfaction

' Broadly speaking, alienation denotes a socio-psychological condition of the individual which involves his estrangement from certain aspects of his social existence.' Dictionary of Sociology. (1975)

It was felt necessary to commence with a current definition in view of the fact that 'alienation' has been ascribed and related to so many different disciplines in so many different ways. For example it has occurred in, Social psychology, Sociology, Philosophy, Psychoanalysis and Existentialist Philosophy. It has also been used as an explanation of class differences, mental behaviour, industrial problems and conflict, anarchy and ethnic disadvantage. Although it was Marx who first conceptualised 'alienation' into sociological theory, he appeared to be greatly influenced by Hegel, who as stated by Schacht (1970) was the first to elevate the term to a position of philosophical importance. Kaufman 1965 states that 'To claim that a person is alienated is to claim that his relation to something else has certain features which result in avoidable discontent or loss of satisfaction.' According to Schacht, Kenneth Kenison (1965) contends that, 'Most usages of 'alienation' share the assumption that some relationship or connection that once existed, that is 'natural, desirable or good', has been lost.

Although Horowitz (1966) suggests 'the need for a philosophical analysis with particular reference to the use of the term by Social Scientists,' this had to some extent been achieved by Seeman (1959),
and by Nettler (1957). Seeman has appeared to have been influenced by Marx in his analysis of 'alienation' for example two of his isolated concepts are, 'powerlessness' and 'meaninglessness' which were used by Marx in his earliest writings. Schacht's comprehensive work on 'alienation' conducts the reader through a series of interesting and enlightening developments and progressions in true philosophical style. Commencing with traditional uses of the term, he then discourses upon Latin and German derivations and equivalents. The Latin origin he states is 'alienatio', and derives its meaning from the verb alienare (to make something another's, to take away, remove). In addition it can also mean, 'to cause a warm relationship with another to cool'.

Schacht also discusses the German equivalent of 'alienation'. 'Entfremdung', which in Grimm's Worterbuch (1862) meant, 'to make alien, to rob, to take, to strip of'. This German term has since been replaced by 'Verdusserung'.

Grotius (1853), Hobbes (1950) and Locke (1947) do not use the term alienation in the same manner. Grotius uses the Latin alienatio in the connection with the transfer of 'Sovereign authority' over oneself to another person. (The alienation of Sovereign authority). Hobbes and Locke are however similar in their approach in relation to the social contract theory. Hobbes writes in his Leviathan: 'To lay downe a man's right to any thing is to divest him selfe of the Liberty of hindring another of the benefit of his own right to the same. Right is layd aside either by simply renouncing it or by transferring it to another.'
Hobbes considers that this renouncement of right is a gain for the individual. The concept aligns closely with philosophical thinking wherein a person who is not alienated is dehumanised.

Jean-Jacques Rousseau (1947) in 'the Social Contract' closely relates aliener and renouncer, and uses them interchangeably when speaking of 'alienating ones liberty'. When discussing 'transfer' he uses the term 'alienate.' Rousseau considers it doubtful that one has the right to surrender or 'alienate' his freedom. He is however in favour of this surrender if the authority for such is transferred to a community, where one surrenders the particular self, and which as Schacht states, 'occurs frequently in Hegel's discussion of alienation in the Phenomenology. An interesting passage from Hegel's essay on the German Constitution, (1802) translated by Schacht states:

"The thoughts contained in this work can have no purpose or effect .......... other than that of the comprehending of what exists that makes us vehement and causes us suffering; rather it is what is not as it should be. But if we see that it is as it must be - that is, that it is not arbitrary or accidental - then we also see that it should be as it is." Schacht says, this passage is of special interest because it reveals a number of assumptions and inferences which are basic to, but not explicit in, his discussion of the overcoming of one type of alienation in the Phenomenology. Schacht criticises Hegel's statement by saying that it is far from convincing, and states that one may be unable to see how it would be possible for system to be improved at the present time, and yet feel irreconcilably at odds with it. One may still find it too repugnant, too 'alien' to
embrace. The author disagrees with Schacht, and feels that Hegel does not categorically state that, if we see it as it must be, then any suffering is ended, only that it would have a reductive effect, that is alleviate the suffering. What Hegel appears to be stating is that if one fully understands the reason for a situation, then one has certainty, and 'alienation' is alleviated. Hegel uses 'alienation' in two ways: as a separation or discordant relation, and self alienation, between one's actual condition and essential nature. Marx criticises Hegel on these two aspects, on the basis that they are abstract, logical and speculative expressions. That they do not reflect the true man and are merely forms of consciousness and self-consciousness. Schacht criticises Marx in that different forms of consciousness and self-consciousness need not necessarily be abstract.

Marx through his identification of self-realisation placed the greatest emphasis upon production, this for Marx is man's species life. Schacht states; but for Marx, as for Hegel, productive activity corresponds to the dimension of individuality or personality, and is that through which the individual personality expresses and thereby realises itself.

Marx's use of the term 'alienation' is to suggest a separation of some sort, for example the relinquishment of one's control over one's product and labour. Marx contends that, when a producer does not own the product he produces, but that it belongs to another, then the product is alien to him, then he in turn is alienated. Schacht admits that this characterisation is useful, but he does not wholly
agree and cites a member of an orchestra, who although directed by another obtains a degree of self-fulfillment.

Marx identifies the source of alienation as the nature of civil society, and the institution of private property. In this society workers may be motivated by the same desire for enrichment as the capitalists. He further contends that, "The positive supersession of private property is the positive supersession of all alienation." Schacht postulates that because Marx employed the term alienation in connection with a wide variety of things it cannot convey anything specific.

Erich Fromm 1941, 1961, 1962 uses the term alienation to denote virtually anything which is not as it should be, and renders the term meaningless. A number of sociologists interpret alienation as some form of separation of the individual from some aspect of society. Both Fromm and Marx hold that men can be unaware of their alienation, sociologists do not hold this view and contend that it is conceived in terms of attitudes and feelings and therefore is a psychological state of an individual. They also consider that appropriate research methods - questionnaires - interviews - will often reveal the attitudes that reflect some form of alienation. Schacht criticises those sociologists who list a number of uses for the term, then referring to the corresponding phenomena as different "types" of alienation, and subsequently speaking of them as so many "dimensions", aspects or "elements" of alienation. He disagrees with the multi-dimensional concept.
and cites the three traditional uses of alienation—transfer of property—mental derangement—and separation from others. It would be absurd to conclude that it warrants regarding the three things as three 'aspects' of a single 'multidimensional' phenomenon: 'alienation'. Yet he then states that the attempts of sociologists to deal in this way with the various instances of 'alienation' with which they are concerned may not be so patently absurd.

The author feels that Schacht has missed an important point, in that it would appear to be reasonable to suggest that any of the three traditional uses of 'alienation' must themselves be multi-dimensional. In other words there surely must be degrees of 'alienation'. How much of oneself has one had to surrender? Would the worker in an industrial environment be more alienated than Schacht's example of a musician? As there will be differing reasons for 'alienation' within one factor so there will be differing dimensions of these. If 'alienation' with and at work is considered undesirable, then surely the object would be to reduce it? In this very context we are indicating various levels of such, that is dimensions.

Seeman (1959) established a redefinition of the various usages of the terms of 'alienation' in order to make them empirically testable:

'Powerlessness', was that of alienation as a feeling on the part of the individual that he cannot influence the social situation in which he interacts.
'meaninglessness' is a feeling on the part of the individual that he has no guides for conduct on belief.

'normlessness' is the individual's feeling that illegitimate means are required to achieve goals.

'isolation' is a feeling of estrangement from the cultural goals of society.

'self-estrangement' an inability to find self-rewarding activities.

Each of these terms Seeman sees as independent of each other. Various attitude scales have been used to measure them in the social context of alienation.

This approach of being more objective and empirical and free from certain implicit value assumptions has been attacked, particularly by J. Horton. 'The Dehumanisation of Anomie and Alienation.' E.J.S. 1964.

Horton asks: I raise the question: are contemporary definitions of alienation and anomie actually value free, or are we witnessing a transformation from radical to conformist definitions and values under the guise of value free sociology? He talks about the transmogrification into things instead of evaluations about things. Horton states that, 'American sociologists have made a concerted effort to cleanse alienation and anomie of the messy conditions of their birth in the polemical writings of Marx and Durkheim.'
There are three standard formulas for the right of purification; all three begging the questions of values:

The question of value and the perspective of the Sociologist is begged by shifting the source and responsibility for evaluation away from the observer to:

1. the persons being observed (the psychological approach),
2. the values of the dominant groups which set the boundaries of the social system being observed. (the middle-range approach).
3. the supra-individual standards of the community of sociologists (the professional ideology approach).

Horton then identifies the first approach as shifting the source of meaning to the persons observed, from a sociological to a social psychological approach. Is this then, wrong? In the initial definition of alienation it was defined as a 'socio psychological condition'. Has Horton discovered an observable dichotomy between industrial sociology and social psychology? There are distinctions, but these are often subsumed in approaches to common problems in research.

His statement concerning the sociologist transferring correlations into definitions of alienation with respect to feelings that people have about themselves is in the form of a criticism, why? Surely this empirical approach is sound, if values are finally to be found for factors that contribute to 'alienation' then the survey method is the correct one? In answer to his 'narrowly empirical sociologist view', and shifting responsibility to the respondents. This cannot be true,
It implies that the sociologist who is empirical must therefore be narrow — this surely is questionable and as to shifting responsibility, it is the researcher who devises the questions in a survey, (and they are not always couched in terms of agree-disagree as Horton suggests).

It is the researcher that makes his own interpretation of the results and not the respondents. Empirical sociologists and psychologists are mostly very reluctant to make false and unsubstantiated claims, thereby abdicating their academic responsibility and rigour. In spite of Horton’s criticism of Seeman, the author feels that Seeman should be praised rather than condemned, he did attempt the difficult task of rationalising, where no rationality appeared to exist. How can any scientist truthfully apply values without understanding the constituent parts of a constraint? and indeed the varying levels of contribution.

**Alienation and Job Satisfaction**

The degree of recognition by ones superiors, relationship to other workers, and the job in relation to one’s career expectation are variants identified by Aiken and Hage (1966) and contributing to dissatisfaction and ‘alienation from work’. It is therefore the hygiene factors they are mostly concerned with — dissatisfiers. They therefore differ from Marx in his concept of ‘alienation from the process of production’. Seeman however concentrates upon the job itself and intrinsic satisfaction. One who is not intrinsically satisfied is alienated. Miller (1967) observes that a man who does not find his
work intrinsically satisfying need not be dissatisfied with his job. This agrees with the author's interpretation of most semi-skilled jobs, and this statement of Millers is quite remarkable in view of his research area; that is 'Industrial Scientists and Engineers'. Other research of professionals has shown intrinsic aspects as contributing more to satisfaction. Herzburg et al. Blauner (1964) has a more generalised concept of alienation in which he states:

Alienation is a general syndrome made up of a number of different objective conditions and subjective feeling-states which emerge from certain relationships between workers and the sociotechnical settings of employment. Alienation exists when workers are unable to control their immediate work processes to develop a sense of purpose and function which corrects their jobs to the overall organisation of production, to belong to integrated industrial communities, and when they fail to become involved in the activity of work as a mode of personal self-expression. Blauner's concept of 'alienation' is thus more basic and practical than other exponents. Granted his reference to absence of self-expression relates to Marx's 'alienated labour', and his view of meaninglessness with Seeman and Miller. Nevertheless his identification of the necessity for workers to be able to control their immediate work process is important to this research.

His dissertation on 'Powerlessness', meaninglessness, isolation and self-estrangement however need to be examined:

'A person is powerless, he states, when he is an object controlled and manipulated by other persons or by an impersonal system (such as
technology) and when he cannot assert himself as a subject to change or modify this domination. The non-alienated pole of the powerlessness dimension is the state of freedom and control.

What appears to be forgotten is that in order for a worker to control his own work other controls such as management and work study must be seen to be effective. If these controls are seen to be ineffective it is then the worker will feel a state of 'powerlessness' or an inability to control his own work, especially if part of his earnings are based upon bonus for output.

"Meaninglessness alienation reflects a split between the part and the whole. A person experiences alienation of this type when his individual acts seem to have no relation to a broader life-programme. Meaninglessness also occurs when individual roles are not seen as fitting into the total system of goals of the organisation but have become severed from any organic connection with the whole. The non-alienated state is understanding of a life-plan or of an organisation's total functioning and activity which is purposeful rather than meaningless."

What appears to be indicated in the above is a complete lack of certainty. If the worker identifies that the goals of the organisation are maximum productivity for a reasonable wage, and the management and workstudy controls are so ineffective that achievement falls hopelessly short of these goals, then nothing is meaningful and uncertainty, dissatisfaction, and alienation will prevail.
Isolation suggests, Blauner states, the idea of general societal alienation—remoteness. This type of alienation the author suggests would also stem from the two previous terms and from general dissatisfaction. Isolation from staff and management.

Self Estrangement has a denigrating effect—a loss of personal dignity and identity, when it is stated an activity becomes a means to an end. This latter term the author considers would be more difficult to ascertain or measure than the other terms. It appears to relate partially with Durkheim's (1951) transcendental concept of anomie.

Blumberg 1971 states 'There are objective alienating qualities about much labour and that these are seen and felt as such by the worker, although perhaps he does not articulate them explicitly.' In his chapter, 'Alienation and Participation', a review of the literature, he is in fact citing much of the research designed to reveal satisfaction or dissatisfaction within various environments. The author feels that some results in which the respondents indicated a higher satisfaction through some form of participation merely reflected a substitution for ineffective controls. This assumption would of course be difficult to prove, unless controls, participation, decision making were measured to reveal the highest contributor to satisfaction. If however controls are shown to be an important contributor to satisfaction, then surely a case is made for further research into the participation/satisfaction/alienation syndrome.

In conclusion it would seem that alienation—dissatisfaction and uncertainty are related, and if this research indicates that satisfaction is directly proportional to the degree of management and work study control,'
Although Taylor placed considerable emphasis upon monetary reward as an important motivator, the main impact of his work was directed at improving employer-employee relations. His differential piecework system, introduced in 1890 was based upon the time studies of the best and fastest workers and he rewarded those that achieved this range of work most handsomely. It could be argued that only a few people could achieve the range of the best and fastest workers performance, but in the absence of more factual knowledge of what this implied it must be remembered that Taylor had no other yardstick for the establishment of a realistic time standard. (Bedaux introduced rating 1910).

Taylor recognised the need for improved management efficiency in order to motivate the workforce and his system of "Functional Foremanship", was the forerunner of the service departments of today. His concept of true management as a science and the necessity to establish sound principles for effective management was greeted and acclaimed by many authorities of management practice. In essence some of his principles stated:

1. The need to replace rule of thumb methods with the scientific determination of each element of a man's job;
2. scientific selection and training of workmen;
3. co-operation between workmen and management to accomplish the work;
4. a more equal division of responsibility between workers and management.

Clearly much of Taylor's work was revolutionary in his emphasis of management's responsibility towards the work force and although as stated previously, much was acclaimed, there were many who looked upon his work with mistrust and suspicion, in the opinion of many, unfounded. Drucker stated in Dale's "Readings in Management"; Taylor was one of the first to conceive of the satisfaction of the
worker as a central goal of industrial endeavour. Warr and Wall 1975 state that; his writing reveals, if only in embryonic form, a concern for issues including those that today have become known as performance appraisal, job analysis, job evaluation, job design, ergonomics, selection and training. His research is also important for its deliberate use of the methodological techniques of control and criterion groups.

Rarely, however, is he credited with these contributions. It is his strong emphasis on man's desire for money, and his contention that management should manipulate pay in order to obtain greater effort from employees, that have survived over the years.

The Hawthorne studies promoted a consideration of human relation factors. The basic problem being studied was: what are the factors in the physical and social environment of the person working in an organisation which affect his working performance and his personal satisfaction with his work. In the experiments with lighting intensities, no positive relation was found between these two variables (Lupton 1966, 1971).

Further subsequent experiments in relation to relay assembly and variations in working hours and tea breaks failed to prevent an upward trend in productivity. The investigations found difficulty in interpreting these results, and the full explanation came to focus upon social factors within the group. Further research was conducted by Roethlisberger and Dickson (1939) in the Bank Wiring Observation Room at Western Electric, America. Fourteen men were closely studied over a period of six months in 1931 and 1932. Their behaviour and work output was continuously recorded, no changes in conditions took place. The groups established their own norms of output. Individuals encouraged each other to maintain an agreed production level. If this target was exceeded the workers underbooked and used the balance to regulate their overall production figures in times when they under
In summary of the Hawthorne experiments it would seem that social factors and relationships appear to be more important to the people in their jobs. These studies changed the emphasis from physical aspects and incentive value of the working environment to a consideration of interpersonal relations and communications, group norms and values, participation, supervision, morale and satisfaction. (Warr and Wall 1975).

Stagner (1950)

Reports a study based upon a nationwide survey of 7,000 employees.

36% placed security first
15% satisfaction with actual job

and only

7% mentioned money as a prime consideration.

Nealey (1964)

He had 1,133 members of an electrical trade union paired to compare six employee benefit options.

(1) Additional pension
(2) Six per cent raise
(3) Reduction of work week
(4) Full Hospital Insurance
(5) Closed shop
(6) Extra vacation

Hospital insurance was preferred followed by closed shop principle, 6 per cent pay rise came third.

It must be concluded that money is not a sole motivator or satisfier.
Maslow's Motivation/Job Satisfaction Theories (1943)

Maslow postulated that man has five classes of basic needs.

1. Physiological need, a desire for food, water, oxygen, sleep and sex.

2. A safety need, the desire for security and avoidance of physical danger.

3. Social needs, the desire for love, affection and friendship.

4. Esteem needs, self respect.

5. Fulfillment - self actualisation.

Maslow's model can be illustrated thus:

[Diagram showing the hierarchy of needs with physiological needs at the lowest level and self-actualisation at the highest level.]

Relate mainly to job content.

Relate mainly to job context.
A hierarchy of needs structure. Maslow states that man is continually in a state of imbalance or disequilibrium. To correct this imbalance man is motivated to satisfy his current need, and when satisfied he obtains a state of equilibrium.

The most important are the basic needs, when these are satisfied man moves up the ascending scale to the higher order needs. It is homeostatic in that man is continually making the necessary adjustment to obtain equilibrium. An important concept of Maslow's is that:

"More basic need groups are said to be prepotent in that they will take precedence over all those higher in the hierarchy."

Porter (1961) applied Maslow's model to industry to see if it described different levels of management. His assumption was the higher the level of management the more important the higher order needs became.

In his first study he surveyed 64 foremen and 75 middle managers from three different companies. The questionnaire contained 15 items designed to provide information about five different motivational need classes derived from Maslow. The respondents were asked:

(a) How much of this need is there in your present job?
(b) How much should there be?
(c) How important is it to you?

A seven point rating scale was used. Range, minimum 1 —— to maximum 7.
Both groups identified security and self actualisation as having a high relative importance. Middle management reported a large deficiency in self actualisation only, whereas the foremen reported a large deficiency in esteem, autonomy and self actualisation. Thus the basic level of satisfaction was found to be lower for foremen than for middle management. Maslow's theory predicts that the most deficient needs should also be the most important. This prediction is not borne out in this research. For example foremen reported.

<table>
<thead>
<tr>
<th>Esteem</th>
<th>Relative Deficiency</th>
<th>Relative Importance</th>
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<tr>
<td>Large</td>
<td>Small</td>
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<table>
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<tr>
<th>Autonomy</th>
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<tr>
<td>Large</td>
<td>Moderate</td>
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</table>

Porter (1962)

In his next study Porter surveyed a nationwide sample of 6,000 managers and executives. The results from 1916 usable returns indicated a strong relationship between the levels in management and the need deficiencies, with self actualisation and autonomy being the least fulfilled.

In a further study Porter examined need fulfillment and need importance as a function of horizontal relationship between line and staff managers. He found a greater need fulfillment was required by line managers than by staff management. Summary of Porters application of Maslow's theory.

(1) Results show that peoples evaluation of needs do not match Maslow's entirely.
(2) Self actualisation and autonomy are respectively 1 and 2.
(3) Security tends to come before Esteem and Social needs.
(4) The homeostatic cycle did not seem to operate.

None of the results emerging give any indication of what motivates a man to perform well at his job. It must also be asked whether an emotional state alone can be a determinant of behaviour? In this research satisfaction has the status of an independent variable.

Blum states that the work of Porter in applying the Maslowian need structure as a frame of reference for furthering our understanding of management in industry cannot be over emphasised. It marks one of the most meaningful developments in many years.

Vroom's Model of Motivation: A Decision Theory Approach

Vroom's basic assumption is that an individual's motivation to carry out an action will depend on his view of the consequences of that action and alternative actions.

This is very much in line with a commonsense view of human behaviour; people only do what they do because they think it will have certain consequences for them. However Vroom has attempted to formalise and quantify this idea and, as a result, his language is sometimes less than clear.

The basic propositions of his theory set out in Blum can be expressed as follows:

(1) Every action is instrumental in producing consequences for an individual.

If I change my job - (a) I earn more money
(b) I have further to travel
(2) People evaluate the consequences of their actions in the following way:

Firstly they judge whether it is pleasant or unpleasant.
Secondly they make some quantitative assessment of the degree of unpleasantness or pleasantness involved.
Thirdly they make some estimate of how probable each consequence is.

(a) I earn more money. Pleasant - +9/10: probability - certain 1.0.
(b) I travel further. Unpleasant - -6/10: probability - not quite sure 0.7.

(3) The value of each consequence for the individual can then be estimated by multiplying its probability by its attractiveness.

(a) I earn more money. +9 times 1.0 p. = +9.0
(b) I travel further. -6 times 0.7 p. = -4.2

(4) And the value of the action for the individual, can be estimated by adding up the values of its consequences.

I change my job = (a) more money i.e. +9.0 plus (b) longer travel i.e. -4.2
= +9.0 + -4.2
= +4.8

The total value of the action i.e. +4.8 is called the valency of the action.

(5) An individual's motivation to perform an action is directly proportional to the valency of the action for him; low valency = low motivation and high valency = high motivation.
(6) Given a choice between actions - going to the pub +7 or washing the car - 2 - the individual will choose the one with the highest valency - going to the pub.

Before leaving the basic propositions of the theory, it is important to note that the entire decision making process represents the individual's subjective estimate of what is going to happen.

- I may think I will get a higher salary in my new job though in fact I do not. The truth of my beliefs is irrelevant; what makes me take the job is the belief that I will get a higher salary if I do.

Another consequence of the subjective nature of these decisions is that the way people evaluate the consequences of their actions and the importance they attach to them will be determined by their personality makeup, attitudes and personal history. So the same decision will result from a very different process from one person to the next.

- One man may judge having to work hard as a challenging and favourable consequence to an action, while another may judge it to be very unpleasant.

- One man may judge the use of the firm's car as a favourable consequence to his job, while another may judge it to be unfavourable because that particular make of car is in his experience highly unreliable.

In the industrial setting, Vroom's theory would predict that a man's motivation to do the job will be directly proportional to the valency of that job for him i.e. how attractive that job is to him in terms of its consequences.
A second tempting inference to draw is that a man's motivation to do the job will be reflected in his performance on the job; one would suppose that the motivational factors that lead a man to do a job will at least be related to the factors that determine whether he does it well or badly. If one could not say this, we should have to say that there are at least two types of motivation - motivation to do something and also motivation to do that something well. It may well be that a distinction like this seems rather odd, but later discussion will lead us to a conclusion of this kind.

Before discussing research on Vroom's theory, it is important to make note of one assumption that all investigators have made.

It was noted earlier that Vroom's theory describes a highly subjective process of reasoning that varies for each individual. Any research on this process would entail interviewing each individual to find out his subjective assessment of the consequences of his actions for him.

In contemporary research this time consuming approach has been avoided by assuming that there are certain objective features of the work environment, which have roughly the same subjective values for all workers. Whether this assumption is legitimate is questionable.

In Blum is found a description of representative research on Vroom's theory.

In this study, motivation to do the job was operationally defined in terms of measures of absenteeism and labour turnover.
Valency or attractiveness of the job was operationally defined in terms of a measure of job satisfaction.

According to Vroom's theory, motivation to do a job is directly proportional to its valency; and Blum reports that a moderate correlation obtained between absenteeism/turnover (motivation) and job satisfaction (valency).

But what about the second inference that motivation will be directly proportional to performance or productivity on the job? Blum reports here that no relationship was found, which is not surprising since it is known that no consistent relationship between job satisfaction and productivity has been found.

But the problem is how does Vroom's theory explain the lack of such a relationship. According to Blum, Vroom's theory can account for this by specifying that motivation to do a job simply means 'motivation to work sufficiently hard to keep the job' but not motivation to do well on the job.

As stated earlier, the discussion now leads to the conclusion that there are at least two types of motivational factor; the first is Vroom's motivation 'to work sufficiently hard to keep the job' and the second factor is that which motivates men to high performance and productivity on their job. And since it is the second factor that management is predominantly interested in, Vroom's theory is apparently of little help.
It is certainly useful to have a theory which suggests a way of analysing the motivational process, but if this theory can only explain the occurrence of absenteeism and labour turnover we are left with a somewhat negative approach to the problems of human motivation and work.

It was noted earlier that for reasons of experimental convenience investigators have assumed that certain features of the work environment such as pay, have a consistently high subjective value for all subjects.

Thus in the above study, the valency of a job was defined in terms of a measure of job satisfaction, and it is the case that many objective features of the work environment show a positive correlation with job satisfaction e.g. job interest, social acceptance, attitudes of supervision, status.

To this extent the assumption in question is legitimate.

However it does not rule out the possibility of investigating individual differences e.g. personality factors, and Vroom's theory would suggest that individual differences have a very strong influence on valency.

Vroom himself reports evidence which bears out the last point.

Supervisors were measured on the personality variable of authoritarianism - respect for authority - on an attitude questionnaire.

Their satisfaction with their jobs (valency) was also measured. And finally they were asked to estimate the degree of influence they could exert over their superiors.
Supervisors who scored high in authoritarianism, showed no relationship between job satisfaction and the amount of influence they could exert over their supervisors.

On the other hand, supervisors who scored low in authoritarianism, showed a positive correlation between the amount of influence they could exert over their superiors and their job satisfaction i.e. if they could exert a great deal of influence they were job satisfied and if their influence was small, they were extremely dissatisfied.

Personality variables can then influence the valency of an action or job.

In conclusion, three questions are left concerning Vroom's theory:

(1) To what extent does he explain motivation to do well on a job i.e. performance and productivity.

(2) Valency as he defines it is a subjective concept - to what extent can it be made objective for research purposes?

(3) Is it plausible to believe that people consciously or unconsciously go through a process of addition and multiplication of variables when they decide to do something e.g. get married?

Although Vroom's theory is extremely difficult to test, the author does feel however, that people do make an evaluation and summarise the favourable and unfavourable aspects before making a decision, albeit subconsciously.
Herzberg's Two Factor Model Of Motivation (1959) (1968)

This theory emphasizes the contribution of job satisfaction to motivation, and can be stated in terms of three main principles.

(1) Motivation is determined by two types of factor:
   (a) Hygiene factors which lower satisfaction when poor, but cannot increase it.
   (b) Motivators which enhance job satisfaction.

(2) Each factor affects performance and output in different ways:
   (a) Hygiene factors can increase dissatisfaction and lower output.
   (b) Motivators can increase satisfaction and so increase performance and output.

(3) Job enrichment will increase the motivators, satisfaction and output.

Thus the theory makes a specific statement about the motivational factors underlying performance and output.

Initial Research

In this study Herzberg interviewed 200 engineers and accountants. Subjects were asked to describe critical incidents at work that led to high or low job satisfaction.

Their replies had to satisfy certain restrictions.

(1) They had to be in the past.
(2) They had to be related to job satisfaction.
(3) It had to result in extremely high or low job satisfaction.
(4) They had to be objective events in the work situation.
They were also asked to estimate the duration of their feelings of satisfaction or dissatisfaction.

476 critical incidents were analysed for their causes, and two types of factor emerged from the analysis:

(a) Hygiene factors which led to dissatisfaction and were temporary.

(b) Motivators which led to satisfaction and were longer lasting.

Typical of hygiene factors were — company policy, supervision, social relationships, working conditions.

Typical of motivators were — achievement, recognition, the work itself, responsibility, advancement.

Salary was an ambiguous factor which occurred in both categories.

It is important to note however that Herzberg's theory can be interpreted in two ways yielding two types of prediction.

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<thead>
<tr>
<th>Low Job Satisfaction</th>
<th>High Job Satisfaction</th>
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<tr>
<td>Hygiene Factors</td>
<td>A low</td>
</tr>
<tr>
<td>Motivators</td>
<td>B low</td>
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Two interpretations or sets of predictions can be made for the conditions described in the above matrix.
The first interpretation involves a vertical comparison.
(a) In conditions of low job satisfaction, hygiene factors will be more frequent than motivators (A low greater than B low)
(b) In conditions of high job satisfaction, motivators will be more prevalent than hygiene factors (B high greater than A high)

The second interpretation involves a horizontal comparison.
(a) Hygiene factors will be more prevalent in conditions of low job satisfaction than high job satisfaction. (A low greater than A high)
(b) Motivators will be more prevalent in conditions of high job satisfaction than low job satisfaction. (B high greater than B low).

Both interpretations could be true, or either one could be true independently of the other.

Wall and Stephenson in a review (1970), cite a view in favour of Herzberg's hypotheses from studies on managers, scientists, supervisors, engineers, assembly line workers, technicians and nurses. This constitutes an impressive cross sectional sampling of social class, occupational and salary groups.

However it is not clear which interpretation of Herzberg's theory they claim to support. The results of the female assemblers indicated that only two motivating factors were significant - achievement and recognition.

Further studies were made to test Herzberg's theory.
162 professional and non-professional workers in an aerospace plant, were assessed for high or low job satisfaction.

One hygiene factor (company policy) and one motivator (achievement) were compared for their relative contribution to high or low job satisfaction. The results show that the motivator, achievement, was the more important determinant of both high and low job satisfaction.

Thus interpretation 1. which predicts that the hygiene factor should be more important for low job satisfaction was refuted.

Dunette (1967) et al.

Secretaries, storemanagers, research scientists, salesmen and clerks were all assessed in terms of satisfaction with their jobs.

Dunette found that three motivators and one hygiene factor were the biggest determinants of both satisfaction and dissatisfaction.

But he also found that the motivators were more important than the hygiene factor for low and high job satisfaction. This again refutes interpretation 1. which predicts that the hygiene factor should have been more important in cases of low job satisfaction.

Hinrichs (1967) et al.

600 technicians were assessed for satisfaction with their jobs. Hinrichs found that hygiene factors were more important than motivators for cases of low and high job satisfaction.
Again interpretation 1. is refuted but for the opposite reason; it predicts that motivators should be more important in conditions of high job satisfaction, and they were not.

Hinrichs did find that interpretation 2. was supported; that hygiene factors were more prevalent in conditions of low job satisfaction than high, and motivators were more prevalent in conditions of high job satisfaction than low.

In general the data refute interpretation 1. (the vertical comparison) and they support interpretation 2. (the horizontal comparison).

A general review of the literature shows that while there is considerable support for Herzberg's theory, the studies which support him tend to have used Herzberg's procedures, while those which do not support him have used other methods.

This suggests that Herzberg's results were biased by the interview techniques that he used, and it is necessary to examine his techniques a little more closely.

(1) Vroom suggests that the technique of asking for critical incidents may have biased the answers; with events leading to low job satisfaction workers will naturally tend to blame outside factors i.e. hygiene factors and on the other hand with events leading to high job satisfaction workers will naturally attribute the causes to themselves i.e. motivators.

Wall and Stephenson set out to test Vroom's criticism.
They assumed that in a selection interview people will naturally want to present themselves in the best light possible, and the type of critical incident collected in a selection interview should support Herzberg's theory.

On the other hand people interviewed at work are not particularly concerned with the impression they make, and, if Vroom's criticism is correct, critical incidents collected in a relaxed working environment should not support Herzberg.

These predictions were verified; data obtained from selection interviews did support Herzberg's two factor theory, while data obtained in relaxed working conditions did not.

(2) Another problem with Herzberg's technique is that of scoring critical incidents as being due to either hygiene or motivational factors, and the reliability of the scorer is always in question.

(3) Again Herzberg used a very simple method of scoring; he simply counted the number of times a factor of either type occurred in the story. But when people scored each others account, they expressed a desire to use a weighting system which allowed them to say that one factor was twice as important as another.

(4) Again Wall has asked whether the perceived causes of low job satisfaction were in fact the real causes of their low morale - men whose motivation is low will be more ready to find fault with and blame their environment, than men whose motivation is high.
Consider the incident of wild cat strikes where the ostensible reason for stopping work is often very different from the genuine grievances the men have.

(5) One final problem is more a comment on Herzberg's theory than his techniques, but it raises the question of how hygiene factors and motivators interact. It is quite possible for working conditions (hygiene factors) to be very bad, while the motivators present are very good as for example in nursing. How do these two types of factors interact in this situation, and what will be their final effect on performance and productivity? The theory provides no clear answer. Warr and Wall (1975) state that the consensus of opinion that has emerged is that the two factor theory does not stand up to the empirical test. However, even in its failure it has added another important dimension to the job attitude research.

Further research connected with the satisfaction and dissatisfaction syndrome was conducted by Dollard, Doob et al. (1939).

**Frustration - Aggression Hypothesis**

According to Blum:-

A revised hypothesis concerning the above generally suggests that aggression is typically produced by frustration, but that being frustrated does not necessarily result in an aggressive response. Responses to frustration are now considered to be of four basic types:

- Withdrawal responses.
- Attack responses.
- Limitation responses.
- Substitution responses.

This would appear to indicate that frustration causes dissatisfaction, although Scott (1966) suggests the activation theory wherein the human organism needs stimulation and variety in its environment and frustration might satisfy these needs. The author feels that this statement will only be true if the individual has some control over his working environment.
If the individual accepts frustration as a challenge then there must be some identifiable way in which he can surmount these obstacles. Surely only this would cause satisfaction. Much will depend upon the personality and requirements of the individual, and indeed the areas of frustration.

Hoppock

A community wide survey conducted by Hoppock (1935) where eighty per cent of the 351 employed adults answered the questionnaire showed that only 15 per cent of the sample had job dissatisfaction. Robinson and Hoppock (1952) have since collected data on 191 assorted studies reporting percentages of job dissatisfaction. The median figure is 18 per cent dissatisfied. These results would seem to indicate that only a small proportion of workers are really dissatisfied with their jobs. One would of course need to know more about the sample.

In this chapter a considerable amount of research has been cited and reviewed. The objective has been to identify the various types of research, the factors selected, and the contribution of these factors to job satisfaction and/or job dissatisfaction. Herzberg's two factor theory will be used to identify the factors as either hygiene or motivators.

As reported in Blum (1968), Vroom (1964) factor analysed a number of studies in job satisfaction and listed the different dimensions of factors as follows:-
Herzberg, Mausner, Peterson and Capwell 1957 report data compiled from 16 different studies and involving over 11,000 employees. The following shows how the workers ranked the factors according to their importance.

- **H** - Hygiene
- **M** - Motivators
## Relative Importance of Different Aspects of Job Satisfaction

### Range of Rankings

<table>
<thead>
<tr>
<th>Job Factor Or Specific Job Aspect</th>
<th>Least Important</th>
<th>Most Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Interest (From intrinsic aspects of jobs)</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Opportunity for advancement</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Appreciation (From supervision)</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Company and management</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Intrinsic aspects of job (Excluding ease)</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Wages</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Supervision</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Social aspects of job</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Working conditions (Excluding hours)</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Hours (From working conditions)</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Ease (From intrinsic aspects of job)</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Benefits</td>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

**Legend:**
- Interquartile range
- Median rank
- H – Hygiene
- M – Motivators
Blum (1968) states that while these data may be used as an approximate indication of the overall importance of the various job factors, it is very important to keep in mind that this ranking is apt to be quite different from any particular class or group of workers. Herzberg et al points this out clearly. For example with people at higher occupational and/or educational levels intrinsic aspects of the job go up in importance, while security drops off considerably.

A further analysis of the relative importance of factors emanating from eight pieces of research into job satisfaction as reported in Tiffin and McCormick (1968) follows.
<table>
<thead>
<tr>
<th>Source</th>
<th>Chant Misc. Workers</th>
<th>Chant Dept. Store Workers</th>
<th>Wyatt et al. Women Factory Workers</th>
<th>Berdie Male H.S. Graduates</th>
<th>Blum and Russ Male</th>
<th>Female</th>
<th>Jurgensen Male Applicants</th>
<th>England and Stein Male Employees</th>
<th>Level Of Actual Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity For Advancement</td>
<td>M 1</td>
<td>M 1</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>5.5</td>
</tr>
<tr>
<td>Job Security</td>
<td>H 2</td>
<td>H 2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>5.5</td>
</tr>
<tr>
<td>Opportunity To Use Ideas</td>
<td>M 3</td>
<td>M 3</td>
<td>7</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity To Learn A Job</td>
<td>M 4</td>
<td>M 4</td>
<td>8</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity For Public Service</td>
<td>M 5</td>
<td>M 5</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type Of Work</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervisor</td>
<td>H 6</td>
<td>H 5</td>
<td>4</td>
<td>9</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
<td>Company</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pay</td>
<td>H 7</td>
<td>H 6</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5.5</td>
<td>10</td>
</tr>
<tr>
<td>Co-workers</td>
<td>H 8</td>
<td>H 8</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Conditions</td>
<td>H 9</td>
<td>H 9</td>
<td>2</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Work</td>
<td>H 10</td>
<td>H 10</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Hours</td>
<td>H 11</td>
<td>H 10</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>3.6</td>
</tr>
<tr>
<td>Easy Work</td>
<td>M 12</td>
<td>M 12</td>
<td>10</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefits</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognition</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**H** - Hygiene  
**M** - Motivators
The Factors

If we examine factors that appear important to workers, the following emerge:

<table>
<thead>
<tr>
<th></th>
<th>Motivators</th>
<th>Hygienes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vrooms Analysis</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Herzberg et al</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Tiffin and McCormick</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

Security was identified by most of the respondents as the more important. Opportunity for advancement was ranked jointly with security. Intrinsic aspects of the job were also ranked high, generally third. Further rankings contained more hygiene factors than motivators, and the hygiene factors were invariably ranked higher than the remaining motivators. In an analysis and evaluation of the two factor theory King (1972) generalises from five theories and concludes that although some research tends to support one or more of these theories, many of the results show experimenter coded biases and defensive biases. He also indicates that further research needs to be conducted patterned after Halin and Smith (1967). Without discussing in depth King's analysis of Halin and Smith's study, it is interesting to note that the hygiene factors correlated significantly more with overall satisfaction than with overall dissatisfaction. Although no direct overall comparison may be made with theories tending to support the two factor theory because only two motivators and three hygiene factors were used, it does nevertheless challenge the theory that motivators correlate only with satisfaction.
**CORRELATIONS BETWEEN SATISFACTION WITH EACH OF FIVE JOB FACTORS AND MEASURES OF OVERALL JOB SATISFACTION AND OVERALL JOB DISSATISFACTION**

*(Hulin & Smith, 1967)*

<table>
<thead>
<tr>
<th>Job Factor</th>
<th>Males Satisfaction</th>
<th>Males Dissatisfaction</th>
<th>Females Satisfaction</th>
<th>Females Dissatisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motivators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Itself</td>
<td>.68</td>
<td>.44</td>
<td>.45</td>
<td>.43</td>
</tr>
<tr>
<td>Promotion</td>
<td>.40</td>
<td>.38</td>
<td>.46</td>
<td>.14</td>
</tr>
<tr>
<td><strong>Hygienes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pay</td>
<td>.39</td>
<td>.24</td>
<td>.12</td>
<td>.18</td>
</tr>
<tr>
<td>Supervision</td>
<td>.53*</td>
<td>.25</td>
<td>.31</td>
<td>-.03</td>
</tr>
<tr>
<td>Co-workers</td>
<td>.48*</td>
<td>.13</td>
<td>.20</td>
<td>-.08</td>
</tr>
</tbody>
</table>

* The difference between the correlation with satisfaction and with dissatisfaction is significant at the .05 level.

The author feels that a considerable weakness exists in much of the research to date on job satisfaction, in that the most acclaimed research has mainly examined the areas of management, that is from line supervisor upwards, and also many staff positions. What appears to be required is more structured research into the higher density area of manufacturing organisations. The semi-skilled operators lack aspects of intrinsic satisfaction, opportunity for self development, advancement and other motivators. It is well known that people occupied in managerial and staff positions have invariably more variety in their jobs and indeed more opportunity for self actualisation and intrinsic satisfaction. It would therefore appear logical to concentrate upon the largest population area in manufacturing concerns.
To indicate an approximate ratio of this population area in manufacturing organisations, a typical assembly shop set up follows:

**Batch Production**

- 150 Semi-skilled operatives
- 10 Setters or Leading operators
- 10 Chargehands
- 2 Assistant foremen
- 1 Foreman
- 2 Labourers
- 10 Viewers
- 5 Inspectors
- 4 Stores Keepers
- 2 Wages clerks
- 2 Planning Engineers
- 2 Work Study Practitioners
- 1 Personnel Assistant
- 2 Production Control
- 4 Sales
- 4 Development and Design
- 3 Maintenance Engineers
- 4 Toolmakers

**Ratio 150/68**

It would probably be accepted that most of the service areas indicated have far more variety and inherent stimulation in their work than the semi-skilled operators.

It was felt necessary to test operator understanding of the financial incentive scheme under which they worked. Further that a review of some
Operator Understanding

One of the basic requirements of a financial incentive scheme is that it should be simple and easily understood (Marriott's summarised principles 1961). This requirement is based on the assumption that operatives who perceive higher personal productivity as a means to increased earnings perform more effectively than operatives who do not perceive this relationship. (Georgopoulos et al. 1957). Other studies have reached a similar conclusion of which two investigations conducted by the Industrial Psychology Research Group merit attention. Both studies concerned forms of Bedaux payment systems; that is a type of premium bonus system where earnings vary proportionally less than output. The methods used were mainly personal interviews and analysis of factory records. Wyatt, Langdon and Marriott surveyed six factories in which 564 operatives were asked:

(a) Do you understand how your wages are calculated?
and

(b) Do you know when you have reached the point at which you start earning bonus?

The replies were tabulated under the headings of Yes, Roughly and No, as follows:

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>Roughly</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>Range</td>
<td>%</td>
</tr>
<tr>
<td>(a)</td>
<td>46</td>
<td>1-98</td>
<td>14</td>
</tr>
<tr>
<td>(b)</td>
<td>53</td>
<td>1-98</td>
<td>6</td>
</tr>
</tbody>
</table>

The research conducted into this area might be useful.
Thus only half of the number of operatives interviewed claimed to understand their wages calculation. The understanding varied between factories - 80% and above in two factories understood the calculation of wages, while in two others this fell to 5%. This was explained by the conditions of work, and to a lesser extent the amount of explanation given by management. In the factories which showed high operative understanding, the operatives were mainly on one type of work, and in one case management aided understanding by the provision of simple charts explaining the calculation of wages. In factories where operatives revealed low understanding, frequent changes in the work occurred and the mechanism for calculation was so complicated, that management found it difficult to give an intelligible explanation.

The second study by Shimmin 1959, was in six factories ranging from 300 - 3,000 operatives. In examining understanding, levels of comprehension of the schemes were distinguished and termed 'formal' and 'functional' understanding. The former was defined as understanding the principle of the wage incentive, methods of work measurement and the calculation of pay. The latter was defined as having a working knowledge gained from experience of cash bonus related to some output level. 388 operatives were assessed, and the results summarised under good understanding, limited understanding and no understanding.
The conclusion to be drawn from these results is that over 40% of the operatives lack any useful understanding of the financial incentive schemes under which they work. Marriott (1961) argues that it is reasonably certain that productivity will be adversely affected where lack of understanding undermines the incentive effort. Also the full benefits of the incentive may not be achieved where lack of understanding exists. Thus the fact that plans exist which have increased production and lowered unit costs, despite a low level of understanding by employees does not disprove the premise.

Further criticism of much of the previous research is the apparent lack of structure in the questions asked. To ask someone to recall the good or bad moments of the job and expect an accurate and unbiased account specifically remembered and identified, in the author's opinion is just not feasible. As King (1972) states they are bound to contain biases of many kinds. Those respondents that cannot remember and are reasonably satisfied with their jobs are surely not going to disappoint the researcher! With these facts in mind the author has designed a number of questions within five factors as previously mentioned:

<table>
<thead>
<tr>
<th>Understanding</th>
<th>%</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>14</td>
<td>0 - 29</td>
</tr>
<tr>
<td>Limited</td>
<td>42</td>
<td>21 - 67</td>
</tr>
<tr>
<td>No</td>
<td>44</td>
<td>20 - 67</td>
</tr>
</tbody>
</table>
The questions are specific and designed to reveal job satisfaction amongst semi-skilled operators who have very little opportunity for job motivation as identified by previous researchers. The theory will be explained and developed in the next chapter.

This chapter has so far concerned itself with research associated with the satisfaction—dissatisfaction syndrome. Psychologists would argue that the domains have been mostly in their areas of discipline. The author however would contest this statement. For much of this research has been associated with groups— their attitudes, interactions, responses and involvement. In consequence we have moved into the domain of the Industrial Sociologist. A clear dichotomy appears irrational and impossible, perhaps we should now identify this research with Social Scientists and appreciate the necessity of the involvement of both the psychologist and sociologist in research of this nature. In view of this latter statement an examination of the concepts of dissatisfaction and the work of philosophers and sociologists with relation to dissatisfaction and alienation is thought to be useful.
Alienation/Dissatisfaction

'Broadly speaking, alienation denotes a socio-psychological condition of the individual which involves his estrangement from certain aspects of his social existence' Dictionary of Sociology. (1975)

It was felt necessary to commence with a current definition in view of the fact that 'alienation' has been ascribed and related to so many different disciplines in so many different ways. For example it has occurred in, Social psychology, Sociology, Philosophy, Psychoanalysis and Existentialist Philosophy. It has also been used as an explanation of class differences, mental behaviour, industrial problems and conflict, anarchy and ethnic disadvantage. Although it was Marx who first conceptualised 'alienation' into sociological theory, he appeared to be greatly influenced by Hegel, who as stated by Schacht (1970) was the first to elevate the term to a position of philosophical importance. Kaufman 1965 states that 'To claim that a person is alienated is to claim that his relation to something else has certain features which result in avoidable discontent or loss of satisfaction.' According to Schacht, Kenneth Kenison (1965) contends that, 'Most usages of 'alienation' share the assumption that some relationship or connection that once existed, that is 'natural, desirable or good', has been lost.

Although Horowitz (1966) suggests 'the need for a philosophical analysis with particular reference to the use of the term by Social Scientists,' this had to some extent been achieved by Seeman (1959),
and by Nettler (1957). Seeman has appeared to have been influenced by Marx in his analysis of 'alienation' for example two of his isolated concepts are, 'powerlessness' and 'meaninglessness' which were used by Marx in his earliest writings. Schacht's comprehensive work on 'alienation' conducts the reader through a series of interesting and enlightening developments and progressions in true philosophical style. Commencing with traditional uses of the term, he then discourses upon the Latin and German derivations and equivalents. The Latin origin he states is 'alienatio', and derives its meaning from the verb alienare (to make something another's, to take away, remove). In addition, it can also mean, 'to cause a warm relationship with another to cool'.

Jean-Jacques Rousseau (1947) in the Social Contract closely relates aliener and renouncer, and uses them interchangeably when speaking of 'alienating ones liberty'. When discussing 'transfer' he uses the term 'alienate'. Rousseau considers it doubtful that one has the right to surrender or 'alienate' his freedom. He is however in favour of this surrender if the authority for such is transferred to a community, where one surrenders the particular self, and which as Schacht states, 'occurs frequently in Hegel's discussion of alienation in Phenomenology. An interesting passage from Hegel's essay on the German Constitution, (1802) translated by Schacht states:

"The thoughts contained in this work can have no purpose or effect .......... other than that of the comprehending of what exists that makes us vehement and causes us suffering; rather it is what is not as it should be. But if we see that it is as it must be - that is, that it is not arbitrary or accidental - then we also see that it should be as it is. "Schacht says, this passage is of special interest because it reveals a number of assumptions and inferences which are basic to, but not explicit in, his discussion of the overcoming of the one type of
alienation in the Phenomenology. Schacht criticises Hegel's statement by saying that it is far from convincing, and states that one may be unable to see how it would be possible for system to be improved at the present time, and yet feel irreconcilably at odds with it. One may still find it too repugnant, too 'alien' to embrace. The author disagrees with Schacht, and feels that Hegel does not categorically state that, if we see it as it must be, then any suffering is ended, only that it would have a reductive effect, that is alleviate the suffering. What Hegel appears to be stating is that if one fully understands the reason for a situation, then one has certainty, and 'alienation' is alleviated. Hegel uses 'alienation' in two ways: as a separation or discordant relation, and self alienation, between ones actual condition and essential nature. Marx criticises Hegel on these two aspects, on the basis that they are abstract, logical and speculative expressions. That they do not reflect the true man and are merely forms of consciousness and selfconsciousness. Schacht criticises Marx in that different forms of consciousness and self-consciousness need not necessarily be abstract.

Marx's use of the term 'alienation' is to suggest a separation of some sort, for example the relinquishment of one's control over one's product and labour. Marx contends that, when a producer does not own the product he produces, but that it belongs to another, then the product is alien to him, then he in turn is alienated. Schacht admits that this characterisation is useful, but he does not wholly agree and cites a member of an orchestra, who although directed by another obtains a degree of self-fulfillment.

Marx identifies the source of alienation as the nature of civil society, and the institution of private property. In this society workers may be motivated by the same desire for enrichment
as the capitalists. He further contends that, 'The positive supersession of private property .......... is the positive supersession of all alienation.' Schacht postulates that because Marx employed the term alienation in connection with a wide variety of things it cannot convey anything specific.

A number of sociologists interpret alienation as some form of separation of the individual from some aspect of society. Both Fromm and Marx hold that men can be aware of their alienation, many sociologists do not hold this view and contend that it is conceived in terms of attitudes and feelings and therefore is a psychological state of an individual. They also consider that appropriate research methods — questionnaires — interviews — will often reveal the attitudes that reflect some form of alienation. Schacht criticises those sociologists who list a number of uses for the term, then referring to the corresponding phenomena as different 'types' of alienation, and subsequently speaking of them as so many 'dimensions', aspects or 'elements' of alienation. He disagrees with the multi-dimensional concept and cites the three traditional uses of alienation — transfer of property — mental derangement — and separation from others. It would be absurd to conclude that it warrants regarding the three things as three 'aspects' of a single 'multidimensional' phenomenon: 'alienation'. Yet he then states that the attempts of sociologists to deal in this way with the various instances of 'alienation' with which they are concerned may not be so patently absurd.

The author feels that Schacht has missed an important point, in that it would appear to be reasonable to suggest that any of the three traditional uses of 'alienation' must themselves be multi-dimensional. In other words there surely must be degrees of 'alienation'. How much
of oneself has one had to surrender? Would the worker in an industrial environment be more alienated than Schacht's example of a musician? As there will be differing reasons for 'alienation' within one factor so there will be differing dimensions of these. If 'alienation' with and at work is considered undesirable, then surely the object would be to reduce it! In this very context we are indicating various levels of such, that is dimensions.

Seeman (1959) established a redefinition of the various usages of the terms of 'alienation' in order to make them empirically testable:

'Powerlessness', was that of alienation as a feeling on the part of the individual that he cannot influence the social situation in which he interacts.

'Meaninglessness' is a feeling on the part of the individual that he has no guides for conduct on belief.

'Normlessness' is the individual's feeling that illegitimate means are required to achieve goals.

'Isolation' is a feeling of estrangement from the cultural goals of society.

'Self-estrangement' is an inability to find self-rewarding activities.

Each of these terms Seeman sees as independent of each other. Various attitude scales have been used to measure them in the social context of alienation.
Alienation and Job Satisfaction

The degree of recognition by one's superiors, relationship to other workers, and the job in relation to one's career expectation are variants identified by Aiken and Hage (1966) and contributing to dissatisfaction and 'alienation from work'. It is therefore the hygiene factors they are mostly concerned with - dissatisfiers. They therefore differ from Marx in his concept of 'alienation from the process of production.' Seeman however concentrates upon the job itself and intrinsic satisfaction. One who is not intrinsically satisfied is alienated. Miller (1967) observes that a man who does not find his work intrinsically satisfying need not be dissatisfied with his job. This agrees with the author's interpretation of most semi-skilled jobs, and this statement of Millers is quite remarkable in view of his research area; that is 'Industrial Scientists and Engineers'. Other research of professionals has shown intrinsic aspects as contributing more to satisfaction. Herzburg et al. Blauner (1964) has a more generalised concept of alienation in which he states:

Alienation is a general syndrome made up of a number of different objective conditions and subjective feeling-states which emerge from certain relationships between workers and the sociotechnical settings of employment. Alienation exists when workers are unable to control their immediate work processes to develop a sense of purpose and function which connects their jobs to the overall organisation of production, to belong to integrated industrial communities, and when they fail to become involved in the activity of work as a mode of personal self-expression. Blauner's concept of 'alienation' is thus more basic and practical than other exponents. Granted his reference to absence of self-expression relates to Marx's 'alienated labour',
and his view of meaninglessness with Seeman and Miller. Nevertheless his identification of the necessity for workers to be able to control their immediate work process is important to this research.

His dissertation on 'Powerlessness', meaninglessness, isolation and self-estrangement however need to be examined:

'A person is powerless, he states, when he is an object controlled and manipulated by other persons or by an impersonal system (such as technology) and when he cannot assert himself as a subject to change or modify this domination. The non-alienated pole of the powerlessness dimension is the state of freedom and control.'

What appears to be forgotten is that in order for a worker to control his own work other controls such as management and work study must be seen to be effective. If these controls are seen to be ineffective it is then the worker will feel a state of 'powerlessness' or an inability to control his own work, especially if part of his earnings are based upon bonuses for output.

'Meaninglessness alienation reflects a split between the part and the whole. A person experiences alienation of this type when his individual acts seem to have no relation to a broader life-programme. Meaninglessness also occurs when individual roles are not seen as fitting into the total system of goals of the organisation but have become severed from any organic connection with the whole. The non-alienated state is understanding of a life-plan or of an organisation's total functioning and activity which is purposeful rather than meaningless.'
What appears to be indicated in the above is a complete lack of certainty. If the worker identifies that the goals of the organisation are maximum productivity for a reasonable wage, and the management and workstudy controls are so ineffective that achievement falls hopelessly short of these goals, then nothing is meaningful and uncertainty, dissatisfaction, and alienation will prevail.

Isolation suggests, Blauner states, the idea of general societal alienation — remoteness. This type of alienation the author suggests would also stem from the two previous terms and from general dissatisfaction. Isolation from staff and management.

Self Estrangement has a denigrating effect — a loss of personal dignity and identity, when it is stated an activity becomes a means to an end. This latter term the author considers would be more difficult to ascertain or measure than the other terms. It appears to relate partially with Durkheim's (1951) transcendental concept of anomie.

Blumberg 1971 states 'There are objective alienating qualities about much labour and that these are seen and felt as such by the worker, although perhaps he does not articulate them explicitly.' In his chapter, 'Alienation and Participation', a review of the literature, he is in fact citing much of the research designed to reveal satisfaction or dissatisfaction within various environments. The author feels that some results in which the respondents indicated a higher satisfaction through some form of participation merely reflected a substitution for ineffective controls. This assumption would of course be difficult to prove, unless controls, participation, decision making were measured to reveal the highest contributor to satisfaction. If however controls are shown to be an important contributor to satisfaction, then surely a case is made for further research into the participation/satisfaction/alienation syndrome.
In conclusion it would seem that alienation — dissatisfaction and uncertainty are related, and if this research indicates that satisfaction is directly proportional to the degree of management and work study control, then uncertainty will reflect dissatisfaction and also some aspect of alienation.

It was mentioned in the introduction that trying to produce an environment which allows for high efficiency and a high level of worker satisfaction appear to be incompatible (Blum and Naylor 1968) Vroom (1964) summarised twenty areas of research measuring job satisfaction and job performance and no simple relationship emerged between these two factors. When measured, the correlations had little theoretical and practical importance. Social scientists and many employers have been researching and experimenting to try and solve some of the problems associated with worker dissatisfaction. High labour turnover, lateness and absenteeism in many organisations culminated in higher costs and loss of output. The Swedish Employers Confederation published a report on job reform in Sweden, translated and edited by David Jenkins (1975). They state the objectives of work reform are generally expressed not only in terms of increased productivity and efficiency, but also of increased job satisfaction and more interesting and more stimulating tasks as worthwhile ends in themselves. Considerable attention is being devoted to the physical design of the workplace and the engineering of production equipment.

Highly fragmented work tasks, excessively authoritarian management practices and the stepped-up tempo of modern production plants were deemed to be generating stress, psychological pressures and feelings of alienation among the workers. The piece-rate system, widely applied in Sweden, was closely linked to the alleged evils of the prevailing management system. Fixed monthly wages for all workers in factories as well as in offices, became a frequent demand.

They also speak of extending the work cycle, integrating production
and auxiliary tasks and decentralising authority and responsibility. Organisation of people into small groups (autonomy).

Various cases are quoted; Saab, A.S.E.A.'s office/factory layout, Steel Foundry, Volvo and others. All so far indicate success in that they have achieved higher satisfaction and if not higher output, at least maintained the previous level. Similarly George Thomason's book "Experiments in participation" wherein he reveals work conducted along similar lines at I.C.I., B.P., Avon Rubber Plant and others are extremely encouraging. Blumberg (1971) states: I do not share the belief that alienation is merely a condition which the intellectual experiences when he contemplates manual labour. I believe, and there is after all, ample sociological evidence to confirm it, that there are objective alienating qualities about much labour and these are seen and felt as such by the worker, although perhaps he does not articulate them explicitly. He then states that there is hardly a study in the entire literature of participation which fails to demonstrate that, satisfaction in work is enhanced and that other generally acknowledged beneficial consequences accrue from a genuine increase in workers decision-making power. Such consistency of findings he states, is rare in Social research. He further states that participation has lately become quite fashionable in management and business school thinking in the United States, having replaced the human relation approach, which was considered too manipulating and thus self-defeating by authority styles, theory Y, T Groups and an assorted alphabet soup of participatives and pseudo-participative techniques. Although he says "Our approach", of course differs from all of these in that we do not see participation as a device to lower costs, to improve quality, to increase productivity, to undercut trade union of worker's demands, or to give workers the illusion of power without its actuality, the more easily to guarantee jealously guarded managerial prerogatives within the framework of private enterprise. We are interested in the question of participation as it bears on the largest sociological
and philosophical issue of the alienation of labour, and we are prepared to follow wherever this research leads.

Nevertheless of seventeen pieces of research on participation summarised by Blumberg; seven are surveying production workers and most revealed higher efficiency from participation and job satisfaction. It could be argued that although many people would agree with Blumberg's sentiments, we do as a nation need to be economically sound and therefore organisations have the need to look for increased output and reduced costs as well as lower labour turnover and increased operator satisfaction. The indications are that organisations are moving in this direction and achieving many of these desired improvements.

The author feels that this research in its emphasis upon other factors and their possible relationship and contribution to satisfaction tends to complement much of the previous and ongoing research and it is hoped will prove a useful addition to so much already identified and established in this field.
CHAPTER III

THEORY
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THEORY

It will be remembered that the theory stated the following

Related Assumption
Workers like certainty and dislike uncertainty in some aspects of their working environment.

Predictions
(1) The more effective management and work study controls are seen to be by the operatives, the higher the operator satisfaction and their certainty.

(2) If management and work study controls are low then operator satisfaction will be high only if operator control is high.

(3) The higher the level of communication as seen by operatives, the higher the level of operator satisfaction and certainty.

It was also stated that uncertainty will be said to be proportional to the number of events which could reasonably occur at any given moment. Reasonably in the sense that the events are likely to occur.

As an example Shannon's theory was quoted in the introduction and it will be used in the same qualitative sense only.
For example the operator could experience in his working environment many aspects which would contribute to his uncertainty. A number of these aspects were identified in the introduction. It is not just the existence of some of these aspects that create uncertainty but the operators interpretation of how effective management and work study are in controlling these aspects that increases or reduces his uncertainty.

Reasonably will then be the interpretation placed upon any event that the operator sees as likely to occur in many differing situations. In the situation that occurs for a particular event the operator will not immediately identify all the factors that contribute to most events, but only those that contribute to the immediate situation, and which for him at that particular moment are critical. For example if the operator is held up in his job waiting for material, his immediate identification of the reason will be the area of management control and he may also blame his immediate supervision. If however he knows by experience that management are usually effective in supplying material then his uncertainty will not be as great. He may indeed show a degree of tolerance, because experience has taught him, that management generally resolve these difficulties promptly.

The definition of uncertainty does not allow a direct measure. It must then be asked, if we cannot measure uncertainty directly how then can it be measured? By measuring the performance of
Management and Work Study

Management and work study are asked directly about their own controls, these results however are only used in the analysis of communication (discussed at the end of this chapter).

Only the operatives identification of the performance of management and work study will be measured. This method is more likely to represent the level and degree of uncertainty felt by the operatives. It is also more likely to reflect the different interpretations separate groups of operatives will place upon similar situations in different companies.

Selection Of Factors

Twelve aspects of the working environment in which operatives like certainty and dislike uncertainty were outlined in the introduction. There are others and they will be identified in this chapter and more specifically in the chapter dealing with questionnaire construction. As stated previously the questions were originally based upon the author's experiences in industry, that is face validity. A considerable amount of research in this area was studied and there were commonalities in some of the questions with those in this research. It was felt that many of the questions posited by other researchers were too specific; for example:

those responsible for uncertainty, that is:
Do you like your job?
Do you dislike your job?

and too vague for example:

Think of the time when you were happiest in your job.
Think of the time when you were unhappiest in your job.

In the main the strongest criticism of previous research is that they were mostly descriptive studies. It is for these reasons that a more constructive and cohesive model was designed to be used in this research. It appeared necessary to re-examine the working environment and ask, what are the essential factors which can be identified as those necessary for satisfactory job performance?

Restating that this research is confined to semi-skilled operatives, and that the factors now posited apply particularly to this sample of the working population, they are:

**Operator Understanding O.U.**

These questions deal with specific understanding of the financial incentive scheme, calculation of borns, understanding formulae, knowledge of the function of components, and how time standards are measured.

**Work Study Control W.S.C.**

These questions deal with loose time standards, the financial incentive scheme, work queries, method study application, and management backing for work study.
These questions deal with restrictive practices, the booking on and off work, co-operation with work study and effort on unmeasured work.

Management Control M.C.

These questions deal with the booking of work, departmental effectiveness, work scheduling, scrap and rectification and inspection's contribution.

These variables are the independent variables and will be measured against the variables within the last factor—operator satisfaction, termed the dependent variable.

Operator Satisfaction

These questions deal with company and management policy, working conditions, supervision and security.

If the variables chosen do not explain satisfaction in this research then other causes of satisfaction will have to be identified and considered.

It is the author's opinion that many external factors and
internal social factors are somewhat overstated by a number of researchers. It is his experience that operators identify the task set by management and do their best to achieve this regardless of those supposedly other causal influences.

Operators tend to suppress their personal troubles and problems where it would conflict with their job performance. These factors can of course influence their behaviour and relationships with their fellow operatives, but regardless of this they generally manage to produce standard output. If this was not the case many more companies would be bankrupt within a short period of time.

In companies operating some type of financial incentive scheme, management identification of standard output and performance is:

"That pace and performance which a qualified operator will achieve all day without undue fatigue."

It is British Standard 100 performance. Derived from Bedaux's concept of motivated pace - that is 80 minutes work in 60 minutes. If most operators can and in fact do achieve British Standard 100 performance, then it is the overall departmental performance that is critical.
For Example:

10 operators working a 40 hour week.

Potential 400 standard hours of output.

In the course of the week each operator was waiting for 10 hours, but in the 30 hours they were working they produced 30 standard hours of production.

\[
\text{Operator efficiency} = \frac{\text{Standard hours achieved}}{\text{Hours worked on Standard}} \times 100
\]

\[
= \frac{10 \text{ operators} \times 30 \text{ Standard Hours}}{10 \text{ operators} \times 30 \text{ Hours work On Standard}}
\]

\[
= \frac{300}{300} \times \frac{100}{1} = 100\% \text{ efficiency}
\]

\[
\text{Departmental performance} = \frac{\text{Standard Hours Achieved}}{\text{Total Hours Worked}}
\]

\[
= \frac{300}{400} \times \frac{100}{1} = 75\%
\]

In consequence the operators will have lost 10 hours bonus potential and this could reflect dissatisfaction and uncertainty.
Prediction (2) of the theory stated:

'If work study and management controls are low then operator satisfaction will be high only if operator control is high.'

Many previous researchers have identified restrictive practices (or as named in this research Operator Control) as contributing more to job satisfaction than any other variable, Roethlisberger and Dickson, Donald Roy et al. It is the author's opinion that those research areas mentioned reflected the old haphazard rate fixing methods resulting in both tight and loose time standards. This coupled with ineffective management controls caused dissatisfaction, and inevitably the operators exercised their own controls and manipulations. If this is correct then Operator Control will only be high if work study and management controls are seen to be low. If work study and management controls are seen to be high then the need for operator controls to be exercised is not applicable and could well reflect certainty and a higher satisfaction.

Job Performance

A considerable amount of research has been structured to ascertain what relationship may exist between operator performance and job satisfaction. The conclusion reached is that generally no correlation appears to exist between these two variables. It depends to a large degree on what factors of job satisfaction were measured and related. Although this research is not intended to
measure these concepts nevertheless overall departmental efficiencies will be assessed and related to an overall job satisfaction score. The theory in the research is not specific on this point and there are inherent difficulties with assessment where no specific intention to examine these variables initially existed. It is felt however that operators working within a financial incentive scheme seek the opportunity to at least earn standard bonus over the full working week. If they are prevented from achieving this target (which after all is the economic target of management) they fail to produce this output level and are dissatisfied. This demonstrates a relationship between satisfaction, certainty and output.

This is not to state that the more output an operator achieves the more satisfied he is, but only that level of output that can be maintained over a full working week to guarantee his full wage plus the bonus earned. Satisfaction in this situation arises more from always having work available and being allowed to complete this work, with no delays. In this latter context less uncertainty leads to higher job performance.

It has already been said that individual operator performance will not be examined, but that overall departmental effectiveness will be. If the standard hours achieved by the operatives in a particular department are divided by the total hours worked and multiplied by one hundred, this would measure the overall department efficiency. If ineffective and non-productive time were low and operators produced at standard performance B.S.100 then the overall
departmental efficiency would be high. Thus reflecting effective management and work study controls. If ineffective and non-productive time were high the overall departmental efficiency would be low reflecting ineffective management and work study controls as previously discussed on page 64.

Prediction (3) of the theory stated:

'The higher the level of communication as seen by the operatives, the higher the level of operator satisfaction and certainty.'

The area of communication concerns the three groups of respondents, that is management, work study and operatives. The level of communication means the corresponding level of replies of the three groups. The questions constructed are similar for all three groups with this difference.

Operators are asked questions that are specific to them in the industrial environment and the questions to management and work study specifically relate to how they think that the operators will reply to those questions, for example:

A question to operatives asks:

'How much do you know about the type of financial incentive scheme applied to you?'

The answers are structured as follows:—

I know a lot about the financial incentive scheme
I know a fair amount about the financial incentive scheme
I know a little about the financial incentive scheme
I know nothing about the financial incentive scheme

The questions to management state:
'How much do operatives know about the type of financial incentive scheme applied to them?'

The answers are constructed in similar fashion to those concerning the operatives:
They know a lot about the financial incentive scheme
They know a fair amount about the financial incentive scheme
They know a little about the financial incentive scheme
They know nothing about the financial incentive scheme

The answers therefore should reveal the level of communication that exists between the three groups.

If the reply by the operatives indicated that they knew a fair amount about the financial incentive scheme applied to them, and management and work study gave the same reply, then the level of communication is high (all the same level). This should increase operatives certainty and therefore their satisfaction.

**Summarising The Predictions**

**Operator Understanding**

Assuming research indicates that approximately 50% of operatives understand their financial incentive scheme and system, then the
contribution that this variable will make to satisfaction and certainty will be small. This however has yet to be tested but nevertheless some contribution is expected. Further discussions regarding this factor will be developed in the final analysis.

It was stated on Page 2 that: 'This research will be restricted to ten companies, where possible manufacturing different products or processes. It is also intended to select companies operating different types of financial incentive schemes in order to obtain a more representative sample. It was assumed that management and work study controls would vary in effectiveness according to the type of financial incentive scheme applied. For example regressive schemes, (those that do not pay proportionally to effort) have much in common with the old type piecework systems. The times vary and work study application generally leaves a lot to be desired. This type of application in consequence might well lead to higher operator controls - manipulation of the system. The more progressive type of schemes such as straight proportional (Linear) and graded measured daywork may well prove to have more effective controls by management and work study and therefore might indicate less need for operator controls. It was for this reason that it was decided to include companies operating different schemes. It is recognised that a sample of ten firms operating different schemes would be too small to be able to state categorically which scheme showed most merit. It might however be possible to observe an indication or trend, and make an assumption about such which would need to be
substantiated by further research. It is also intended to relate productive effectiveness to the type of scheme, for if Marriot’s principles apply, then straight proportional type schemes should lead to higher productive effectiveness. Conflicting opinions exist regarding the contribution and effect of variables such as age, sex, length of service, marital status and so on. Fournet et al (1966) state that most studies in these areas deal with the lack of congruence in the perception that an individual has of himself, his job, and the company for which he works.

AGE

Herzberg et al (1957) proposed that there is a significant relationship between age and job satisfaction. They stated that a high morale existed for the young employee immediately after employment, but dropped sharply after a few years and then rose as workers continued in their employment. Fournet et al state that difficulties arise when endeavouring to measure the contribution of age to job satisfaction, because many studies do not give the ages of workers used as subjects and, when they are given, they are often given only in general terms. It is intended in this research to examine the correlation of age with the other determinants of job satisfaction in order to try and obtain a more precise indication of the association and probable contribution.

SEX

It is conceded that the replies of women to questions identically framed for men may well differ in relation to job satisfaction. Hulin and Smith (1964) contest that it is not sex, per se, that is related to either high or low satisfaction, but rather a variety of factors
which themselves are identified differently. Herzberg et al (1957) attributed the greater variabilities in the attitudes of women to the multiple roles assumed by them in positions outside the home. The correlations of the replies of both sexes will be examined in relation to job satisfaction in this research and comparisons will be made across the constituent variables.

Marital Status

Surprisingly Fournet et al (1966) do not mention marital status under their 'Characteristic of the individual'. It has often been assumed that married men and women adopt a more responsible attitude towards work than their single counterparts. In consequence their attitudes may well vary in their identification of the importance to them of the posited variables of satisfaction. This variable will also be measured against job satisfaction. Similarly length of service, and service in present occupation will also be examined in an endeavour to define their contribution to the area of satisfaction.

To summarise, the theories and assumptions will be restated.

1. The essential predictions in this research are that high management and work study controls will reflect high satisfaction and certainty, and that low management and work study controls will only reflect high satisfaction if operator controls are high. If operator control is not high then this will reflect uncertainty and dissatisfaction. Further the higher the level of communication between the three groups the higher the level of satisfaction and certainty.
2. The primary aim of this research is to relate certain aspects of the working environment to the prevailing level of operator satisfaction.

3. To produce a theory which is both empirically testable and which can be of use to management and workers in pursuit of the aim of increasing operator satisfaction.

4. That it is not claimed that the theory will be complete in the sense that all the determinants of operator satisfaction will be specified.

5. That the factors that are selected are deemed to be the most important ones, and more measurable in their present structure than some previous research determinants.

6. The operators selected will be semi skilled as defined on page 3.

7. That this research will be restricted to ten companies operating three different types of financial incentive schemes.

8. Three groups are identified: management, work study and operatives.

9. That the domains selected largely represent the author's industrial experience.

10. The central assumption is that, 'Workers like certainty and dislike uncertainty in some aspects of their working environment.'
11. Because effective communication is thought to be important and contributes to satisfaction and certainty, this will be measured across the three groups.

The following is a theoretical model illustrating the salient features of the theoretical concepts.

Diagrammatic Representation Of The Theory

M.C., W.S.C., O.U., O.C. and communication are the independent variables. It is the measure of these variables operating through the two hypothetical constructs; namely the intervening variables, uncertainty in the working environment and operator uncertainty that will reflect the level of operator satisfaction.
CHAPTER IV

TYPES OF PAYMENT AND
FINANCIAL INCENTIVE SCHEMES
CHAPTER IV

TYPES OF PAYMENT AND FINANCIAL INCENTIVE SCHEMES

Financial Incentive Schemes and Payment Structure

It was stated in the introduction that companies operating different types of financial incentive schemes would be selected for this research. It is expected that these schemes will fall into the following categories:

(1) Regressive schemes; Halsey; Rowan and Bedaux type schemes. These are termed regressive schemes because they pay less than proportional to effort.

(2) Linear schemes, straight proportional or reciprocal payment schemes. These schemes pay directly proportional to effort.

(3) It is proposed to select one firm operating a straight measured daywork scheme. This pays a high dayrate for a measured output but the rate is guaranteed even if the output is not reached.

(4) Graded measured daywork schemes. These schemes tend to pay a high day rate at standard performance, and plus or minus pay bands according to operator performance.

These schemes will now be discussed and graphically illustrated.
In 1890, F A Halsey started a premium pay plan at the Canadian Rand Drill Company. A point of production was to be set from the record of performance during past months. The time saved above this task was to be shared in some arithmetic proportion between the company and the men. The men's share to be paid at the usual hourly rate. The task set was naturally low as time study had not come into use. If the men did not make the task they were still paid their regular time wages. Halsey's plan usually gave $33\%$ of the time wage as a bonus.

This plan was modified in 1898 by the brothers C and J Weir of Glasgow. This, called the Halsey Weir plan, gave 50\% of the time saved to the operative and 50\% to management.

In 1898, James Rowan of Glasgow introduced his Premium Pay Plan, an even more regressive scheme than Halsey Weir in that it was designed to take care of loose time standards. His payment was based upon the time saved expressed as a percentage of time allowed and paid on time taken.

Under this scheme the operative can never achieve double time bonus, as can be seen from the graph, the greater effort the operative makes beyond a time and a half effort ($150\%$), the less he receives in bonus.
Charles Bedaux of the United States first applied this plan in 1919. The savings in time shared 75% to the employees and 25% to supervision. Time study was used to establish time standards and issued as a number of Bedaux (B) units for the task. His plan, really part of an overall Management Control System, was complex, and introduced in Great Britain soon after the general strike and failed in most companies. In the 1930's, however, it was successfully introduced in many concerns.

Developed in the United States in 1921 from straight piece rate. Originally called the Standard Hour Plan and now either straight proportional or reciprocal payment plan. When introduced it provided a guaranteed basic rate and the average bonus was 20% on the basic wage. It is the type of scheme most used. For many years in Britain it paid 33 1/3% bonus on basic rate for a time and a third effort. 80 minutes work in 60 minutes (Motivated pace) Now applied in most local authorities and nationalised industries.

This scheme often described in Britain as a new type of scheme, was originally introduced in the United States in the early 1930's. Based upon job evaluation as a basis for the rate structure and linked to a defined measured output, it was deemed somewhat harsh in its application. The reason for this according to
Professor Lytle is in the pay structure. The base rate was increased from $1/6 to $1/3 to take account of quantity of production, quality of production, versatility, dependability etc. It was the composite of this that was called the measured day rate. It was customary to review these rates once a month for beginners and once every three months for others. Lytle called it an 'Arbitrary grading of intangibles'.

This scheme was modified by many organisations with the introduction of sophisticated work study techniques. Reviews were held but operatives were guaranteed their basic weekly wage.

Many companies in Britain have transferred from other schemes to this latter type.

**Graded Measured Daywork**

This type of scheme was introduced into Britain by the Phillips group in 1958.

Job Evaluation was applied to endeavour to establish the right reward and differentials for the various skills. Payment bands were used and performance calculated monthly and paid weekly. Employees could increase their weekly wage by improving their performance to the next band. Their earnings could go up in one month. If, however, they did not achieve standard output in one period, they did not drop down to the next band at once, but were allowed three months to recover standard based upon an accumulative average.
Example

Below
- Standard Output
Above

<table>
<thead>
<tr>
<th>Below</th>
<th>90 -</th>
<th>93.9 -</th>
<th>£ 4 -</th>
<th>40 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>94 -</td>
<td>97.9 -</td>
<td>£ 2 -</td>
<td>40 hours</td>
</tr>
<tr>
<td>Standard Output</td>
<td>98 -</td>
<td>102 -</td>
<td>£30 -</td>
<td>40 hours</td>
</tr>
<tr>
<td>Above</td>
<td>102.1 -</td>
<td>106 -</td>
<td>£ 2 -</td>
<td>40 hours</td>
</tr>
<tr>
<td>+</td>
<td>106.1 -</td>
<td>110 -</td>
<td>£ 4 -</td>
<td>40 hours</td>
</tr>
</tbody>
</table>

Standard output being 100, and such that a trained operative working at a motivated pace can maintain it without undue fatigue.

A number of organisations in Britain adopted this type of scheme and many pay a straight proportional payment on the band scales.

\[
\begin{array}{c|c|c}
\text{OUTPUT} & \text{TIME RATE} & \text{Earnings on straight piece work with guaranteed time rate} \\
\end{array}
\]

Time Rates

A system of paying labour for the time worked rather than the work produced. The time on which payment is based may be the hour, day, week or fixed salary rate. It provides no extra financial incentive, and any gains or losses arising from variations in the workers' output are taken by the employer. Often termed daywork.
Halsey Premium System

A premium bonus or constant sharing system, with a time rate guarantee. A standard time is allowed for the completion of a job. If exactly this time is taken the worker receives his time rate, thus guaranteeing a minimum wage even if production is less than standard. If the job is completed in less than standard time the worker is paid a fixed percentage of the saving in time. The percentage varies from 30 to 70 per cent of the time saved, the most usual percentage being 50, the remainder of the percentage representing the employer's share.

Formula for 50-50 Sharing:

\[ \text{Time rate} \times \text{Time taken} + \frac{1}{2} \times (\text{time saved} \times \text{time rate}) \]

Assume:

- Time rate = 50 p per hour
- Time allowed = 50 hours
- Time taken = 44 hours
- Time saved = 6 hours

Earnings would be:

- \[ 50 \times 44 \text{ hrs} + \frac{1}{2} \times (6 \times 50) \]
- \[ 2,200p + 150p \]
- \[ £23.50, \text{ as 47 hours pay for 44 hours work.} \]
Effect on Labour Cost

Labour cost falls sharply as output increases up to standard - i.e. it is the same as piece work with guaranteed time rate. For output over standard, labour cost per unit continues to fall at a reducing rate.

Advantages

(1) Guaranteed wage with increased pay for saving in time.
(2) It is simple to understand.
(3) The employer has the benefit of the savings for the proportion of time saved, thus stimulating him to provide the best equipment and method.

Disadvantages

(1) Incentive is not so strong as with piece work and is not recommended for high task. In fact, the harder the operative works, the less he gets per piece.
(2) Does not give the employer full protection against bad rate-setting. Manipulation of time by workers when jobs are being assessed needs careful watching.
(3) Employees often object to sharing savings.
Rowan System

A well-known example of the sharing, or premium bonus, plan. It was introduced in Glasgow in 1898 by James Rowan. It is similar to the Halsey system in that a standard time is allowed for the completion of a job, and bonus is paid for time saved. It differs in the calculation of the bonus award. This is a percentage of the time rate equal to the proportion of time saved to standard time.

Formulas:
(a) Time wages + percentage of hours saved x time wages
(b) Time taken + \( \frac{\text{time taken} \times \text{time saved}}{\text{time allowed}} \) x time rate per hour

Assumes:
Time rate = 50p per hour
Time Allowed = 50 hours
Time Taken = 44 hours
Time Saved = 6 hours

Earnings would be: \( 2200p + (12\% \times 2200p) = 2200p + 264p \)
\( = £24.64p \)

Purpose:
To provide an incentive scheme which would at the same time give protection to the employer against arbitrary or loose rate-setting.

Effect on Earnings:
This system gives a better payment than the Halsey 50-50 until the
time saved is 50 per cent of time allowed. After this point the earning rate declines and gives a smaller return than the Halsey.

The worker can never double his earnings.

Effect on Labour Cost:

Labour cost decreases as production increases up to task level. After that, cost decreases at a much reduced rate.

Advantages:

1. It protects the employer against loose rate-setting.

2. It is a good system for slow workers and learners.

3. It enables the employer to share in the benefit of increased output and encourages him to increase working facilities.

Disadvantages:

1. Sharing systems are not popular.

2. It provides too easy an excuse for loose rate-fixing.

3. It is more complex than the Halsey system.

4. Its incentive value is reduced at high production levels.

5. It is generally more expensive than the Halsey system.
Beaux Point Premium System

A premium bonus system which uses the minute as the time unit. Standard time is determined by work study. Each minute of allowed time is called the Beaux point, or B, thus making 60 units of required work in an hour. Each job has a standard number of points.

Formula:

Workers receive hourly or daily rate plus a bonus of 75 per cent (the original Beaux system) of the number of points saved, multiplied by one-sixtieth of the hourly rate. Assume:

Standard number of points for job 480
Actual number of points earned 540
Rate of pay 50p per hour

Bonus will be \( \frac{75}{100} \times \frac{60 \times 50}{60} = 37\frac{1}{2}p \)

For eight hours work total wage = 40p + 37\(\frac{1}{2}\)p = £4.37\(\frac{1}{2}\)p
Purpose:
To provide one common measure of both human effort and time, to recognise and allow for rest and delay factors in that measure, and to reward workers who exceed required production.

Effect on Earnings:
Earnings increase directly with production although at not such a high rate as under straight piece work or the 100 per cent Bedaux system.

Effect on Labour Cost:
Labour cost falls, but at a decreasing rate after standard has been reached.

Advantages:
(1) Timing of operations is carried to such a degree that the Bedaux system can be made into an effective production control system.
(2) The common denominator, the B, permits great flexibility and can be used for planning and controlling machine times and capacities and for standard cost work.

Disadvantages:
(1) The enormous amount of clerical work required, probably more than under any other system. The control that this system can effect, as mentioned above, helps to offset this expense.
(2) It tempts workers to hurry jobs.
(3) The system under this name tends to arouse hostility on the part of operators.
This graph also represents the straight proportional financial incentive scheme. This is based upon a standard time for a task and the vertical ordinate would represent efficiency wage payment.

That is, earnings would be directly proportional to output in percentage.

*Formula:*

\[
\frac{\text{Standard time achieved}}{\text{Actual Time}} \times \frac{100}{1} = \text{Percentage Efficiency}
\]

Although this research specifically relates to certainty and job satisfaction, replies from organisations operating different financial incentive schemes, may be significantly different in relation to the type of scheme. This will be discussed in the analysis. Much of course depends on the size of each sample.
To assist the reader in a fuller understanding of Financial Incentives Marriots Summarised factors are shown in Appendix I.
CHAPTER V

QUESTIONNAIRE CONSTRUCTION
Moser and Kalton (1971) state that discussion on the questionnaire must begin at the start of the planning stages and not end until pilot surveys are complete. They further state that it is largely a matter of art rather than a science, and that knowledge of the survey population and subject matter, common sense, past experience and pilot work are the surveyor’s main tasks.

The initial design of the questions used in this research were based upon the authors industrial experience. What? he asked himself, were the most important factors relating to my working environment within a financial incentive scheme, and what influenced my satisfaction and certainty? Further to these observations, would the final selected determinants represent the feelings of the population concerned? It was recognised that the questions should be readily understood by the respondents, and therefore they have been couched in terms that specifically relate to the industrial manufacturing environment. It was only to be expected that many of the questions coincided with those posed by previous researchers and therefore reinforced the need for their selection.

Pilot Survey

A pilot study was made of twelve shop stewards at the General and Municipal Workers Union, Woodstock, where the author was teaching. At this stage of the analysis the questions
were examined with the shop stewards to see whether the predictions made on their face validity was generally accepted. A few alterations were made and a further pilot study was conducted with ten shop stewards of the Northern Regional Gas Board attending a course at the same college a week later. Management and work study questionnaires were designed with similar questions to those of the operative questionnaires.

**Further Pilot Study**

It was decided at this stage to use a specific category scale with scores of 0:1:2 and 3 in order to correlate questions with questions. The type of scale chosen will be discussed further in the chapter on measurement.

Two companies were then approached, and after consultation and agreement with the respective works committees further studies were made. One company was concerned mainly with sheet metal work and used a regressive scheme and the second company was an electronics firm using a straight proportional scheme.

The results were analysed and the operatives replies indicated that the differing correlations that had emerged suggested that further research might be rewarding. The number of operatives from the two firms was 55. Distribution next page.
DISTRIBUTION OF CORRELATION VALUES : 55 SAMPLES,
In the absence of any external criteria the final questions
had to be chosen on the basis of their face validity, and the pilot
studies. The final format emerged.

**QUESTIONNAIRE**

To preserve individual independence and allow people to feel
free to answer truthfully and without restriction, NO NAME, NUMBER,
or any other means of identification is required on this questionnaire.

O : 1 : 2, etc., indicates that this form is designed for
operatives, and the 1 and 2 etc., are sheet numbers.

I should be grateful if you would complete this form entirely
on your own. When completed please place the form in the envelope
provided, seal firmly, and hand in for my collection.

The completed forms will only be seen by myself, and used for
the purpose of research into financial incentive schemes.

Thank you for your help.

J. O. Thomson

Would you please answer the following questions by placing a
tick in the appropriate box:

This is only an example to assist you, and will not be included
in the research.
Question: How good are you at time keeping?
Answer: I am seldom late
I am occasionally late
I am often late
I am very often late

If you feel that you are only late occasionally you would tick the second answer so ✓. Other questions answer Yes or No.

We will now proceed with the questions.

Please answer these questions in correct sequence. That is No. 1-2-3-4-5, etc., and please do not alter any of your decisions.

--- o0o ---

Only the operative questionnaires will be discussed. The Management and Work Study Questionnaires have identical questions.

See Appendices II, III and IV.

Operator Understanding

Question 1: How much do you know about the type of financial incentive scheme applied to you?
Answers: I know a lot about the financial incentive scheme
I know a fair amount about the financial incentive scheme
I know a little about the financial incentive scheme
I know nothing about the financial incentive scheme
Question 2: To what degree can you calculate your earnings at any period of time in relation to bonus?

Answer: I can calculate my bonus at any period of time

I can calculate my bonus most of the time

I can calculate my bonus at limited periods of time

I find it difficult to calculate my bonus at any time

Question 3: Do you understand the recognised formula for calculating your bonus?

Answer: I fully understand the formula

I have a good idea of the formula

I have a limited knowledge of the formula

I do not understand the formula

These questions refer specifically to the incentive scheme. It was thought useful to ascertain in this research the level to which understanding contributed to certainty and satisfaction. Also to examine if the research previously conducted in this area was refuted or corroborated. As previously stated in the introduction much depends upon the type of scheme, although many operators appear to surmount this obstacle by a rule of thumb method.
Question 4: Do you understand the function of the parts or processes you work upon?

Answers:
- I fully understand the function
- I have a reasonable knowledge of the function
- I have a limited knowledge of the function
- I have no real knowledge of the function

Question 5: Do you fully understand how a time standard is measured for your own work?

Answers:
- I fully understand
- I have a reasonable understanding
- I have a limited understanding
- I have no understanding

Question 4 was designed to reveal the extent to which the operatives had been inculcated with pertinent information about the components, products and processes the firm produced. This information is thought to influence satisfaction.

Question 5 should indicate the operatives understanding of this important aspect of work study application. How much has been explained to the operatives in order to allay fears and gain co-operation? The author has known operatives to compare standards, and in the discovery of unnecessary anomalies become extremely frustrated. Uncertainty and dissatisfaction will prevail thus reflecting a lack of respect for the work study personnel.
Operator Satisfaction

Question 6: To what extent are you satisfied with your management's policies?

Answers:
- I am highly satisfied with management's Policies
- I obtain a medium degree of satisfaction from management's policies
- I obtain a limited degree of satisfaction from management's policies
- I have no satisfaction from management's policies

State the degree of satisfaction you obtain from the following in your own working situation.

Tick the appropriate box.

Question 7: The Company Policies

[ ] High  [ ] Medium  [ ] Low  [ ] Nil

Question 6 concerns operatives identification of management in general and Question 7 the company in particular. To some degree the manner in which the operatives are thought to judge these aspects, will to some extent reflect a culmination of feelings. Therefore reflecting the way in which the company allows the management to project policies which are either favourable or unfavourable to the operatives. Rules and regulations unfairly applied will be resented and management will be viewed with disapproval.
Question 8: Your working conditions

HIGH  MEDIUM  LOW  NIL

Question 9: Your immediate supervision

HIGH  MEDIUM  LOW  NIL

Question 10: Your security

HIGH  MEDIUM  LOW  NIL

These questions are considered fundamental to satisfaction and certainty, recognised by most operatives and although selected for face validity, have been recognised as important contributors by many previous researchers. (See chapter on theory)

Working Conditions

Working conditions in many respects reflect the policies and attitudes of the organisation. The author recalls an interesting occurrence at one of the Joseph Lucas Companies CAV Ltd at Acton. A deputation of operatives from the Press Shop approached the Industrial Engineering Manager and complained about the work study practitioner. They stated that he was issuing tight time standards and unless he was removed, they would embark on a sit-down strike. The manager sent for the work study practitioner and raised the issue of dispute. The practitioner categorically denied that the standards were tight, and asked to be allowed to conduct an experiment. His hobby was decorating, and he said he was appalled
at the conditions in the press shop, could something be done about this? — he would design a colour system and draw up a schedule, and arrange for a complete decoration programme. General Management gave the practitioner carte-blanche. A team of painters arrived Friday evening and worked throughout the week-end. The machines were cleaned and painted two-tone green, danger areas red, the floor was painted with dark green screed and white lines denoting gangways. Walls were painted and personal lockers replaced. After two months the manager spoke to the shop steward in the press shop. How he asked were they coping with the tight time standards? The shop steward replied, what tight time standards? We have none and what is more important the work study practitioner is the best we have experienced.

When the manager asked the work study practitioner whether he had eased the standards, he replied 'no' and the operatives had not only increased output but, were changing into clean overalls twice a week, and had placed obsolete mouldings around the shop to serve as ashtrays.

**Question 9: Immediate Supervision**

This level of supervision has a closer relationship with the operatives and are often in an unenviable situation, involved in pressures from higher management and the operatives. They are judged by the operatives, against the manner in which they interpret policies, issue work and deal with grievances. If they are seen to be fair and impartial they are invariably respected.
Question 10: Security

Ranked first by many researchers, this variable therefore has a considerable influence upon certainty and satisfaction.

Work Study Control

Question 11: How many loose time standards do you have?
Answers:
- I have quite a number of loose time standards
- I have some loose time standards
- I have very few loose time standards
- I have no loose time standards

To some extent this is a test question. It might well be said that no operator would reveal the presence of loose time standards. Only the analysis of data collection will reveal the facts, all questions in this factor are designed to reveal work study's application and are therefore oriented towards this objective.

Question 12: How well do you consider the financial incentive scheme works?
Answers:
- I consider it works extremely well
- I consider it works very well
- I consider it works fairly well
- I do not consider it works well
This question should really reflect many facets. Whether their time standards are seen to be fair, the method study reasonably applied, the controls realistic, and the earnings compatible with the operators concept of such.

**Question 13:** How quickly are work queries dealt with?

**Answers:**
- They are dealt with at once
- They are dealt with quite soon
- There are some delays when dealing with queries
- There are many queries that take a lot of time

In the author's experience this question is of prime importance. If operatives are held up on a job because someone has failed to understand the necessity of dealing with queries promptly and effectively, they become extremely frustrated, uncertain and dissatisfied. Queries invariably arise from some occurrence beyond the operators control: for example, the wrong material issued, quality inadequately defined, the method in dispute, an incorrect time standard, a machine break down and others.

**Question 14:** Are the time standards in your department based upon:

**Answers:**
- A comprehensive method study
- Reasonable method study
- A partial method study
- No method study
Method study not only reduces the overall time for an operation but also reduces fatigue, recommends improved tools and equipment and invariably improves the image of work study application.

**Question 15:** How much support does Work Study/Estimating receive from management in general for their techniques?

**Answers:**
- A large amount
- A reasonable amount
- A limited amount
- Hardly any

It was considered worth while introducing this question, because in many organisations work study appears to be blamed for many operator complaints and receive little support from their management. If in the view of the operatives they appear to receive support, and they are seen to be fair, in their application of techniques it could reflect increased operator satisfaction and certainty.

**Operator Control**

**Question 16:** How accurate are you in booking waiting time?

**Answers:**
- I am extremely accurate in booking waiting time
- I am reasonably accurate in booking waiting time
- I am sometimes inaccurate in booking waiting time
- I am often inaccurate in booking waiting time
Question 17: How accurate are you in booking off one job and on to another?

**Answers:**
- I am extremely accurate in booking
- I am reasonably accurate in booking
- I am not very accurate in booking
- I am not at all accurate in booking

These are the areas commonly termed restrictive practices and although answers could be biased in that operators might not wish to reveal that they had been fiddling the booking of work; nevertheless it was decided to ask these questions.

Question 18: How often do you find it necessary to overbook on some jobs, and underbook on others?

**Answers:**
- I often find it necessary to balance my work
- I occasionally have to do it
- I very rarely have to do it
- I never find it necessary

This question although similar to 16 and 17, is phrased to indicate some excuse for overbooking and underbooking. The scores from these questions should only be high if there is effective management and work study controls. If however management and work study controls are ineffective and low, then these scores will be low reflecting operators manipulation of the system.
Question 19: How much do you co-operate with the Work Study or Estimating Department?

Answers: I co-operate fully
I co-operate reasonably
I give a limited co-operation
I do not co-operate

Question 19 - if operatives think controls are weak, they will invariably be resistant to work study especially if considerable anomalies exist in the time standards. They may also adopt the same policy if areas of management controls are seen to be weak.

Question 20: Do you consider it necessary to put the same effort into an unmeasured job as one that has a time standard?

Answers: I consider you should put the same effort
I consider you should put in a reasonable effort
I consider you should put in far less effort
I consider you should put in considerably less effort

Question 20 - When operatives are working within a financial incentive scheme, there is often a temptation to reduce their effort and performance on a job that has no time standard. It depends what the operators are paid for an unmeasured job.
In some companies average bonus is paid and there then is an inclination by some operatives to overbook on the unmeasured job to inflate their earnings on the measured work.

**Management Control**

**Question 21:** How well do supervision control the booking of work?

**Answers:**
- Supervision control booking of work very well indeed [ ]
- Supervision control is reasonable [ ]
- Supervision control the booking to a limited degree [ ]
- Supervision seem to have no control on the booking of work [ ]

Operatives are asked to identify management's ability to control the above function. Even if operatives wish to fiddle the booking of work and are prevented from so doing, they tend to have a grudging respect for effective supervision control. It is of course an extremely difficult function to control. If supervision are up to date on the manufacturing schedule and are maintaining regular contact with the production programme and the operatives, they are invariably controlling the booking of work.
Question 22: How effective do you consider the department you are associated with?

Answers: I consider it to be highly effective □
I consider it to be very effective □
I consider it to be fairly effective □
I consider it has little effectiveness □

When operatives are asked this type of question, it is expected that they will subconsciously relate to a number of factors in order to arrive at their decision. More particularly that they will consider the department to be as effective as the controls.

Question 23: How well is the work scheduled and allocated to operatives?

Answers: It is scheduled and allocated extremely well □
It is scheduled and allocated quite well □
It is scheduled and allocated moderately well □
It is scheduled and allocated badly □

This factor of management control is not only vital to the operatives sense and identification of effectiveness and fair mindedness, but also their dignity. Intermittent supply of work, uncertainty of earning bonus results in a complete lack of respect for management and general dissatisfaction.
**Question 24:** How well is scrap and rectification controlled?

**Answers:**
- Scrap and rectification is controlled very effectively
- There is reasonable control of scrap and rectification
- There is not a lot of control over scrap and rectification
- There is no control of scrap and rectification

This aspect of control is deemed to be an important determinant of certainty and satisfaction.

If the operators are considered trained and experienced then their contribution to scrap and work that needs rectifying is often minimal. There are occasions when a job is scrapped or needs rectifying through no fault of the operatives, although they often are blamed. Difficult standards and tolerances that are too tight to work to, inspection's subjective judgement, faulty work from other areas to name a few contributions.

**Question 25:** How effective are inspectors in contributing to productivity?

- They are extremely effective
- They are reasonably effective
- They contribute slightly
- They do not contribute

This question has part affiliation with question 24, except that inspection are often viewed as searching for work to reject. In some organisations the inspectors are most helpful and will often use their initiative and pass work that is marginal. They have also been known to advise operators on how to avoid making scrap or rejects.
Also included at the end of this chapter are six questions on background information, age, sex, length of service, married or single and male or female. In addition to allow a comparison to be made a question is included asking how the present company compares with any previous one.

Further it was decided to design a questionnaire appealing to operators, and specific questionnaires to the Personnel Manager and the Company Accountant. These accompany this chapter.

In summarising this chapter on questionnaire design a further quotation from Moser et al is thought to be applicable:

'If different forms of questions were tried out experimentally or in pilot surveys, the comparison of their success - however judged - would be a solid basis for choice. The difficulties in all this are obvious, which is why surveyors continue to rely heavily on common sense and hunches.'

This survey is no exception except to add, that the author was guided considerably by his own experience and that of other researchers.
Question 26: Would you please indicate how long you have worked for this company?

Answers:
- Less than two years
- Two to five years
- Five to ten years
- Over ten years

Question 27: Would you please tick your appropriate age bracket?

Answers:
- Under twenty years of age
- Twenty to thirty years of age
- Thirty to forty years of age
- Over forty years of age

Question 28: How long have you been doing your present job in this company?

Answers:
- Less than two years
- Two to five years
- Five to ten years
- Over ten years

Question 29: If you have worked for another company, how does your present company compare?

Answers:
- My present company is much better
- My present company is slightly better
- My present company is about the same
- My present company is not as good

Please tick the appropriate box at to whether you are:

[ ] MARRIED  [ ] SINGLE  [ ] MALE  [ ] FEMALE

Would you please use this space for any further contributions or comments? PLEASE PRINT.
To The Personnel Manager

To assist me in my research into your company I enclose:

A copy of the three questionnaires, that is:

Operatives - O
Work Study - WS
Management - M

Also my requests:

Would you please provide the following information:

1. A copy of the Financial Incentive scheme operating in the department concerned for this research.

2. Any agreement affecting the Financial Incentive scheme.

3. The labour turnover figures in this department over the last twelve months.

4. Summaries of any grievances or disputes in this department over the last twelve months.

Many thanks.

Jack Thomson
To The Company Accountant

To complete my research in your company, I should be extremely grateful if you would supply the following information:

- Departmental total hours worked each week of the most recent eight weeks.
- Departmental total hours earned each week over eight weeks.
- Departmental total ineffective and nonproductive time each week over eight weeks.

Many thanks,

Jack Thomson
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

WILL YOU PLEASE HELP ME?

by completing this questionnaire.

I am trying to find out the real facts about operatives: Understanding - Controls - and Satisfaction, within a financial incentive scheme. To complete the picture, I also want to know what management and work study or estimating know about operatives understanding, controls and satisfaction.

Finally, I want to know what you think about management controls and work study/estimating application and control.

I have worked for over twenty years in industry, a number of these were spent on the shop floor where I and my fellow employees were participants in a financial incentive scheme. I should be extremely grateful if you would assist me in this research.

Management, Work Study/Estimating and Operatives questions are similar and I think you will understand when I say that I could have three different answers to the same question from the three groups.

Operatives could say 'I know a little about the incentive scheme.'
Management could say 'They know a lot about the incentive scheme.'
Work Study could say 'They know a fair amount about the incentive scheme.'

If the results of research into a number of firms reveal a similar pattern, it might be possible to design into a financial incentive scheme some factors which will greatly assist more allround satisfaction with the scheme.

You will have helped!

These questionnaires are completely confidential and are designed so that no identity is revealed about who filled them in and the information will only be used for my research into incentives.

Thank you for your co-operation.

Jack Owen Thomson
CHAPTER VI

SELECTION OF FIRMS
CHAPTER VI

SELECTION OF FIRMS

It has already been stated in the introduction that ten firms would be selected, and that it was hoped to obtain firms operating different types of schemes in order to obtain a broad sample. Four companies that were known to the author were approached locally and six companies through the General and Municipal Workers Union where the author was also known. The G.M.W.U. were most helpful, the author had taught on a number of trade union courses over a period of eight years and the companies obtained through the union were those that had sent shop stewards on these courses.

Companies Operating Regressive Schemes

G.A.

This is an old established concern situated in the north east employing a total of 2,000 personnel. The company manufactures a wide variety of seals which are fitted to components also made by the company. The union representation was mainly G.M.W.U. and A.U.E.W. Entry to the firm was conducted through an area officer of the G.M.W.U. and the industrial relations manager of the organisation. The company operates a regressive type of financial incentive scheme, wherein bonus is paid on a separate low bonus rate. Appendix V for company agreement.
E.D.

This company is situated in the mid-east employing a workforce of 1,300 employed in the manufacture of goods and appliances for the home. The union representation was mainly G.M.W.U. and A.U.E.W. Entry to the firm was conducted through an area officer at the G.M.W.U., the union convenor and the personnel manager. The company operates a straight proportional type of financial incentive scheme but becomes regressive as a low ceiling is placed upon earnings. Appendix VI for company agreement.

S.E.L.

This is a relatively small firm manufacturing a variety of electronic instruments. It is part of a large organisation that purchased it a number of years previously. Because it makes a reasonable profit and employs its own particular expertise it is somewhat autonomous and uses its own systems and controls, directed and managed by the two originators and inventors. Like a number of companies that commenced in a relatively small way it has many built-in anomalies, not the least a number of outmoded and complicated financial incentive schemes. The department selected was small and involved only seven operators. The financial incentive applied was a type of Rowan (regressive), and although it was realised the results would have little significance it was felt that they might well indicate a particular trend. There was
no union representation and management arranged for the research to be conducted. Incentive scheme agreement. (Appendix VII).

Companies Operating Straight Proportional Schemes

S.M.

Specialised domestic and commercial appliances were manufactured by this company, which was of medium size, part of a large group and employing 2,000 work force. It was particularly well organised, using fairly sophisticated techniques. Computerised costing, wages, sales and production control existed besides a well organised work study department. The predominant Trade Union was the A.U.E.W. and the shop stewards were mostly of the militant type. This of course had the associated drawbacks, that is there were often local disputes and grievances. Despite this, however, the joint convenors were sympathetic towards this research. The result was that the works committee promised co-operation. The type of financial incentive scheme in use was straight proportional. Standard times were compiled and issued by the work study department, and there was fairly comprehensive method study applied.

No incentive written agreement was available.

H.A.

This company manufactures domestic and office equipment. It employs approximately 450 direct work force, has recently instituted work study techniques, revised the time standards
from the old type rate fixing to the Bedaux 60/80 system of
time allowed per task. A straight proportional financial
incentive scheme is applied throughout. The predominant trade
union representation is by the T.G.W.U. Entry to the firm
was through the Production Director.

No written incentive agreement was available.

B.S.

This company employs 1,800 direct operatives, mostly
female, and manufactures radio and sound recording equipment.
Situated in the Midlands it is part of a group, and a
considerable amount of the output is exported. The union
representation is largely G.M.W.U. and entry was through
the area union offices and the works manager. The company
operates a straight proportional financial incentive scheme.
No agreement for the scheme exists.

A.E.

This company situated in the Northeast employs 491 direct
operators, and manufactures domestic heating appliances. It
is a member of a large group, and is somewhat autonomous both
in structure and finance. The predominant union is the
G.M.W.U. Entry to the firm was made through the area trade
union officer, the personnel manager and the works committee.
A straight proportional financial incentive scheme operates.

Appendix VIII for company agreement.
Companies Operating Graded Measured Daywork

P.

This company is part of a very large organisation, is situated between Portsmouth and Southampton, and manufactures electronic components. It employs 1,200 direct operators and the T.G.W.U. predominates. Entry to the organisation was through management and the trade union convenor. The company had moved from operating a straight proportional financial incentive scheme to the above, which had been in operation for about two years. Company agreement Appendix IX.

A.R.

Highly specialised electronic equipment was manufactured by this organisation. Although of medium size, 300 direct operators, it was a member of a large specialised group. Originally the financial incentive used was straight proportional, and in 1968 measured day work was introduced. This innovation was quite extraordinary, because incentive schemes are generally the prerogative of work study advice and application. However, in this case, the Finance Director attended a one-day seminar by the Industrial Society in June 1967 on measured day work and was so impressed with the scheme he decided to introduce it. While the increase in output has not been large, it appears to satisfy the company that the transition has been worthwhile. Entry to the firm
was through management. Whilst operatives are members of a Trade Union (Transport and General Workers) they are not particularly active, which might well reflect satisfaction.

Copy of incentive agreement, (Appendix X).

A Company Operating Measured Daywork

D.

This company is situated in the north east and employs 350 operators in rubber component manufacture. The work is measured and the operators have a target to work to. They are paid a flat basic pay for 44 hours work. The predominant union is the G.M.W.U. and entry to the organisation was made through the area union officer and the personnel manager. No agreement of the scheme exists.

The above companies were not chosen at random but selected, mainly for expediency, as in four companies the author had an association with the management and the remaining six an association with the shop stewards through the G.M.W.U. There appeared to be enough difference in response to justify both types of approach.
CHAPTER VII

METHOD AND MEASUREMENT
The problems of testing the stated predictions will now be considered. It will be remembered that three groups of respondents are being considered that is:

- Management
- Work Study
- Operatives

and that the prime group are the operatives in that it is their perception of the variables that is important. These variables being:

- Operator Understanding (O.U.)
- Operator Satisfaction (O.S.)
- Work Study Control (W.S.C.)
- Operator Control (O.C.)
- Management Control (M.C.)

The following points should be noted:

1. The operators will be semi skilled.

2. The companies selected will be grouped into those using differing financial incentive systems.

3. A sample of operators in an assembly type department together with their associated managers and work study practitioners will be measured on the above variables.

4. The management referred to is middle and low level management, that is departmental managers, foreman and supervisors.
5. The perception of the three groups will be used to measure the level of communication that exists between the groups.

6. The different types of financial incentive schemes will not be considered to be conclusive in terms of the results because of the interactions of the schemes with the types of firms.

7. Productive effectiveness will be analysed for each group and related to satisfaction/dissatisfaction results.

8. Background data, that is age, sex, length of service, married or single will be correlated with the results to examine their significance.

9. Labour turnover will be used as a behavioural variable; and examined as a measure of satisfaction.

It was felt that the appropriate measurement in the first instance should be an analysis of variance. This would be designed to measure the significance of the five factors, the five questions within each factor, the groups of firms and the interaction between firms and factors. Finally the level of response would indicate whether the questions had been answered at random or were meaningful.

The next stage of measurement is to examine the results in relation to the stated predictions. Restating that operator satisfaction O.S. is the dependent variable and that:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator Understanding</td>
<td>O.U.</td>
</tr>
<tr>
<td>Work Study Control</td>
<td>W.S.C</td>
</tr>
<tr>
<td>Operator Control</td>
<td>O.C.</td>
</tr>
<tr>
<td>Management Control</td>
<td>M.C.</td>
</tr>
</tbody>
</table>
are the independent variables and that they all contain five questions: will suffice to indicate that these latter independent variables will be measured in order to ascertain the level of contribution to O.S. A correlation matrix will therefore be established to measure each question within each factor and their level of correlations with O.S. In view of the fact that the firms have been grouped into:

- Regressive financial incentives
- Straight proportional financial incentives
- Graded Measured Day work
- Measured Day work

The correlation matrix will be used to examine the significance of the replies of the operators within each group. This will be followed by a matrix of all the operators. If the stated predictions are significant then management control will be expected to correlate with operator satisfaction, followed by work study control the level at which the correlations contribute will depend upon the degree of satisfaction, that is high satisfaction – high management control. Operator control should only correlate with satisfaction if the level of management and work study control is low.
Operators perception of the variables for each group of firms using different financial incentive schemes.

Groups GA-ED-SML.   Regressive
SM-HA-BS-AE   Straight Proportional
P-AR   Graded Measured Day Work
D   No Scheme   Measured Day Work
A further analysis will be made of the relationship between the dependent variable OS and the independent variables, QU, WSC, OC and MC, using a multiple regression elimination programme, wherein the sum of the means of the replies to the five questions with each variable will be measured against the sum of the means of OS. This technique analyses the degree of explanation of each variable with OS, gradually eliminating all those in turn until ending with the variable that explains OS most. Also in this analysis it will be useful to examine the correlation matrix of the five variables in order to ascertain the relationship each with each other and OS.

**Productive Effectiveness**

Job performance or productive effectiveness has already been outlined and discussed on page 64. It will however be reiterated that the overall departmental effectiveness will be measured, thus reflecting the degree of management and work study control that exists. Measuring operator effectiveness only would not reveal this as:

\[
\text{Operator effectiveness} = \frac{\text{Amount of work produced x standard time for that work}}{\text{Total hours worked - ineffective and non productive time}} \times \frac{100}{1}
\]

the actual measurement of effectiveness will be departmental that is:

\[
\frac{\text{Standard hours achieved}}{\text{Total hours worked}} \times \frac{100}{1}
\]

The more the ineffective and non productive time that exists, (being embodied in the total hours worked), the lower will be the overall departmental effectiveness or efficiency.
Explanation of Analysis of Variance Printouts

Model: \( Y = A + B + C + AC + E \)

where

- \( A = \) 'Factors' (i.e. OU, OS, WSC, OC and MC)
- \( B = 5 \) questions (each set nested within one 'factor')
- \( C = \) Firms
- \( AC = \) Interaction between firms and 'factors'
- \( E = \) Error

Analysis of Variance Table

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Variance (SS/df)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resid.</td>
<td></td>
<td></td>
<td>( \sigma^2_R )</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F - Tests Table

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Var (ss/df)</th>
<th>Var ratio 1</th>
<th>Sig?</th>
<th>Var ratio 2</th>
<th>Sig?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resid.</td>
<td>Sum of squares = sum of squares (all lower order terms + residual)</td>
<td>Resid. df = sum of df (all lower order terms + residual)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{Ratio 1} = \frac{\text{Var (Term)}}{\text{Resid. Var (Term)}} \quad \text{Ratio 2} = \frac{\text{Var (Term)}}{\sigma^2_R}
\]
MULTIPLE REGRESSION ANALYSIS AUTO ELIMINATION

CORRELATION MATRIX

SUM OF FACTOR MEANS CORRELATED WITH EACH OTHER

<table>
<thead>
<tr>
<th></th>
<th>OU</th>
<th>OS</th>
<th>WSC</th>
<th>OC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>OU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSC</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>OC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sum of N means
Operator perception means summated
for each factor correlated
In N sets. For each group of firms
GA - BD - SEL
SM - HA - BS - AE
P - AR
D

Regression Equation:

\[ OS = OU \times B_1 + WSC \times B_2 + OC \times B_3 + MC \times B_4 + \text{constant} \]

where \( B \) = Coefficient
As already stated, the level of the replies between the three groups, that is management, work study and operatives will be measured to endeavour to identify whether the three groups are significantly in agreement with each other. Kendall's Tau was thought to be appropriate and an example follows.

**Kendall's Tau**

Colin Robson (1973) describes Kendall's Tau as an index or measure of the tendency of two rank orders to be similar. It deals not with the scores themselves but with the order when they have been ranked in size, and it then measures the concordance or agreement between these rank orders. It is a correlation coefficient technique, and a descriptive statistic, it simply describes the direction and degree of relationship between the variables. As it deals with pairs and there are three groups to measure in this research, they will be measured by pairing:

- Operators x Management
- Operators x Work Study
- Management x Operators

For each group with different types of schemes.

<table>
<thead>
<tr>
<th>Mean of each factor replies</th>
<th>Management x Operators</th>
<th>Work Study x Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>OU x 5 questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OS x 5 questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSG x 5 questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OG x 5 questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MG x 5 questions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Scores obtained for five factors x five questions and two subjects
Management x operators

<table>
<thead>
<tr>
<th></th>
<th>Management</th>
<th>Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
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<tr>
<td>4</td>
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<td>5</td>
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<td>6</td>
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<td>7</td>
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<td>8</td>
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<td>22</td>
<td></td>
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<td>23</td>
<td></td>
<td></td>
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<tr>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These two sets of scores will then be graphed maximum mean score obtainable for each variable = 3.0
MANAGEMENT V OPERATORS

EXAMPLE

Scores are plotted from their rank order and numbered 1 - 25. All plots are counted above and to the right of each number.

And so on until 25
From graph:

<table>
<thead>
<tr>
<th>Above and to right of</th>
<th>1</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above and to right of</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Above and to right of</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Above and to right of</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Above and to right of</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Above and to right of</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Above and to right of</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

and so on to 25

Total = $S^+$

Calculate $N(N - 1) \over 2$

where $N$ = Number of pairs

Calculate $S = 2S^+ - N(N - 1) \over 2$

$\chi = S \over N(N - 1) \over 2$

Assess significance of $\chi$ using table.

Number of pairs throughout = 25

$N(N - 1) \over 2 = 25(25 - 1) \over 2$

$= 600 \over 2$

$= 300$

$S = 2S^+ - 300$

Critical Value For $N = 25 = 0.27$
Background Data

The means of the replies to these questions that is:

- Length of time with company.
- Length of time with present job.
- Age.
- Comparison of this company with last one.
- Married, single, male or female.

will be correlated with all questions within OS, in order to examine their significance and contribution.

Many previous researchers have indicated that labour turnover is an indicator of satisfaction and dissatisfaction. It is stated that where operatives are dissatisfied labour turnover will be high. Whilst the author recognises a number of constraints, for example much would depend upon the availability of other work in the area, it has been decided to obtain this information from the participating organisations and is included in the questionnaire to personnel management.

Scaling Of Questionnaires

It was stated on page 88 that a specific category scale will be used. There are four alternative answers to each question and these will score 0, 1, 2 and 3, where 3 reflects the most satisfactory answer, that is full understanding, full satisfaction and so on. Although specific category scales invariably use five or seven categories, it was not felt necessary in this research because the questions were fairly specific and the four types of replies were considered satisfactory.
CHAPTER VIII

ANALYSIS OF DETERMINANTS
Analysis Of Results

Analysis of Variance.

A three way analysis of variance was performed on the data, (factors, questions and firms:) for the three groups of firms.

Regressive Schemes Firms SEL, BD and GA.

There was a significant effect of factors;

\[ F = 6.020, \text{df (4, 40), } p = .01 \]
and of the questions;

\[ F = 5.307, \text{df (20,40), } p = .01 \]
and of the firms;

\[ F = 8.063, \text{df (2, 40), } p = .01 \]

There was also a significant interaction between firms and factors;

\[ F = 2.511, \text{df (8, 40), } p = .05 \]

Straight Proportional Schemes Firms AE, BS, SM and HA.

There was a significant effect of factors;

\[ F = 91.933, \text{df (4, 60), } p = .01 \]
and of the questions;

\[ F = 18.161, \text{df (20,60), } p = .01 \]
and of the firms;

\[ F = 12.962, \text{df (3, 60), } p = .01 \]

There was also a significant interaction between firms and factors;

\[ F = 9.583, \text{df (12,60), } p = .01 \]
Graded Measured Daywork  Firms P and AR

There was a significant effect of factors;
\[ F = 19.756, \text{df} (4, 20), p = .01 \]
and of the firms;
\[ F = 37.366, \text{df} (1, 20), p = .01 \]
All the other main effects and interactions did not reach significance.

Straight Measured Daywork  One Firm D

As this 'group' contains only one firm it was tested against the rest of the firms. This could cause any consistences due to this firm alone to be overestimated for the firm's variables as the comparison group will have a large variance. However, this is not too important as the firm's variables assume little relevance in the subsequent discussion. There was a significant effect of the factors;
\[ F = 12.921, \text{df} (4, 20), p = .01 \]
and of the questions;
\[ F = 4.836, \text{df} (20,20), p = .01 \]
and of the firms;
\[ F = 20.945, \text{df} (1, 20), p = .01 \]
There was no significant interaction between firms and factors.

The results as a whole reject the view that the questions were answered randomly. All the groups showed a significant effect of factors which supports the view that the questions within a factor were to some extent measuring the same underlying variable. Further evidence on this point will be obtained from the correlation matrices. The grouping of firms according to their type of incentive scheme has
not been shown to be very useful for this type of investigation. All the groups showed main effects of firms and more importantly, two of the groups showed significant interactions between firms and factors suggesting that the differences between firms within a group were not simply those of absolute scores on a factor. For this reason the correlation matrices will be examined separately for each firm. The one discrepant result is the lack of a main effect of questions for the straight proportional scheme group. However the importance of this result is somewhat reduced by the fact that there is a main effect of factors. The presence of a firms x factors interaction might suggest that the lack of a 'questions' effect was due to the grouping of the particular firms.

The next set of analyses to be performed was the calculation of the correlation between the factors for each firm and then to perform an auto-elimination to determine the contribution in terms of the variance explained, of the most relevant variables. In all these analyses OS is used as the dependent variable and OU, WSC, OC and MG are the independent. This is so that the predictions of the theoretical model may be tested.

The model states that certain variables, (OU, WSC, OC, MG and communication), determine indirectly OS. This is an imprecise statement and predicts only that an increase or decrease in one of the independent variables will produce an increase or decrease in the value of OS. In other words the nature of the function relating the independent variables to OS has not been stated. This is
reasonable at this stage of the theories development as there is little point in formalising a theory to the point where quantitative predictions can be made if it cannot explain qualitatively the relevant data. In order to test the predictions however it is necessary to assume that the relationship between OS and the independent variables is monotonic. If it is not then any relationship will not be revealed by performing correlations between the dependent and independent variables. Thus the theory predicts a correlation between OS and OU, WSC, OC and MC, and further predicts whether the correlation will be positive or negative.

A more difficult problem concerns the types of measures used. The questionnaires only produce ordinal scales, and thus rank correlation coefficients should be employed. Unfortunately the programme employed used a product moment correlation coefficient which assumes at least an interval scale. The main disadvantage in practical terms of using the parametric statistic is that it will underestimate any curvilinear monotonic relationship, and thus work against the predictions. This of course is preferable to the opposite type of error, nevertheless it is still undesirable. One way around the problem is to obtain scattergrams of the data and look for any obvious non-linearity. This was done and four typical examples follow:--

Figs 2, 3, 4 and 5.
FIGURE 3
COMPANY G.A.

OS/WSC OPERATOR SATISFACTION

WPK STUDY CONTROL
It is evident that the regression lines bisect the points fairly well for all values along the abscissa and there is no obvious non-linearity. A more fundamental question is whether the use of parametric statistics in these circumstances (that is with ordinal scales from questionnaires) can be justified on logical grounds.

Nunnally (1967) argues that as there is no way in which ratio or interval scales might be produced when measuring attitudes in this way, that it is reasonable to assert that the derived scale is an interval scale and defines the level of an attitude with regard to this scale. This is a complicated argument and contrary to classical scaling theory, however Nunnally's basic point is well taken and thus the author has less doubts about using parametric statistics for this data. Finally all parametric statistics assume that the scores are normally distributed and as can be seen from a reproduction of Figure 1 based upon 55 operatives this is true from the questionnaire replies.

In summary there appears little reason not to use parametric statistics and their use will not lead to any false confirmation of the predictions. It is to be hoped that they will not lead to falsely rejecting the theory.

Each firm will now be taken in turn and the correlation matrices of the factors discussed. S.E.L. will not be considered as there are only 7 operators in the sample. Where deemed necessary individual question correlations will be considered.
FIGURE I

DISTRIBUTION OF CORRELATION VALUES : 55 SAMPLES.
Only two independent variables correlate significantly with OS, VIZ, MC and OU. The correlation is in the right direction, as MC increases, OS increases. Further WSC and MC correlate highly with each other, and both correlate with OC. It should be remembered that as the value of OC increases the amount of fiddling (or control by operators) decreases. Thus this means that as MC and WSC increase so OC decreases. This is in agreement with the theory. Finally the correlation of OU with OS is in the right direction as predicted by the theory: as OU increases OS increases.
The correlation of OU with OC is puzzling at first glance. The more operators understand the scheme the less fiddling occurs. The opposite would seem to be more plausible. However OU also correlates with MG and this could be mediating the correlations with OC. (MG also correlates with OC).

The greater the MG the more the scheme will be explained, resulting in the less chance or need for OC. This point of view is supported by the individual question matrix Figure 7. The OC question that correlates highly with OU is, overbooking and underbooking of work, which also correlates highly with MG.

The multiple regression showed no significant effects for any of the independent variables with OS in spite of the high correlations. Examination of the regression line for OS/MG Figure 8 shows that there is some non-linearity (although this is unusual as previously stated), and this would account for the lack of a significant regression line. Further correlations in Figure 7 tend more to support the theories rather than to refute them.
### Correlation Matrix 1 - 25 Variables

All values not significant at 95% level designated.

**Company B.D.**

#### Regressive Scheme

<table>
<thead>
<tr>
<th>Operator Understanding</th>
<th>Operator Satisfaction</th>
<th>Work Study Control</th>
<th>Operator Control</th>
<th>Management Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>0.79</td>
<td>0.72</td>
<td>0.71</td>
<td>0.52</td>
</tr>
<tr>
<td>0.79</td>
<td>1.00</td>
<td>0.69</td>
<td>0.67</td>
<td>0.46</td>
</tr>
<tr>
<td>0.72</td>
<td>0.69</td>
<td>1.00</td>
<td>0.65</td>
<td>0.46</td>
</tr>
<tr>
<td>0.71</td>
<td>0.67</td>
<td>0.65</td>
<td>1.00</td>
<td>0.45</td>
</tr>
<tr>
<td>0.52</td>
<td>0.46</td>
<td>0.46</td>
<td>0.45</td>
<td>1.00</td>
</tr>
</tbody>
</table>

---

**Notes:**
- All values not significant at 95% level.
- Correlation matrix showing relationships between various company factors.
- Key areas include understanding of policies, satisfaction with current policies, etc.
- Values range from 0.37 to 1.00, indicating varying degrees of correlation.
Company G.A. Regressive Scheme

Number of respondents 34
Number of Questionnaires issued 40
Incompleted 6

Figure 9

OU
1  OS
0.402  2  WSC
0.197  0.419  3  OC
0.059  0.292  0.370  4  MC
0.080  0.292  0.244  -0.038  5

Critical value .324

For this firm WSC and OU correlate with OS and the correlations are in the right direction. Further OC correlated with WSC showing that as WSC increases the amount of OC decreases. There is no correlation between OC and OS for this firm. It would appear that the operators do not think that the MC's are significant to their working situation. They identify more with WS and OS with respect to overall management policies and aspects of work study effectiveness. Figure 10. Reference to the scattergraph previously displayed, Figure 2, indicates a relatively low association of MC with OS. Whereas in Figure 3 a more positive association is identified with OS/WSC.

The multiple-regression explained 34.93% of the variance but this reduced by only 6.65% when only WSC and OU were included in the analysis in agreement with the correlation matrix, Figure 9.
to

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c4

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•trpm uroj j o Sxrjpireqsaopurt

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Company A.E. Straight Proportional Scheme. Number of respondents 29.
Number of Questionnaires Issued 34
Figure 11 Incompleted 5

<table>
<thead>
<tr>
<th></th>
<th>OU</th>
<th>OS</th>
<th>WSC</th>
<th>OC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.277</td>
<td>0.010</td>
<td>0.291</td>
<td>-0.129</td>
<td>-0.042</td>
</tr>
<tr>
<td>2</td>
<td>0.291</td>
<td>0.081</td>
<td>0.017</td>
<td>0.453</td>
<td>0.329</td>
</tr>
<tr>
<td>3</td>
<td>OC</td>
<td>0.017</td>
<td>0.081</td>
<td>0.017</td>
<td>0.131</td>
</tr>
<tr>
<td>4</td>
<td>MC</td>
<td>0.453</td>
<td>0.329</td>
<td>0.131</td>
<td>0.349</td>
</tr>
</tbody>
</table>

Critical value .349

Only one correlation reached significance for this firm MC and OS indicating that for this firm only MC had any effect on OS. This is not surprising as this firm occupies the adjacent site to company BD and a similar pattern has emerged. Work study in both of these firms has been somewhat restricted in relation to it's overall function and in consequence tends to play a minor role with respect to dealing with queries, control of the financial incentive scheme, and so on. Management controls are therefore seen by the operators to contribute more to OS in consequence. Reference to Figure 12 shows that the only significant relationship with work study is that when the number of loose time standards reduce the fiddling on booking at work reduces. The multiple regression explained 31.54% of the variance when all the independent variables were included, but was 29.29% when only MC and OU were retained. There are similarities with the previous firm. MC appears to assure greater importance as a determinant of OS than the other independent variables.
The theory was neutral with regard to the relative contributions of the independent variables to OS and implicitly the minimum assumption was made that they were all of equal importance. It would not be surprising if this assumption was wrong, and required modifying as certain people will be able to control the uncertainty in the working environment to a much greater extent than others. It is plausible that management have the greatest amount of control in this respect. A further explanation is that work study have no authority over operators and can only request through management, for any alterations.
### Correlation Matrix - 25 Variables

**Company A.E.**

**Straight Proportional Scheme**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Work Study Control</th>
<th>Operator Control</th>
<th>Management Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator Understanding</td>
<td>0.39</td>
<td>0.42</td>
<td>0.36</td>
</tr>
<tr>
<td>Operator Satisfaction</td>
<td>0.42</td>
<td>0.42</td>
<td>0.30</td>
</tr>
</tbody>
</table>

**Figure 12**

**Correlation Matrix 1 - 25 Variables**

29 Individuals

All values not significant at 0.05 level designated.
<table>
<thead>
<tr>
<th>OU</th>
<th>OS</th>
<th>WSC</th>
<th>( 0.122 )</th>
<th>( 0.229 )</th>
<th>( 0.361 )</th>
<th>( 0.123 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Critical Value \( .3044 \)

OS correlates positively with MC and WSC which both correlate with each other. This latter fact is not surprising as management and work study tend to be non-independent, for work study is governed by management ultimately. This does not apply to departmental management, but as mentioned previously some of the controls overlap. There is a correlation between OU and OC which again is somewhat surprising, for it means that the greater the understanding the less the fiddling, and therefore less OC. Unlike the previous occurrence of this correlation it cannot be explained by appealing to a correlation between OC and MC or WSC, although both correlations are both significant at the OS level.

Examination of Figure 14 indicates the MC contributes less to OS than WSC which appears to contribute more to OU than indicated in
Figure 13. The correlations of OC with OU are somewhat confusing as OC tends to reduce the more they understand about the function of the parts they work upon. Could this be an intrinsic requirement? Further and possibly more feasible OC reduces as more knowledge is acquired as to how a time standard is evolved.

Examination of the scatter graphs, Figures 15 and 16, do indicate a stronger relationship between OS and WSC than OS and MC. 26.00% of the variance was explained by the multiple-regression with all variables and this dropped to 23.72% for OS and WSC alone. This confirms that in this firm WSC seems to be the main determinant of OS. Further reference to Figure 14 shows that the operators identified work study as receiving considerable management support (Question 15), and these correlate highly with, policy, working conditions and immediate supervision. It could be for this reason that the operatives identify more with WSC than MC.
Correlation Matrix 1 - 25 Variables 40 Individuals
All values not significant at 95% level designated.

Figure 14

Company B.S.

Straight Proportional Scheme
Company SM  Straight Proportional Scheme
Number of respondents 30
Number of Questionnaires Issued 33
Incomplete 3

<table>
<thead>
<tr>
<th></th>
<th>OS</th>
<th>WSC</th>
<th>OC</th>
<th>MC</th>
<th>OU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.166</td>
<td>2</td>
<td>0.570</td>
<td>0.569</td>
<td>0.122</td>
</tr>
<tr>
<td>2</td>
<td>0.209</td>
<td>0.329</td>
<td>0.106</td>
<td>0.737</td>
<td>0.569</td>
</tr>
</tbody>
</table>

Critical Value = -0.349

WSC and MC correlate highly with OS. As for the previous firm, OU seems less important, contrary to the results for the regressive schemes. This may be because a straight proportional scheme is easier to understand and all the operators found this to be so.

OC does not correlate significantly with any other factor in the multi-regression, Figure 17. In the individual question matrix Figure 18 however, OC does correlate with immediate supervision and management policies, the contribution nevertheless bears no resemblance to the contribution of MC and WSC to OS. The amount of variance explained in the multiple-regression is very high at 69.30%. This only drops to 67.28% when OU, MC and WSC are included.

The inclusion of OU is probably due to its very low SE of (B) and this fits in with the assumption that all operators are able to understand the scheme well, thus producing little variance in values of OU. This is further supported by the fact that the value of B, the regression coefficient for OU and OS is very low. MC alone explains 54.33% of the variance. The two scatter graphs Figures 19 and 20 substantiate the contributions and relationships between OS and MC and OS and WSC. The regression lines have a closer fit to the data than any previously discussed.
### Correlation Matrix 1 - 25 Variables

**ALL VALUES NOT SIGNIFICANT AT 95% LEVEL DESIGNATED**

#### Table

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.56</td>
<td>0.33</td>
<td>0.34</td>
<td>0.55</td>
<td>0.43</td>
</tr>
<tr>
<td>0.36</td>
<td>0.33</td>
<td>0.35</td>
<td>0.56</td>
<td>0.43</td>
</tr>
<tr>
<td>0.36</td>
<td>0.34</td>
<td>0.36</td>
<td>0.57</td>
<td>0.44</td>
</tr>
</tbody>
</table>

#### Figure 18

**Company S.M.**

**Straight Proportional Scheme**

---

**Operator Understanding**  **Operator Satisfaction**  **Work Study Control**  **Operator Control**  **Management Control**
Company H, A,

Straight Proportional Scheme

Number of respondents 33
Number of Questionnaires Issued 41
Incomplete 8

<table>
<thead>
<tr>
<th></th>
<th>OS</th>
<th>WSC</th>
<th>OC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.325</td>
<td>2</td>
<td>0.585</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>0.483</td>
<td>0.585</td>
<td>3</td>
<td>0.083</td>
</tr>
</tbody>
</table>

Critical Value .324

OS correlates highly with MC and WSC which also correlate with each other. MC also correlates with OU which has a low variance, similar to company SM. (SE (B) = .1307 B = .0468. Thus considerable similarity exists as in the previous firms. 41.73% of the variance is explained by the multiple-regression; OS and WSC explained 34.22% and OS and MC 38.26%. Examination of the individual question matrix, Figure 22, reveals the considerable contribution made by WSC and MC to OS. OC makes no contribution to OS, although it does relate to OU and WSC these correlations are not significant in the multiple regression matrix.
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 46 | 0.64 | 0.39 | 0.37 | 0.92 | 0.49 | 0.36 | 0.52 | 0.89 | 0.56 | 0.61 | 0.45 | 0.51 | 0.37 | 0.56 | 0.61 | 0.35 | 0.38 | 0.50 | 0.35 | 0.38 | 0.64 | 0.38 | 0.38 | 0.49 |
| 47 | 0.45 | 0.51 | 0.35 | 0.55 | 0.50 | 0.38 | 0.46 | 0.51 | 0.40 | 0.49 | 0.63 | 0.36 | 0.38 | 0.49 | 0.38 | 0.49 | 0.38 | 0.38 | 0.33 | 0.36 | 0.46 | 0.48 | 0.35 | 0.35 |

**Operator Understanding**  
**Operator Satisfaction**  
**Work Study Control**  
**Operator Control**  
**Management Control**

**Figure 22**

Company H.A.

Straight Proportional Scheme
For this firm operatives appear to find understanding a problem and hence it assumes more importance in relation to OS, than in previous firms. OC, MC, WSC and OU correlate with OS, and all in the predicted direction. The correlation of OC with WSC and MC are also in the predicted directions. More WSC and MC produce less OC, MC and WSC correlate with each other and MC correlated with OU which is plausible as management determine how much the operators understand. As understanding appears important to operators and correlates with OS, the fact that the operators also identify MC as important to OS would indicate that one would expect some correlation of MC with OU. 61.80% of the variance is explained by the independent variables, WSC and OU explain 54.36% and WSC alone explains 40.54%. The scatter graphs Figures 24 and 25, illustrate the close relationships between OS and MC and OS and WSC, the scatter graphs for OC and OU follow a similar pattern. Reference to the individual question matrix Figure 26 indicates that the most important OC questions are, the amount of effort put into unmeasured work and their co-operation with work study.
Quite surprisingly they appear to be showing that the more effort they put into unmeasured work and the more they co-operate with work study the more satisfied they are. It is possibly a reflection of their need for certainty. 61.80% of the variance is explained by the independent variables and WSC and OU alone explain 54.36%. WSC with OS explain 40.54%.
Figure 25
Company P

OS/WSC
Operator Satisfaction

Work Study Control
### Correlation Matrix 1 - 25 Variables 50 Individuals

**All Values Not Significant at 95% Level Designated**

#### Figure 26

<table>
<thead>
<tr>
<th></th>
<th>Operator Understanding</th>
<th>Operator Satisfaction</th>
<th>Work Study Control</th>
<th>Operator Control</th>
<th>Management Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of Financial Incentive Scheme</td>
<td>0.59</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
</tr>
<tr>
<td>Ability to Calculate Overtime</td>
<td>0.62</td>
<td>0.62</td>
<td>0.62</td>
<td>0.62</td>
<td>0.62</td>
</tr>
<tr>
<td>Understanding of Formula</td>
<td>0.51</td>
<td>0.51</td>
<td>0.51</td>
<td>0.51</td>
<td>0.51</td>
</tr>
<tr>
<td>Understanding of Non-Standard Measurements</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
</tr>
<tr>
<td>Satisfaction with Company's Policies</td>
<td>0.45</td>
<td>0.45</td>
<td>0.45</td>
<td>0.45</td>
<td>0.45</td>
</tr>
<tr>
<td>Satisfaction with Working Conditions</td>
<td>0.38</td>
<td>0.38</td>
<td>0.38</td>
<td>0.38</td>
<td>0.38</td>
</tr>
<tr>
<td>Satisfaction with Supervisors</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
</tr>
<tr>
<td>Irregularity of Financial Incentive Scheme</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
</tr>
<tr>
<td>Irregularity of Financial Incentive Scheme</td>
<td>0.49</td>
<td>0.49</td>
<td>0.49</td>
<td>0.49</td>
<td>0.49</td>
</tr>
<tr>
<td>Application of Method Study</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
</tr>
<tr>
<td>Accuracy in Booking Setting Times</td>
<td>0.61</td>
<td>0.61</td>
<td>0.61</td>
<td>0.61</td>
<td>0.61</td>
</tr>
<tr>
<td>Accuracy in Booking Understanding</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
</tr>
<tr>
<td>Overbooking and Undershooting</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
</tr>
<tr>
<td>Co-operation with Work Study</td>
<td>0.49</td>
<td>0.49</td>
<td>0.49</td>
<td>0.49</td>
<td>0.49</td>
</tr>
<tr>
<td>Error into Measured Work</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
</tr>
<tr>
<td>Superiors Control of Work</td>
<td>0.45</td>
<td>0.45</td>
<td>0.45</td>
<td>0.45</td>
<td>0.45</td>
</tr>
<tr>
<td>Effectiveness of Department Control</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
</tr>
<tr>
<td>Control of Scrap and Rejection.</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
</tr>
<tr>
<td>Pay Increases Contributions.</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
</tr>
</tbody>
</table>

**Company P.**

*Graded Measured Daywork*
Company A.R. Graded Measured Day Work

Number of respondents 39
Number of Questionnaires Issued 44
Incompleted 5

\[ \begin{array}{c|c|c|c|c|c|c}
\text{OU} & \text{OS} & \text{WSC} & \text{OC} & \text{MC} & \\
0.065 & 0.094 & 0.167 & 0.206 & \\
2 & 3 & 4 & 5 & \\
0.452 & 0.272 & 0.248 & 0.540 & \\
0.452 & 0.272 & 0.248 & 0.540 & \\
0.276 & 0.540 & 0.595 & 0.276 & \\
\end{array} \]

Critical Value .3044

In this firm the only variables that correlate with OS are MC and WSC. OU and OC having no significant correlations with OS. This has to be reconciled with the fact that this scheme as in Company P is somewhat difficult to understand and the pattern is somewhat different, although the work is very similar - electronic assembly. OU and OC are not significant in their relationship with OS. Nevertheless, a similar pattern emerges in the significance of MC and WSC. There is then a relationship in these areas. All the variables in the multiple regression accounted for 33.3% of the variance, and MC alone accounted for 29.19%. Examination of the individual question matrix, Figure 28, does however, indicate a number of isolated questions within OU and OC as significant. Inspections contribution was deemed important to satisfaction.
**Figure 28**

**Correlation Matrix 1 - 25 Variables for 39 Individuals**

All values not significant at 99% level designated "a".

Company A.R.

Graded Measured Daywork

<table>
<thead>
<tr>
<th>Operator Understanding</th>
<th>Operator Satisfaction</th>
<th>Work Study Control</th>
<th>Operator Control</th>
<th>Management Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>0.79</td>
<td>0.37</td>
<td>0.38</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.35</td>
<td>0.42</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.37</td>
<td>0.41</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.40</td>
<td>0.36</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.40</td>
<td>0.32</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.56</td>
<td>0.46</td>
<td>0.34 0.32</td>
</tr>
</tbody>
</table>

Note: All values not significant at 99% level designated "a".
Company D  No Incentive Scheme

Number of respondents 14
Number of Questionnaires Issued 27
Incompleted 13

Figure 29

<table>
<thead>
<tr>
<th></th>
<th>OS</th>
<th>WSC</th>
<th>OC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.450</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.584</td>
<td>0.621</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.632</td>
<td>0.697</td>
<td>0.660</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>0.244</td>
<td>-0.033</td>
<td>0.558</td>
<td>-0.043</td>
</tr>
</tbody>
</table>

Critical Value .4973

This firm is exceptional in that MC does not correlate with OS whereas WSC and OC do. This is because there is no financial incentive scheme in this firm, and most of the controls, that is scheduling of work, control of scrap and overall departmental control is effected by a computer. The correlations of WSC with MC is in line with most of the previous results, as with the correlations of OC with WSC. For the same reason that OS does not correlate with MC, OC is not correlated with MC. The conclusion is that management have little direct control over uncertainty, except in so far as they determine workstudy policy. (This was discussed previously in relation to company AE where the situation was in reverse). In AE work study was subsumed under MC and in this case MC is subsumed under WSC at least in the opinion of the operators. The OU questions are not relevant in this firm as there was no scheme to understand. 60.53% of the variance is explained when all the variables are included in the multiple-regression. OC alone explains 48.53% of the variance.
This result fits the theory very well. Management only determine OS when they can influence the level of uncertainty in the working environment through a financial incentive scheme.

Derived of this influence work study and operators themselves determine the level of OS. Figure 30 individual question matrix. Figure 31 OS/WSO scatter graph. Figure 32 OS/OC scatter graph.
**CORRELATION MATRIX 1 - 25 VARIABLES FOR 14 INDIVIDUALS**  
All values not significant at 95% level designated " .

<table>
<thead>
<tr>
<th>Company</th>
<th>Measured Daywork</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Operator Understanding**

- Knowledge of financial incentive scheme
- Ability to calculate earnings
- Understanding of formulas
- Understanding of function of parts
- Understanding of the standard measurement
- Satisfaction with management's policies
- Satisfaction with company's policies
- Satisfaction with immediate supervision
- Satisfaction with pay security
- Number of leave time standards
- Work habits effectiveness
- Work study support
- Accuracy in booking values
- Accuracy in booking off jobs
- Co-operation with work study
- Effort into unmeasured work
- Effectiveness of work scheduling and allocation
- Control of scrap and rectification
- Inspections contribution

**Operator Satisfaction**

- Work Study Control

**Work Study Control**

- Operator Control

**Management Control**

- 25
FIGURE 31

COMPANY D

QS/WSC

OPERATOR SATISFACTION

1

1.60 x 10

1.20

0.90

0.60

0.30

WORK STUDY CONTROL

0.30 0.60 0.90 1.20 1.50 x 10
A further multiple regression analysis was used to examine the contribution of each factor to OS and calculating the percentage explained.

**Each Factor Explained With OS**

<table>
<thead>
<tr>
<th>Factor</th>
<th>OU (%)</th>
<th>WSC (%)</th>
<th>OC (%)</th>
<th>NO (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD</td>
<td>0.410</td>
<td>0.174</td>
<td>0.263</td>
<td>0.431</td>
</tr>
<tr>
<td>GA</td>
<td>0.402</td>
<td>0.419</td>
<td>0.292</td>
<td>0.291</td>
</tr>
<tr>
<td>AE</td>
<td>0.279</td>
<td>0.291</td>
<td>0.017</td>
<td>0.452</td>
</tr>
<tr>
<td>BS</td>
<td>0.121</td>
<td>0.487</td>
<td>0.236</td>
<td>0.336</td>
</tr>
<tr>
<td>SM</td>
<td>0.165</td>
<td>0.569</td>
<td>0.328</td>
<td>0.737</td>
</tr>
<tr>
<td>HA</td>
<td>0.325</td>
<td>0.585</td>
<td>0.002</td>
<td>0.618</td>
</tr>
<tr>
<td>P</td>
<td>0.517</td>
<td>0.636</td>
<td>0.568</td>
<td>0.570</td>
</tr>
<tr>
<td>AR</td>
<td>0.064</td>
<td>0.451</td>
<td>0.272</td>
<td>0.540</td>
</tr>
<tr>
<td>D</td>
<td>0.449</td>
<td>0.620</td>
<td>0.696</td>
<td>0.032</td>
</tr>
</tbody>
</table>

**Conclusions**

The main assumptions of the theory have been substantiated, that is, that when NO and or WSC increase then OC decreases. Another concept however emerges: When operators perceive that management are ineffective then WSC correlates more with OS.
When operators perceive that work study are ineffective then MC correlates more with OS than WSC, OU contributed more to OS in the firms operating regressive financial incentive schemes (they are more complex), also with company P whose graded measured day work scheme had to be related to identified levels of performance by the operatives. Although operating a similar scheme to P, AR's had fewer complications and so OU seemed relatively unimportant to the operatives.

Although the main part of the theory has been substantiated, that is: When management control and work study control are seen by the operatives to be more effective, (increase) then operator satisfaction will be high, this is a within firm computation, and it was decided to analyse the effect of management control and work study control across firms using Spearman's rank correlation technique.

**Correlations**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS v. MC</td>
<td>.896</td>
</tr>
<tr>
<td>Critical figure at .01 two-tailed test</td>
<td>.834</td>
</tr>
<tr>
<td>OS v WSC</td>
<td>.929</td>
</tr>
<tr>
<td>Critical figure at .002 two-tailed test</td>
<td>.917</td>
</tr>
</tbody>
</table>
The contribution of MG and WSC to OS is extremely significant and further consolidates and supports the theory of the relationship of these variables within and across firms.

Further analyses have yet to be made:

Communication, productive effectiveness, labour turnover and background data in order to complete the examination of the theoretical model. Also to relate these variables to OS and draw conclusions. Further points will emerge and they will be discussed at each stage. Overall conclusions will then be made in relation to this research as a whole. Further requirements and research will be identified with respect to the summary and conclusions.
CHAPTER IX

ANALYSIS OF COMMUNICATION
PRODUCTIVE EFFECTIVENESS AND LABOUR TURNOVER
As previously stated S.E.L. will not be considered in view of there being only seven respondents. The remaining nine firms will be considered. The significant figure for N = 25 is 0.27 using Kendall's Tau.

**B.D. Regressive**

- Management v Operatives: 0.226
- Work Study v Operatives: 0.233

No significance

**C.A. Regressive**

- Management v Operatives: 0.420
- Work Study v Operatives: 0.140

Management v Operatives significant

**S.M. Straight Proportional**

- Management v Operatives: 0.446
- Work Study v Operatives: 0.446

Both significant

**H.A. Straight Proportional**

- Management v Operatives: 0.640
- Work Study v Operatives: 0.266

Management v Operatives significant

**B.S. Straight Proportional**

- Management v Operatives: 0.280
- Work Study v Operatives: 0.120

Management v Operatives significant
<table>
<thead>
<tr>
<th>A. E. Straight Proportional</th>
<th>Work Study v Operatives</th>
<th>0.113</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management v Operatives</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>No significance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A. R. Graded Measured Day Work</th>
<th>Work Study v Operatives</th>
<th>0.360</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management v Operatives</td>
<td>0.573</td>
<td></td>
</tr>
<tr>
<td>Both significant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D. Straight Measured Day Work</th>
<th>Work Study v Operatives</th>
<th>0.313</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management v Operatives</td>
<td>0.406</td>
<td></td>
</tr>
<tr>
<td>Both significant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It was stated in the introduction page 13, that:

"The higher the level of communication as seen by the operatives, the higher the level of operator satisfaction and certainty."
Communication results will be ranked with percentage raw scores of operator satisfaction to examine if there is a relationship. If a relationship does exist then Spearman rank order correlation will be used to measure this relationship.

The ranking of communication will be arranged in order of the most significant value of MC and operatives and WSC and operatives, followed by the remainder in descending order.

<table>
<thead>
<tr>
<th>Rank Order OS</th>
<th>Firm</th>
<th>Rounded Percentage Of Maximum (15)</th>
<th>Rank Order Comm.</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AR</td>
<td>73</td>
<td>1</td>
<td>SM</td>
</tr>
<tr>
<td>2</td>
<td>BS</td>
<td>68</td>
<td>2</td>
<td>P</td>
</tr>
<tr>
<td>3</td>
<td>GA</td>
<td>65</td>
<td>3</td>
<td>AR</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>62</td>
<td>4</td>
<td>D</td>
</tr>
<tr>
<td>5</td>
<td>BD</td>
<td>58</td>
<td>5</td>
<td>HA</td>
</tr>
<tr>
<td>6</td>
<td>P</td>
<td>57</td>
<td>6</td>
<td>GA</td>
</tr>
<tr>
<td>7</td>
<td>HA</td>
<td>54</td>
<td>7</td>
<td>BS</td>
</tr>
<tr>
<td>8</td>
<td>SM</td>
<td>50</td>
<td>8</td>
<td>BD</td>
</tr>
<tr>
<td>9</td>
<td>AE</td>
<td>43</td>
<td>9</td>
<td>AE</td>
</tr>
</tbody>
</table>

Clearly there is no relationship between operator satisfaction and communication, thus refuting one prediction of the theory as restated on page 174.
Productive Effectiveness

It was stated on page 66 that overall departmental efficiencies would be assessed and related to an overall job satisfaction score. It was further stated that this research is not specific on this point. The author feels that a more detailed explanation is necessary. Initially productive effectiveness would be derived from the three levels of data submitted by the firms that is:

- Total hours worked
- Standard hours achieved
- Ineffective and non-productive hours.

The weekly summary sheets provided by the accountants in many of the firms were so full of ambiguities that standardised extraction became almost impossible. There could therefore be an inherent weakness in the final data. This was overcome by using only the total hours worked and standard hours achieved. Nested within these figures are the ineffective and non-productive hours. It is therefore impossible to check the accuracy of the time standards that exist. This data was separated out and graphed for three of the firms as shown on the following pages. The usefulness is readily apparent in that a correlation should exist between the three areas. That is: when ineffective and non-productive hours increase, then standard hours produced decrease, providing that total hours worked relate.
Firm A.n.R. shows a cohesive relationship between all three plots. H.A.'s data reveals a lack of correlation; standard hours produced are often higher than total hours worked regardless of the ineffective and non-productive hours. S.M. have even more ambiguities in that when ineffective and non-productive hours increase so do standard hours produced. This is completely illogical, for how can the volume and average performance increase when less productive time is available. It is regrettable that this analysis could not have been completed for every firm. This will be discussed under the heading of conclusions and further research.

The P.E. figures will now be displayed in rank order and related to an overall Operator Satisfaction score as previously displayed.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Firms</th>
<th>PE</th>
<th>Rank</th>
<th>Firms</th>
<th>OS Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BS</td>
<td>110%</td>
<td>1</td>
<td>AR</td>
<td>73</td>
</tr>
<tr>
<td>*2</td>
<td>SM</td>
<td>105%</td>
<td>2</td>
<td>BS</td>
<td>68</td>
</tr>
<tr>
<td>*3</td>
<td>AE</td>
<td>105%</td>
<td>3</td>
<td>GA</td>
<td>65</td>
</tr>
<tr>
<td>4</td>
<td>P</td>
<td>103%</td>
<td>4</td>
<td>D</td>
<td>62</td>
</tr>
<tr>
<td>5</td>
<td>HA</td>
<td>95%</td>
<td>5</td>
<td>BD</td>
<td>58</td>
</tr>
<tr>
<td>6</td>
<td>D</td>
<td>93%</td>
<td>6</td>
<td>P</td>
<td>57</td>
</tr>
<tr>
<td>7</td>
<td>BD</td>
<td>88%</td>
<td>7</td>
<td>HA</td>
<td>54</td>
</tr>
<tr>
<td>8</td>
<td>GA</td>
<td>82%</td>
<td>8</td>
<td>SM</td>
<td>50</td>
</tr>
<tr>
<td>9</td>
<td>AR</td>
<td>79%</td>
<td>9</td>
<td>AE</td>
<td>43</td>
</tr>
</tbody>
</table>

No relationship appears to exist between PE and OS thus substantiating previous research summarized by Vroom 1964. The same scores have been shown consecutively purely for convenience, and would have been allocated the mean of 3-4 that is 3.5 each had Spearman's method been used.
It will be remembered that on page 63 the author stated that:
"Operators tend to suppress their personal troubles and problems where it would conflict with their job performance." This statement is substantiated to some degree by the above results wherein those operatives with low satisfaction produce a high output and conversely those with high satisfaction produce a low output.

Labour Turnover (L.T.O.)

The following information was received from the nine firms.

In rank order:

<table>
<thead>
<tr>
<th>Firm</th>
<th>Labour Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D</td>
</tr>
<tr>
<td>2</td>
<td>AR</td>
</tr>
<tr>
<td>3</td>
<td>BS</td>
</tr>
<tr>
<td>4</td>
<td>GA</td>
</tr>
<tr>
<td>5</td>
<td>BD</td>
</tr>
<tr>
<td>6</td>
<td>P</td>
</tr>
<tr>
<td>7</td>
<td>AE</td>
</tr>
<tr>
<td>8</td>
<td>HA</td>
</tr>
<tr>
<td>9</td>
<td>SM</td>
</tr>
</tbody>
</table>

Vroom (1964) examined seven studies which related job satisfaction to labour turnover, and all indicated a negative relationship. That is the higher a worker's satisfaction the less apt he was to leave the job. The following figures were obtained using Spearman's rank order correlation technique:

\[
\text{LTO v OS} = .847
\]

Critical value for \( N = 9 \) for a two-tailed test at .01 significance = .834
This substantiates Vroom's findings.

It was decided to further examine this relationship by measuring the ranked means of the individual question replies against labour turnover and the following results were obtained.

<table>
<thead>
<tr>
<th>Rank Order</th>
<th>Satisfaction with:</th>
<th>Rank Order</th>
<th>Satisfaction with:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Security v. labour turnover</td>
<td>Immediate supervision v labour turnover</td>
<td>.892</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Working Conditions v labour turnover</td>
<td>.823</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management Policy v labour turnover</td>
<td>.821</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Company policy v labour turnover</td>
<td>.717</td>
</tr>
</tbody>
</table>

Company policy was significant only at .10 level and therefore ignored.

The ranking as it has emerged appears not only interesting but also logical. Security has mainly occupied first or second rankings by respondents in much of the research into job satisfaction. The importance of this variable to operatives in this research is clearly indicated, followed by the level of supervision that concerns and affects them most. Working conditions were more important than management policy and both highly significant. (see pages 35 and 37 for other rankings of these variables)
Background Data

It was mentioned on page 70 that Herzburg et al (1957) proposed that there was a significant relationship between age and job satisfaction. Although in support of Fournet et al in stating that analysis of this type is difficult, this analysis was attempted and age had a negative correlation with working conditions in BD and more with satisfaction, a significant correlation (.343 - critical value .330) with OS and .493 with OC. In AE age correlated .470 with OC and negatively with immediate supervision. In BS there was no significant correlation with age. SM had age correlated with OU. In P age correlated with OC and immediate supervision. No correlation existed in AR whilst D had a negative correlation with security. The following page displays the summary of the background data from which there appears to be no logical connection within or with other variables this correlation exercise will in consequence not be pursued.

Other variables have been added; PE, Turnover, Communication and OS and the whole displayed in tabular form to examine if any other cohesive relationship emerges. Apart from turnover and OS already discussed, no other pattern materialised.
# BACKGROUND DATA

## SUMMARY

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>NUMBER RESPONDENTS</th>
<th>YEAR WITH COMPANY MEAN</th>
<th>AGE BRACKET MEAN</th>
<th>YEAR ON PRESENT JOB MEAN</th>
<th>PRESENT COMPANY MEAN</th>
<th>PAST COMPANY MEAN</th>
<th>MAX 3</th>
<th>SEX MALE-FEMALE</th>
<th>MARITAL STATUS</th>
<th>PRODUCTIVE EFFECTIVENESS</th>
<th>LABOUR TURNOVER</th>
<th>COMMUNICATIONS</th>
<th>OPERATOR SATISFACTION</th>
<th>PERCENTAGE OF TOTAL 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD</td>
<td>29</td>
<td>5-10</td>
<td>30-40</td>
<td>1.3</td>
<td>1M</td>
<td>1F</td>
<td>1.3M</td>
<td>27M</td>
<td>84</td>
<td>57</td>
<td>Poor</td>
<td>58</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>35</td>
<td>5-10</td>
<td>30-40</td>
<td>1.03</td>
<td>2M</td>
<td>3F</td>
<td>21M</td>
<td>28M</td>
<td>82</td>
<td>35</td>
<td>Good</td>
<td>65</td>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>AE</td>
<td>29</td>
<td>2-5</td>
<td>30-40</td>
<td>1.88</td>
<td>4L</td>
<td>5F</td>
<td>1LM</td>
<td>25M</td>
<td>105</td>
<td>74</td>
<td>Poor</td>
<td>43</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>BS</td>
<td>41</td>
<td>2-5</td>
<td>20-30</td>
<td>2.27</td>
<td>1M</td>
<td>2F</td>
<td>11M</td>
<td>4F</td>
<td>110</td>
<td>34</td>
<td>Good</td>
<td>68</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>SM</td>
<td>30</td>
<td>5-10</td>
<td>40</td>
<td>5-10</td>
<td>2.32</td>
<td>1F</td>
<td>1M</td>
<td>26M</td>
<td>105</td>
<td>100</td>
<td>Very Good</td>
<td>50</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>HA</td>
<td>33</td>
<td>2-5</td>
<td>30-40</td>
<td>3.13</td>
<td>2M</td>
<td>3F</td>
<td>21M</td>
<td>25M</td>
<td>95</td>
<td>90</td>
<td>Good</td>
<td>54</td>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>29</td>
<td>2</td>
<td>20-30</td>
<td>1.63</td>
<td>3F</td>
<td>4M</td>
<td>22F</td>
<td>32M</td>
<td>103</td>
<td>67</td>
<td>Very Good</td>
<td>57</td>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td>39</td>
<td>2-5</td>
<td>30-40</td>
<td>4.71</td>
<td>3F</td>
<td>4M</td>
<td>23M</td>
<td>16S</td>
<td>79</td>
<td>30</td>
<td>Very Good</td>
<td>73</td>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>14</td>
<td>2</td>
<td>30-40</td>
<td>2.25</td>
<td>14M</td>
<td>1F</td>
<td>13M</td>
<td>1S</td>
<td>88</td>
<td>26</td>
<td>Good</td>
<td>62</td>
<td>Very Good</td>
<td></td>
</tr>
</tbody>
</table>

F = Female  
M = Male  
S = Single  
M = Married
CHAPTER X

SUMMARY AND CONCLUSIONS
CHAPTER X

SUMMARY AND CONCLUSIONS

This research has examined nine firms in relation to a number of concepts and predictions. These predictions will be re-stated and the results of this research will be discussed and summarised in this chapter.

Related Assumption

"Workers like certainty and dislike uncertainty in some aspects of their working environment."

Prediction 1

"The more effective management and work study controls are seen to be by the operatives the higher the operator satisfaction and their certainty."

Prediction 2

"If management and work study controls are low then operator satisfaction will be high only if operator control is high."

Prediction 3

"The higher the level of communication as seen by the operatives, the higher the level of operator satisfaction and certainty."
Significant Correlation With O.S.

- Company B. D. -
  - OU → OS
  - MC → OS

- Company G. A. -
  - OU → OS
  - WSC → OS

- Company A. E. -
  - MC → OS

- Company B. S. -
  - WSC → OS
  - MC → OS

- Company S. M. -
  - WSC → OS
  - MC → OS

- Company H. A. -
  - OU → OS
  - WSC → OS
  - MC → OS

- Company P. -
  - OU → OS
  - WSC → OS
  - OC → OS
  - MC → OS

- Company A. R. -
  - WSC → OS
  - MC → OS

- Company D. -
  - WSC → OS
  - OC → OS
It was stated on page 10 that the degree of uncertainty which the operative experiences in areas beyond his control can be said to be directly proportional to the degree of management and work study controls. The more effective the degree of control exercised by these groups in the industrial environment the less uncertainty the operatives will experience. The level of satisfaction will also be reflected by the degree of uncertainty. It has also been established that there are occasions when operatives perceive other variables that contribute to their certainty and satisfaction. An example of this occurring is within the companies BD and GA where OU assumes an equal importance with MC and WSC to OS. This is understandable as both companies operate regressive financial incentive schemes, which require more understanding than straight proportional and other types of schemes. (Marriot 1961) A further example is company D wherein OC assumes a relative importance with WSC to OS. This company operates no financial incentive scheme and management controls are by computer, therefore WSC supercedes MC in relevance and OC is significant to OS.

With reference to the 'Related Assumption', page 185, the level of MC and/or WSC supported by OU in specific cases and OC in one case already mentioned, reflects the level of uncertainty and therefore operator satisfaction. This level is indicated by the significant correlations of these variables in which we may assume that as these levels increase, then so do the levels of certainty and satisfaction. This statement also supports Prediction I and reference to page 186 shows that in all nine companies MC and/or WSC were the main contributors and therefore predictors of OS.
Prediction 2

This has not been supported, for although in company D OC appeared
to assume the role of MC, the correlation was positive indicating that the
less the operators need to control the more satisfied they are. The
prediction implied that as MC and WSC became less effective then, the
operators would assume their own controls. This has not been
substantiated and is therefore refuted. (Further samples need to be
taken to confirm this aspect)

Further examination of the individual question matrices indicates
that some questions are more significant than others for many of the
sample companies.

For example:—

Questions 2, 3, 4 and 5 correlated with 6, 7, 12, 27, 23 and 24.

These are predominately questions on understanding with management and
company policy, and with management control. Whilst questions 6, 7, 8
and 9 on satisfaction correlated with 12, 13, 15, 19, 20, 22, 23, 24 and
25 WSC, OC and MC.

An analysis of the total individual question replies (N = 285)
is enclosed, P. 189, this further substantiates the related assumption
and prediction I of the theory, reflecting the strong association between
WSC, MC and OS.
Prediction 3

Communication although significant within a number of companies did not correlate with any other variable, more particularly operator satisfaction. It therefore corroborated much of the previous research in this area (BLUM 1968).

The fact that productive effectiveness did not correlate significantly with any other variable is also not surprising, as already mentioned, no previous research findings have indicated an association (BLUM 1968). It would appear that productive effectiveness does not appear as important to operatives as many researchers would have us believe. Probably because, as the author has already stated, standard performance is mainly achieved. If higher productivity is what is required, then a reduction of the ineffective and non-productive time is what will achieve this. Management must therefore be more effective in order to achieve this reduction.

The effect of labour turnover was not predicted in the theory. Data was however collected and analysed, and the results corroborated much of the previous research in this area, in that a high level of correlation was found to exist when ranked with operator satisfaction. The correlation was negative indicating that as operators become less satisfied the more inclined they will be to leave the company. This latter result when linked to the central assumptions of the theory; that is the direction of management, work study controls and operator satisfaction, is deemed important. Management have needed to identify variables contributing to dissatisfaction in order to attempt to resolve this problem and therefore reduce labour turnover. Whilst not assuming that the variables identified in this research are all conclusive, it is thought that they
are the major contributors to operator satisfaction in the industrial environment, and have been proven in this research to be predictors of operator satisfaction. If management can resolve these areas then it follows that a higher satisfaction will ensue and a logical reduction in labour turnover.

Diagrammatic Representation Of The Theory

- Operator Satisfaction (OS)
- Operator Uncertainty
  - Uncertainty In The Working Environment
    - Communication
    - Management Controls (MC)
    - Work Study Controls (WSC)
  - Operator Controls (OC)
  - Operator Understanding (OU)
Diagrammatic Results Of The Theory - A Generalised Concept

Operator Satisfaction OS

Operator Uncertainty

Labour Turnover Operator Understanding

Uncertainty In The Working Environment

Operator Controls OC

Management Controls MC

Work Study Controls WSC

MAIN PREDICTORS
It now follows that to predict OS in companies similar to those selected for this research and among semi-skilled operators; MC, WSC and LTO, questionnaires would be used for those companies using straight proportional financial incentive schemes. The addition of 0.00 for companies using regressive financial incentive schemes, and OC for companies operating no financial incentive scheme. There being only one company with no scheme, more research would be required to substantiate the latter statement.

Background data was collected but nothing of significance was found (page 184). It was stated on page 69 that this research will be restricted to ten companies where possible manufacturing different products and operating different types of financial incentive schemes. Some assumptions were made as to how OC, WSC and MC might vary within different types of schemes. This variation has only been partial and not very significant except in relation to the companies using regressive schemes and no scheme. It is interesting to note that the two companies using regressive financial incentive schemes are in the bottom three for productive effectiveness, whilst the companies operating a straight proportional type of scheme lead in productive effectiveness.

The exception is company P which operates a graded measured daywork scheme. The grades are calculated on a straight proportional basis, and it is in this respect that the scheme is similar to the straight proportional schemes. A.R. operate a different structure with graded measured day work. 0.0 was also significant in companies H. A. and P. and therefore was representative in four out of the nine companies. The explanation could
be that H.A. used the Bedaux 60/80 work units computation method (page 63) which requires more understanding and the graded scheme in Company P. was only recently introduced. It would appear that when operatives identify a need for more understanding, then O.U. correlates significantly with O.S. Although as previously stated it might be expected that O.U. would be more significant in relation to companies operating regressive financial incentive schemes, more samples would be required to substantiate this claim. For the moment it should be noted that a trend exists. If operatives did manipulate schemes more than has been indicated in this research, then it is possible that more understanding would allow more manipulation. O.U would have been more significant and correlated negatively with O.S. This has not however materialised and if as stated by Wyatt, Langdon and Marriott (1938) that only 50% of operatives fully understand their financial incentive scheme, and that productivity will be adversely affected in this case, then this could be supported by companies BD and GA where O.U was significant and PE low. To completely support this theory, however, it would imply that O.U correlated with PE and this does not occur.

Clearly no categoric conclusions can be reached regarding the different financial incentive schemes. It would appear that in this research and this sample the companies operating the straight proportional type of scheme are more effective from the productivity viewpoint. This is the same conclusion reached by O.E.C.D. 1970 and Marriott (1968).
Kaufman's (1965) theory appears extremely relevant to this research, wherein he stated: "To claim that a person is alienated is to claim that his relation to something else has certain features that result is avoidable discontent or loss of satisfaction." This is measured in this research by the levels of OU, WSC, OC and MC with OS.

Kennison (1965) contends that most usages of alienation share the assumption that some relationship or connection that once existed that is natural, desirable or good has been lost. This would imply that it first did exist, but this may not be true, people can become alienated because of something they identify that should exist, but does not. Marx's use of alienation in suggesting a separation, and that when a producer does not own the product, that becomes alienated and so does the producer, is in the author's opinion an exaggerated claim. This is not to state that the product cannot produce an alienated state, but that in this research attitudes towards controls and people responsible for the exercising of these controls, can also cause people to become alienated.

The author turned to Schatt for an explanation of the company AR's results. What appeared paradoxical is that, operator satisfaction was high, labour turnover low, communications very good, but productive effectiveness very low, might well be explained from Hegel's essay on
the 'German Constitution', (1802), wherein he states, "The thoughts contained in this work can have no purpose or effect other than that of comprehending of what exists that makes us vehement and causes us suffering, rather it is, what is not as it should be, but if we see that it is as it must be, that is not arbitrary or accidental, then we also see that it should be as it is." It is therefore possible that the operatives in AOR realised that MC and WSC was difficult, but that every effort was made to surmount these difficulties, and although they were not as they should be, but were as they must be then they had less uncertainty and a higher satisfaction.

Marx's identification of selfrealisation placed the greatest emphasis upon production, (this to Marx's man's species life), and Schacht states, but for Marx, as for Hegel, productive activity corresponds to the dimension of individuality or personality and is that through which the individual personality expresses and thereby realises itself. What emerges from this research is what was previously postulated, and that is that regardless of individual personality, the level of satisfaction, of communication, operatives will produce at standard performance or above. They will fixed to subsume their personal feelings or in fact any factors that might prevent them from achieving standard output or performance. Excellent operators perform above standard, and therefore it is the output above standard (BS100) that they themselves will decide what level to achieve.

Richard Schacht criticises those sociologists who list a number of usages for the term alienation, and then referring to corresponding phenomena as different types of alienation. It is possible that they do not mean different types but different reasons. It would be absurd to conclude that alienation is only a unifactor, as there will be a
number of reasons for alienation so also will there be a number of elements or factors that contribute or are associated with alienation.

Miller's (1967) concept in observing that the man who does not find his work intrinsically satisfying will not be satisfied with his job is not reflected in this research. Likewise, Blaumer's concept of powerlessness, wherein he states that a person is powerless when he is an object manipulated and controlled by other persons, or by an impersonal system such as technology, and when he cannot assert himself as a subject to change or modify this domination the non-alienated state or dimension is the freedom of control, is also not substantiated by this research. In fact in this research control of people is all important and that which substantially contributes to and predicts the level of operator satisfaction. The author feels that the area of freedom for the operator is that range that he knows he can achieve over and above standard performance. Operatives generally know that once standard performance is achieved they will not be badgered by supervision for more output. Nevertheless if they are paid bonus on what they produce they might opt for a certain level on and above standard output for a certain bonus figure. In this respect the operative retains his personal dignity because it then became his decision. It is not unusual for some excellent operatives to continuously return 115 to 120 British Standard output. Examination of levels of productive effectiveness and operator satisfaction (page 184) supports this recent discussion. Company AE has low satisfaction but a high productive effectiveness SM likewise, and similarly P and HA. If alienation is associated with uncertainty and dissatisfaction, then it does not appear that they detract from a sound P.E.

In concluding and prior to discussing further research it is felt useful to list the achievements of this research.
1. It is felt that the assumption made regarding certainty and uncertainty have been substantiated.

2. That prediction I—higher controls relating to higher satisfaction has also been substantiated.

3. That there is some causal relationship between dissatisfaction and alienation.

4. That the type of financial incentive scheme may influence the results, and only a larger sample of companies will confirm or otherwise.

5. That previous research showing a correlation between labour turnover and satisfaction has also been corroborated in this research.

6. That this research supports Hulin and Smith's views; that is that contrary to Herzberg's theory hygiene factors do correlate significantly with satisfaction. That it is the operator's own identification of the place and importance of those variables. For management not to recognise these facts can only increase their dissatisfaction, uncertainty and alienation.

Further Research

The central concept of the theory in this research having been substantiated it now remains to examine areas that could be improved and further work identified. It is thought useful to design additional
questions within the existing variables. That a variable with questions on intrinsic aspects would be useful, if only for (rounding-off) the research and being able to compare more directly with other research.

The number of replies could be increased in order to increase the range of values and it might assist interpretation of results. Background data questions should be structured with much shorter intervals; for example age range probably structured up to 20 years 20-25, 25-30 and so on. Similarly with time with company and time on present job.

It is felt that PE has been proved to be somewhat equivocal and therefore to try to be consistent with companies in obtaining operator performance and relevant dept. statistics would be sound. If it is thought worthwhile to proceed with samples of companies operating different financial incentive schemes, then more companies in each scheme should be selected. Finally it should be remembered that the structure and concepts of this research differs from other research, and that it should retain most of the same structure.
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APPENDIX I

MARRIOT'S SUMMARISED FACTORS

A. Industrial Relations

An incentive payment system.

1. Must be just and fair to management and workers and benefit both. They should be guided by defined policies and procedures. (5)

2. Should have the support of the workers and trade unions and gain their confidence. It should not be paternalistic. (5)

3. Should cover the maximum number of workers in a factory to prevent dissensions. It should not upset the natural balance of wage rates. (3)

4. Should stimulate co-operation and teamwork amongst the workers. (2)

5. Should not be detrimental to welfare of the workers; should help to assure increased production and thereby promote the general welfare. (2)

6. Should stimulate the characteristics which the employer desires to maintain or improve. (1)

7. Should stimulate the interest of the employee in the well-being of the business. (1)

B. Organisation and Technical Efficiency

An incentive payment system.

8. Should have full management support in such matters as work study, standardized shop procedure, instructions covering policy and methods, production, material and quality control and maintenance. (4)

9. Must be rigidly maintained so as to enable the systems to be modified where necessary in the interests of equity and efficiency. (3)
10. (a) Should not be costly in operation — no excessive clerical work.  
(b) Should reduce costs.

11. Should be installed and maintained by an adequate and competent industrial engineering staff who should be fair and impartial.

12. Should be based on proper job-evaluation, time-studies and accurate rate-setting.

C. Standards And Incentive Payment System

13. The rate or standard should be guaranteed until the job is changed; no rate-cutting, and unrestricted as to earning.

14. The worker should be rewarded in direct proportion to the increased output.

15. There should be enough spread between the guaranteed base-rate and the normal bonus-rate to provide the necessary incentive for extra effort; the rewards should be generous.

16. Hourly base-rates should be guaranteed.

17. There should be a standardized task accurately set at a reasonable level.

18. Workers' performance should be measured over as short a period as possible, preferably daily, to enable them to check on the relation between their effort and earnings.
19. There should be an equitable adjustment for failure to meet the task when the cause of the failure is beyond the workers' control. (3)

20. Workers' effort should be assessed on an individual basis. (2)

21. (a) Standards should be operable in busy seasons and dull times — under extreme conditions of a variable labour market. (2)

(b) Favourable earnings obtained in the carrying out of a job in the course of a given period, should not be used to compensate for low earnings obtained from other jobs or in other periods. (1)

22. Time values should be set on the basis of the average time a workman of average skill working at average speed under normal conditions with reasonable recognised allowances. (1)

23. There must be measurable output and performance. (1)

D. Workers' Understanding and Grievances

An incentive payment system

24. Must be simple and easily understood by all workers. (7)

25. Should be in relation to individual performance and easily calculable by workers. (6)

26. Should have adequate grievance machinery. (3)

27. Should have appropriate safeguards for workers. (1)
E. Supervision

An incentive payment system.

28. Supervisors should be automatically controlled and assisted.

29. Supervisors should play a major role in the programme and be fully trained in the fundamentals of industrial engineering.

F. Quality And Waste

An incentive payment system.

30. Measured standards must be based on definite quality requirements and direct controls placed over waste.

31. Adequate steps should be taken to control quality of output, in particular by inspection and by suitable work recording systems showing the incidence of spoilt work.
To preserve individual independence and allow people to feel free to answer truthfully and without restriction, NO NAME, NUMBER or any other means of identification is required on this questionnaire.

0:1, 0:2 etc., indicates that this form is designed for operatives, and the 1 and 2 etc., are sheet numbers.

I should be grateful if you would complete this form entirely on your own. When completed please place the form in the envelope provided, seal firmly, and hand in for my collection.

The completed forms will only be seen by myself, and used for the purpose of research into financial incentive schemes.

Thank you for your help.

J.O. THOMSON

Would you please answer the following questions by placing a tick in the appropriate box:

This is only an example to assist you, and will not be included in the research.

Question: How good are you at timekeeping?

Answers:

- I am seldom late
- I am occasionally late
- I am often late
- I am very often late

If you feel that you are only late occasionally you would tick the second answer so.

We will now proceed with the questions.

Please answer these questions in correct sequence. That is no. 1-2-3-4-5, etc., and please do not alter any of your decisions.
Question 1: How much do you know about the type of financial incentive scheme applied to you?

Answers: I know a lot about the financial incentive scheme

I know a fair amount about the financial incentive scheme

I know a little about the financial incentive scheme

I know nothing about the financial incentive scheme

Question 2: To what degree can you calculate your earnings at any period of time in relation to bonus?

Answers: I can calculate my bonus at any period of time

I can calculate my bonus most of the time

I can calculate my bonus at limited periods of time

I find it difficult to calculate my bonus at any time

Question 3: Do you understand the recognised formula for calculating your bonus?

Answers: I fully understand the formula

I have a good idea of the formula

I have a limited knowledge of the formula

I do not understand the formula

Question 4: Do you understand the function of the parts or processes you work upon?

Answers: I fully understand the function

I have a reasonable knowledge of the function

I have a limited knowledge of the function

I have no real knowledge of the function

Question 5: Do you fully understand how a time standard is measured for your own work?

Answers: I fully understand

I have a reasonable understanding

I have a limited understanding

I have no understanding
Question 6: To what extent are you satisfied with your management's policies?

Answers:
- I am highly satisfied with management's policies
- I obtain a medium degree of satisfaction from management's policies
- I obtain a limited degree of satisfaction from management's policies
- I have no satisfaction from management's policies

State the degree of satisfaction you obtain from the following in your own working situation.

Tick the appropriate box.

Question 7: The company policies

| HIGH | MEDIUM | LOW | NIL |

Question 8: Your working conditions

| HIGH | MEDIUM | LOW | NIL |

Question 9: Your immediate supervision

| HIGH | MEDIUM | LOW | NIL |

Question 10: Your security

| HIGH | MEDIUM | LOW | NIL |
Question 11: How many loose time standards do you have?

Answers: I have quite a number of loose time standards
I have some loose time standards
I have very few loose time standards
I have no loose time standards

Question 12: How well do you consider the financial incentive scheme works?

Answers: I consider it works extremely well
I consider it works very well
I consider it works fairly well
I do not consider it works well

Question 13: How quickly are work queries dealt with?

Answers: They are dealt with at once
They are dealt with quite soon
There are some delays when dealing with queries
There are many queries that take a lot of time

Question 14: Are the time standards in your department based on:

Answers: A comprehensive method study
Reasonable method study
A partial method study
No method study

Question 15: How much support does Work Study/Estimating receive from management in general for their techniques?

Answers: A large amount
A reasonable amount
A limited amount
Hardly any
Question 16: How accurate are you in booking waiting time?

Answers:
- I am extremely accurate in booking waiting time
- I am reasonably accurate in booking waiting time
- I am sometimes inaccurate in booking waiting time
- I am often inaccurate in booking waiting time

Question 17: How accurate are you in booking off one job and on to another?

Answers:
- I am extremely accurate in booking
- I am reasonably accurate in booking
- I am not very accurate in booking
- I am not at all accurate in booking

Question 18: How often do you find it necessary to overbook on some jobs, and underbook on others?

Answers:
- I often find it necessary, to balance my work
- I occasionally have to do it
- I very rarely have to do it
- I never find it necessary

Question 19: How much do you co-operate with the Work Study or Estimating Department?

Answers:
- I co-operate fully
- I co-operate reasonably
- I give a limited co-operation
- I do not co-operate

Question 20: Do you consider it necessary to put the same effort into an unmeasured job as one that has a time standard?

Answers:
- I consider you should put in the same effort
- I consider you should put in a reasonable effort
- I consider you should put in far less effort
- I consider you should put in considerably less effort
Question 21: How well do supervision control the booking of work?

Answers:
- Supervision control booking of work very well indeed
- Supervision control is reasonable
- Supervision control the booking to a limited degree
- Supervision seem to have no control on the booking of work

Question 22: How effective do you consider the department you are associated with?

Answers:
- I consider it to be highly effective
- I consider it to be very effective
- I consider it to be fairly effective
- I consider it has little effectiveness

Question 23: How well is the work scheduled and allocated to operatives?

Answers:
- It is scheduled and allocated extremely well
- It is scheduled and allocated quite well
- It is scheduled and allocated moderately well
- It is scheduled and allocated badly

Question 24: How well is scrap and rectification controlled?

Answers:
- Scrap and rectification is controlled very effectively
- There is reasonably control of scrap and rectification
- There is not a lot of control over scrap and rectification
- There is no control of scrap and rectification

Question 25: How effective are inspectors in contributing to productivity?

Answers:
- They are extremely effective
- They are reasonably effective
- They contribute slightly
- They do not contribute
Question 26: Would you please indicate how long you have worked for this company?

Answers:
- Less than two years
- Two to five years
- Five to ten years
- Over ten years

Question 27: Would you please tick your appropriate age bracket?

Answers:
- Under twenty years of age
- Twenty to thirty years of age
- Thirty to forty years of age
- Over forty years of age

Question 28: How long have you been doing your present job in this company?

Answers:
- Less than two years
- Two to five years
- Five to ten years
- Over ten years

Question 29: If you have worked for another company, how does your present company compare?

Answers:
- My present company is much better
- My present company is slightly better
- My present company is about the same
- My present company is not as good

Please tick the appropriate box as to whether you are:

- [ ] Married
- [ ] Single
- [ ] Male
- [ ] Female

Would you please use this space for any further contributions or comments? PLEASE PRINT.
APPENDIX III

QUESTIONNAIRE

This form is designed for all levels of management, and to preserve anonymity no names or other means of identification are required.

M represents Management, and 1, 2 etc., sheet numbers.

I should be grateful if you would complete this form without assistance and when completed please place the form in the envelope provided, seal and hand in to the personnel department for my collection.

The completed forms will be confidential and only used for my research into financial incentive schemes.

J.O. THOMSON

This is only an example to assist you, and will not be included in the research.

Question: How good are you at timekeeping?

Answers: I am seldom late

I am occasionally late

I am often late

I am very often late

If you feel that you are only late occasionally, you would tick the second answer so ✔.

We will now proceed with the questions.

Please answer these questions in correct sequence. That is No. 1-2-3-4-5, etc., and please do not alter any of your decisions.
**Question 1:** How much do operatives know about the type of financial incentive scheme applied to them?

**Answers:**
- They know a lot about the financial incentive scheme
- They know a fair amount about the financial incentive scheme
- They know little about the financial incentive scheme
- They know nothing about the financial incentive scheme

**Question 2:** To what degree can operatives calculate their earnings at any period of time in relation to bonus?

**Answers:**
- They can calculate their bonus at any period of time
- They can calculate their bonus most of the time
- They can calculate their bonus at limited periods of time
- They find it difficult to calculate their bonus at any time

**Question 3:** How well do operatives understand the recognised formula for calculating their bonus?

**Answers:**
- They fully understand the formula
- They have a good idea of the formula
- They have a limited knowledge of the formula
- They do not understand the formula

**Question 4:** Do operatives know the function of the part or process that they work upon?

**Answers:**
- They fully understand the function
- They have a reasonable knowledge of the function
- They have a limited knowledge of the function
- They have no knowledge of the function

**Question 5:** Do you think operatives fully understand how a time standard is measured for their own work?

**Answers:**
- They fully understand
- They have a reasonable understanding
- They have a limited understanding
- They have no understanding
Question 6: To what extent are the operatives satisfied with management's policies?

Answers:

- They are highly satisfied with management's policies
- They obtain a medium degree of satisfaction from management's policies
- They obtain a limited degree of satisfaction from management's policies
- They have no satisfaction from management's policies

State the degree of satisfaction the operatives obtain from the following in their own working situation.

Tick the appropriate box.

Question 7: The company policies

- HIGH
- MEDIUM
- LOW
- NIL

Question 8: Their working conditions

- HIGH
- MEDIUM
- LOW
- NIL

Question 9: Their immediate supervision

- HIGH
- MEDIUM
- LOW
- NIL

Question 10: Their security

- HIGH
- MEDIUM
- LOW
- NIL
Question 11: How many loose time standards do operatives have?

Answers:
- They have quite a number of loose time standards
- They have some loose time standards
- They have only a few loose time standards
- They have no loose time standards

Question 12: How well do you consider the financial incentive scheme works?

Answers:
- I consider it works extremely well
- I consider it works very well
- I consider it works fairly well
- I do not consider it works well

Question 13: How quickly are work queries dealt with?

Answers:
- They are dealt with at once
- They are dealt with quite soon
- There are some delays in dealing with queries
- There are many queries that take a lot of time

Question 14: Are the time standards in your department based upon:

Answers:
- A comprehensive method study?
- Reasonable method study?
- A partial method study?
- No method study?

Question 15: How much support does Work Study/Estimating receive from Management in general for their techniques?

Answers:
- A large amount
- A reasonable amount
- A limited amount
- Hardly any
Question 16: How accurate are operators in booking waiting time?

Answers: They are extremely accurate in booking waiting time
They are reasonably accurate in booking waiting time
They are sometimes inaccurate in booking waiting time
They are often inaccurate in booking waiting time

Question 17: How accurate are operatives in booking off one job and on to another?

Answers: They are extremely accurate in booking
They are reasonably accurate in booking
They are not very accurate in booking
They are not at all accurate in booking

Question 18: How often do operatives find it necessary to overbook on some jobs, and underbook on others?

Answers: They often find it necessary, to balance work
They occasionally have to do it
They very rarely have to do it
They never find it necessary

Question 19: How much do operatives co-operate with Work Study or Estimating Department?

Answers: They co-operate fully
They co-operate reasonably
They give a limited co-operation
They do not co-operate

Question 20: Do operatives consider it necessary to put the same effort into an unmeasured job as one that has a time standard?

Answers: They consider they should put in the same effort
They consider they should put in a reasonable effort
They consider they should put in less effort
They consider they should put in considerably less effort
| Question 21: How well do supervision control the booking of work? |
|-----------------|------------------|-----------------|-----------------|-----------------|
| Answers:        | Supervision control booking of work very well indeed   |
|                 | Supervision control is reasonable                       |
|                 | Supervision control the booking to a limited degree     |
|                 | Supervision seem to have no control of the              |
|                 | booking of work                                          |

| Question 22: How effective do you consider the department you are |
| associated with? |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Answers:        | I consider it to be highly effective                    |
|                 | I consider it to be very effective                      |
|                 | I consider it to be fairly effective                    |
|                 | I consider it has little effectiveness                 |

| Question 23: How well is the work scheduled and allocated to operatives? |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Answers:        | It is scheduled and allocated extremely well           |
|                 | It is scheduled and allocated quite well               |
|                 | It is scheduled and allocated moderately well          |
|                 | It is scheduled and allocated badly                   |

| Question 24: How well is scrap and rectification controlled? |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Answers:        | Scrap and rectification is controlled very effectively |
|                 | There is reasonable control of scrap and rectification |
|                 | There is not a lot of control over scrap and           |
|                 | rectification                                          |
|                 | There is no control over scrap and rectification       |

| Question 25: How effective are inspectors in contributing to productivity? |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Answers:        | They are extremely effective                           |
|                 | They are reasonably effective                           |
|                 | They contribute slightly                               |
|                 | They do not contribute                                 |
Question 26: Would you please indicate how long you have worked for this company?

Answers:
- Less than two years
- Two to five years
- Five to ten years
- Over ten years

Question 27: Would you please tick your appropriate age bracket?

Answers:
- Under twenty years of age
- Twenty to thirty years of age
- Thirty to forty years of age
- Over forty years of age

Question 28: How long have you been doing your present job in this company?

Answers:
- Less than two years
- Two to five years
- Five to ten years
- Over ten years

Question 29: If you have worked for another company, how does your present company compare?

Answers:
- My present company is much better
- My present company is slightly better
- My present company is about the same
- My present company is not as good

Please tick the appropriate box as to whether you are:

MARRIED  SINGLE  MALE  FEMALE

Would you please use this space for any further contributions or comments?

PLEASE PRINT
APPENDIX IV

QUESTIONNAIRE

This form is designed for personnel responsible for establishing 'Time Standards' whether by any form of estimating, time study, synthetics, analytical estimating, activity sampling, predetermined motion time standards or historical data. As all of these techniques are part of Work Study, the prefix of the form is WS and the numbers relate to the number of pages.

I should be grateful if you would complete this form entirely on your own.

Please do not put any name or identification in order that your anonymity may be preserved.

When completed, please place the form in the envelope provided, seal, and hand in to the personnel department for my collection.

The completed forms will be confidential and only used for my research into financial incentive schemes.

Thank you for your help.

J.0. THOMSON

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This is only an example to assist you, and will not be included in the research.

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Answers: I am seldom late
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We will now proceed with the questions.
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Question 2: To what degree can operatives calculate their earnings at any period of time in relation to bonus?

Answers:
- They can calculate their bonus at any period of time
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Answers:
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- They have a reasonable knowledge of the function
- They have a limited knowledge of the function
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Question 5: Do you think operatives fully understand how a time standard is measured?

Answers:
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Answers: They are highly satisfied with management's policies

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State the degree of satisfaction the operatives obtain from the following in their own working situation.

Tick the appropriate box.

Question 7: The Company Policies

HIGH [ ] MEDIUM [ ] LOW [ ] NIL [ ]

Question 8: Their working conditions

HIGH [ ] MEDIUM [ ] LOW [ ] NIL [ ]

Question 9: Their immediate supervision

HIGH [ ] MEDIUM [ ] LOW [ ] NIL [ ]

Question 10: Their security

HIGH [ ] MEDIUM [ ] LOW [ ] NIL [ ]
Question 11: How many loose time standards do you have?
Answers:
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- They are often inaccurate in booking waiting time

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Answers:

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- I consider it to be very effective
- I consider it to be fairly effective
- I consider it has little effectiveness

Question 23: How well is the work scheduled and allocated to operatives?

Answers:

- It is scheduled and allocated extremely well
- It is scheduled and allocated quite well
- It is scheduled and allocated moderately well
- It is scheduled and allocated badly

Question 24: How well is scrap and rectification controlled?

Answers:

- Scrap and rectification is controlled very effectively
- There is a reasonable control of scrap and rectification
- There is not a lot of control over scrap and rectification
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Answers:

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- They contribute slightly
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- Two to five years
- Five to ten years
- Over ten years

Question 27: Would you please tick your appropriate age bracket?

Answers:
- Under twenty years of age
- Twenty to thirty years of age
- Thirty to forty years of age
- Over forty years of age

Question 28: How long have you been doing your present job in this company?

Answers:
- Less than two years
- Two to five years
- Five to ten years
- Over ten years

Question 29: If you have worked for another company, how does your present company compare?

Answers:
- My present company is much better
- My present company is slightly better
- My present company is about the same
- My present company is not as good

Please tick the appropriate box as to whether you are:

- MARRIED
- SINGLE
- MALE
- FEMALE

Would you please use this space for any further contributions or comments. PLEASE PRINT.
WHAT IS WORK STUDY?

Incentive working is based on Work Study and the first question many people will ask is 'What is Work Study?'

Work Study combines Method Study and Time Study

(1) Method Study is the technique of examining and setting out the way in which jobs are performed (e.g. the way in which things are handled, the type of equipment used, etc.) in order to find the best method.

(2) Time Study is a method of measuring the time needed for a worker of normal ability to complete a given quantity of work when working at normal speed and using the defined method.

Of course, some operators work faster than others, therefore a method of measuring the speed of working is necessary. Work Study practitioners are trained to assess the speed and effort of an operative studied in relation to Standard Performance. Standard Performance, under incentive condition, is equivalent to a man walking at a steady 4 miles per hour.

What is so different about a Work Study Incentive Scheme?

Isn't it the same as piecework?

Piecework gives a price in money terms (e.g. 6d. per 10 pieces) for a job and leaves it to the operator's discretion to find the best method of working. No special arrangements are made to cater for snags and difficulties in the job or to cater for the skill and effort required.
Our Scheme, which is based on Work Study, establishes times for jobs and is not related directly to money.

Work Study lays down a precise method of working, the equipment necessary, and makes provision for the supply and disposal of work. It also provides allowances for fatigue, effort, concentration, working conditions, etc., and ancillary work such as booking of work. An Incentive Scheme, based on Work Study, rewards the worker according to the skill and effort required.

It is important to remember that the Incentive Scheme only rewards extra production when this is brought about by extra skill and effort. Extra production for the same skill and effort does not automatically mean more money.

**Exactly how does a Work Study Officer calculate a time on a job?**

Before timing a job, the equipment and the method of performing work are very carefully defined and the starting and finishing points of the job identified. When an operator is sufficiently trained and experienced in the method of work then the Work Study Officer can commence the Time Study.

He will first approach the operator and explain what he intends to do. After watching the work for a short time, to ensure that the correct method is being used, he will commence to time each element of the job, with a stop watch.
At the same time, he will rate the effort and skill at which that element is being performed. This procedure will be repeated over a number of cycles of the job to make sure that the timings and ratings are accurate and that any incidental work such as moving stock boxes is taken into account.

The observed element times are brought to a common level of performance, or normalised, to a 60 P.I. by taking account of the observed rating at which the element was performed.

Example:

<table>
<thead>
<tr>
<th>Observed Time</th>
<th>Rating</th>
<th>Normalised Time at 60 P.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 minutes</td>
<td>60 P.I.</td>
<td>15 minutes</td>
</tr>
<tr>
<td>15 minutes</td>
<td>75 P.I.</td>
<td>18 2/3 minutes</td>
</tr>
<tr>
<td>15 minutes</td>
<td>50 P.I.</td>
<td>12 1/2 minutes</td>
</tr>
</tbody>
</table>

i.e. Normalised Time = Observed Time x \( \frac{\text{Observed Rating}}{60} \)

Note: P.I. (Performance Index) indicates the number of Standard Minutes of work which would be produced in a Clock Hour.

Even this is not the end of the story because the Normalised Time only gives the time it would take a worker to do the job, working at 60 P.I. but makes no allowances for relaxation, personal needs, completion of work sheets, etc. These allowances have still to be added.
After adding the allowances for the job, the time obtained is called the Standard Time and is usually issued in decimal hours per 1,000 parts.

**Note:** There is normally a Job Specification for an Incentive Job which defines the exact method of working and gives precise information on all allowances added. This specification is held by both the foreman and the Convenor of Shop Stewards and can be seen by anyone on request.

The rates for jobs, in standard hours per 1,000 parts, are entered on a Card or a Standard Table, a copy of which is kept in the shop.

In a few cases, operators may have to do work which has not been given a Standard Time. This is known as Unmeasured Work and the operator is credited with a Standard Hour Allowance for every Clock Hour spent on the job.

**How does an operator earn bonus?**

After training, an operator is paid a flat hourly rate for all working hours spent in the factory. This is a Clock Hour rate known as the Piece Work Supplement.

In addition to this, the operator is paid, for work produced, at a Standard Hour rate. The bonus thus earned is safeguarded by also paying allowances for waiting time, unmeasured work, etc.
What Are Credit Hours?

Times for jobs are issued in Standard Hours per 1,000 parts and Direct Standard Hours are a measure of the work actually produced.

Hours are also given in allowances for lost and extra work—these are known as Allowance Hours.

The total of Direct Standard Hours and Allowance Hours is known as Credit Hours.

Note: Instructions on how to calculate Direct Standard Hours earned are shown at the back of this book.

When are Allowances given?

The Incentive Scheme is based on the assumption that suitable and sufficient work will always be available and that the method of work is as defined in the standards card table, or specification.

When no work is available or when the method of working is temporarily altered, an allowance can be given, either in the form of Allowance Hours or as a temporary increase in Standard Time. The following chart gives some examples for which allowances can be claimed, together with the method of claiming them.
<table>
<thead>
<tr>
<th>Reason</th>
<th>Action by Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine fault prevents continuous working.</td>
<td>Inform supervision and claim waiting time allowance if no other job available.</td>
</tr>
<tr>
<td>Abnormal variation in size or quality of parts.</td>
<td>Inform supervision who will inform the Methods Department who will give a suitable allowance in addition to the normal standard rate.</td>
</tr>
<tr>
<td>Waiting for machine setter.</td>
<td>Claim waiting time allowance if no other work available from supervision.</td>
</tr>
<tr>
<td>Distorted parts cause extra work content.</td>
<td>Inform supervision who will inform the Methods Department who will give a suitable allowance in addition to the normal standard rate.</td>
</tr>
<tr>
<td>Direct Production Work which has no Standard Time established.</td>
<td>Claim unmeasured work allowance for time spent on job.</td>
</tr>
</tbody>
</table>
What bonus can an operator expect to earn?

Current National agreements between Unions and Employers state that a normal operative working under incentive conditions should be able to earn their time rate plus 15%.

Many of our operators earn above this level.

The minimum level of performance expected from an operator, after initial training, is an 80 P.I. for females and a 100 P.I. for males.

What happens if an operator cannot reach a reasonable level of performance?

Supervision and Work Study personnel may be called upon to investigate the job to ensure that the conditions and method of working are in accordance with those specified. If there are any discrepancies these will be put right.

If however, the conditions are right and the operator consistently fails to reach a reasonable level of performance, then the Management have the right to retrain.

If retraining does not bring about an improvement in performance, transfer to another job within the Department may be considered.

If no other suitable job is available the operator's employment may be terminated.
Will a Standard Time be cut if the operator earns too much?

Accepted time standards may only be altered under certain carefully defined conditions.

These conditions are applicable to all systems of payment by results and are subject to a National Agreement between the Engineering Employers and the Confederation of Shipbuilding and Engineering Unions.

An extract of this Agreement is as follows:

'No piecework prices, bobs or basis times established may be altered except for the following reasons:

(1) A mistake in calculations on either side,
    or

(2) The material, means or method of production or the quantities are changed,
    or

(3) A mutual arrangement has been come to between the employer and the worker in the same way as a new price is arranged.'

What sort of change in method would lead to a change in Standard Times?

Remember that the job has been precisely defined, therefore a small change in the pattern of hand movements, machine speeds, the provision of special tools or a change in the nature of the material,
may alter the work content of the job and the effort required to perform it. A change in Quality Standards may also alter the work content. Such changes would mean that the job would have to be re-assessed and a new standard time issued. The new standard time for the changed method would, however, still enable the operator to maintain his or her level of earnings.

Why should Standards be altered if work is being turned out at a different rate, due to changes outside the operator's control?

The work content of a job may increase or decrease due to alterations in methods.

If Standard Times were not corrected for the new work content, it would be unfair to either the Company or the operator.

Our policy, as a Company, is to keep trying to improve our methods and reduce costs. Only by improving productivity can we expand and provide secure employment with good wages.

Furthermore, the improved production, resulting from better equipment and better methods, should result in a benefit to all, not just to those operators who are affected by the change. It is important also that as far as possible, within similar skilled grades and conditions, equal effort should give the same return in wages.
What are the operator's responsibilities when working on an Incentive Scheme?

The conditions of the scheme are laid down in a General Job Specification for Direct Workers. A copy of this specification for Direct Workers. A copy of this specification is held by the Foreman and the Shop Steward and may be examined on request.

The main operator responsibility is for quality, as follows:

Operator rejects

Payment will not be made for work failing to pass inspection through the fault of the operator. The Foreman shall be the judge of the cause of faulty work, subject to appeal to the complaints procedure.

Machines producing scrap

An operator will be responsible for informing Supervision at once if a machine starts producing defective work.

What is the difference between 'Production' and 'Productivity'?

'Production' refers to the amount of work produced, in a given time, irrespective of cost.

'Productivity' is the relationship between the volume of work produced and the cost of production. In other words, it is a measure of efficiency.
For instance, if we produce 1,000 units at a cost of £1,000, the cost of production is £1 per unit.

If, however, through better methods and more efficient working, we can produce the 1,000 units for £950, we have reduced the unit cost to 19/-.

This means that we are more efficient and our 'Productivity' has improved. Remember, 'Productivity' depends on the unit cost and not on the total cost and can improve or get worse irrespective of the volume of work.

This country needs to improve productivity in order to pay its way. We need to do it for the same reason.

**How does improved productivity benefit the workers?**

Improved productivity can be brought about by Management decisions, by the efforts of the workers or by the co-operation of both.

Individual improvements in productivity give improved earnings under the Incentive Scheme. Overall improvement in productivity brings benefits to everyone in the form of improved wage levels.

**With improvements in methods and productivity, what are the dangers of redundancy?**

The Company has given a guarantee that improvements in methods or productivity will not result in redundancy.
It is true that there may be changes in the type of work people will be asked to do but this is inevitable if we are to progress.

Improved productivity and lower costs will create a greater demand for our products. This will ensure continuity of employment and lead to more work — not less.

Since the introduction of incentive systems in the early 1950s, the number employed in this Division has more than doubled.

Calculating Standard Hours Earned

Wages are paid in two parts. The hours worked in the factory are paid at a Clock Hour Rate and the amount of work done is paid for a Standard Hour Rate.

The number of Standard Hours earned on any job is calculated by multiplying Parts produced x Time allowed.

The times allowed for jobs are given in Standard Hours per 1,000 parts.

Standard Times are given in decimal parts of an hour as in the following examples:

<table>
<thead>
<tr>
<th>Standard Hours</th>
<th>Equivalent Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>2$\frac{1}{2}$ hours</td>
</tr>
<tr>
<td>1.25</td>
<td>1$\frac{1}{4}$ hours</td>
</tr>
<tr>
<td>.75</td>
<td>$\frac{3}{4}$ hours</td>
</tr>
<tr>
<td>.125</td>
<td>7$\frac{1}{2}$ minutes</td>
</tr>
</tbody>
</table>
Before a calculation can be made, the number of parts produced must be converted to a decimal fraction of a thousand.

Example:

1,256 parts = 1.256  
953 parts = 9.53

2,450 parts = 2.45  
53 parts = .053

3,600 parts = 3.6  
8 parts = .008

To multiply two decimal numbers, disregard any noughts at the end of the decimal numbers and use ordinary long multiplication. In the answers, the position of the decimal point is decided by counting back the same number of decimal places as there are in the two numbers which have been multiplied together.

Example I

\[
\begin{array}{c}
2.5 \\
\times 0.75 \\
\hline
125 \\
175 \\
\hline
0.1875 \text{ Answer}
\end{array}
\]

There are three figures to the right of the decimal points, therefore there must be three figures to the right of the decimal point in the answer, i.e. 1.875.

Example II

\[
\begin{array}{c}
6.572 \\
\times 1.2 \\
\hline
13144 \\
6572 \\
\hline
78864 \text{ Answer}
\end{array}
\]

Because there are four decimal figures in the numbers multiplied, the final answer is 7.8864.

Example III

\[
\begin{array}{c}
5.25 \\
\times 0.04 \\
\hline
2100 \text{ Answer}
\end{array}
\]

Again there are four decimal figures in the numbers multiplied, therefore the answer must contain the same, i.e. 0.2100.
Examples of Standard Hour Calculations

1. Parts produced 3,564 ........................................ 3,564
   Time Allowed - 2.56 hrs. per 1,000 ..................... 2.56
   21384
   17820
   7128
   Answer = 9,12384 Std. Hrs. earned ..................... 912384

2. Parts produced 6,560 ........................................ 6.56
   Time Allowed - 3.50 hrs. per 1,000 ..................... 3.5
   5380
   1968
   Answer = 22.96 Std. Hrs. earned ....................... 22960

3. Parts produced 4,075 ........................................ 4.075
   Time Allowed - 2.43 hrs. ................................ 2.43
   12225
   16300
   8150
   Answer = 9.90225 Std. Hrs. earned ..................... 990225

4. Parts produced 156 .......................................... 156
   Time Allowed - 1.42 hrs. per 1,000 ................... 1.42
   312
   624
   156
   Answer = .22152 Std. Hrs. earned ..................... 22152

5. Parts produced 75 .......................................... .075
   Time Allowed - 1.30 hrs. per 1,000 ................... 1.3
   225
   75
   Answer = .0975 Std. Hrs. earned ...................... 975
6. Time Allowed — 10.75 hrs. per 1,000 .......................... 10.75
Parts produced 9 ...................................................... .009
Answer = .09675 Std. Hrs. earned ............................... 9675

Note: When wages are calculated, Standard Hours are paid to the nearest two decimal places. The third and other figures after the decimal point are too small to calculate.

Decimals of an Hour

| .1 = 6 mins. | .01 hr. = 36 secs. |
| .2 = 12 mins. | .02 hr. = 1 min. 12 secs. |
| .3 = 18 mins. | .03 hr. = 1 min. 48 secs. |
| .4 = 24 mins. | .04 hr. = 2 mins. 24 secs. |
| .5 = 30 mins. | .05 hr. = 3 mins. |
| .6 = 36 mins. | .06 hr. = 3 mins. 36 secs. |
| .7 = 42 mins. | .07 hr. = 4 mins. 12 secs. |
| .8 = 48 mins. | .08 hr. = 4 mins. 48 secs. |
| .9 = 54 mins. | .09 hr. = 5 mins. 24 secs. |
| 1.0 = 60 mins. | .1 hr. = 6 mins. |

Example:

1.56 hrs. = 1 hr. 33 mins. 36 secs.
.72 hrs. = 43 mins. 12 secs.
2.04 hrs. = 2 hrs. 2 mins. 24 secs.
1. General

The incentive scheme is intended to enable operatives covered by the scheme to increase their earnings by increasing their productivity.

All hours worked will be paid at Base Rate together with a bonus dependent upon the performance achieved. Premium time and Holiday Pay will continue to be paid at the latest agreed rates.

2. Work Values

Work Values for the various operations to be carried out will be determined by Work Study or be derived from synthetic time data.

These values are expressed in standard minutes (SM's) and include adequate Rest Allowances.

These Rest Allowances include time spent on voluntary Tea Breaks, recovery from fatigue and personal needs.

Work Values, once agreed, will not be altered except in the following circumstances:

i) By joint agreement between Management and Unions.

ii) Where an obvious error in calculation can be demonstrated.

iii) In the event of a methods change that is brought about by Management initiative, then clause 2,3 will apply.

In the case of an operator devising an improved method, then he should submit it to an investigation committee where he will get a monetary return depending on the benefits to the Company. (i.e. 25% of the net labour savings over one year calculated on the difference between old and new Standard Minute Values, with £200 maximum).
Under no circumstances will the Company condone an operator introducing
improved methods that have not first been agreed to by supervision, or
been authorised via an investigation committee. Before adopting a new
method many aspects must be investigated, including such things as:

a) **Safety**

Unauthorized method changes may jeopardise the safety
of the operator concerned and others.

b) **Quality**

Unauthorized method changes may cause a lower than
acceptable quality level which is not readily
apparent by normal inspection techniques causing
serious problems.

c) **Machine and Tool Life**

Unauthorized method changes can reduce the effective
life of machinery and tools, e.g. running at too high
a speed or feed.

The case of "creeping" method changes is a little more difficult as such
changes are very small and hardly noticed, or if noticed are too trivial
(in isolation) to take action on. However, a number of these repeated
over a period ultimately do become significant. In these cases (and in
fact in all method changes) where the changes are less than \( \pm 5\% \) of the
issued time standard, then the value will not be altered. That is,
operators can benefit by up to 5% in such cases. When the value falls
outside this range Of \( \pm 5\% \) it will be re-issued in the normal way as are
all standard minute values.

In the event of "creeping" method changes being brought to light, whatever
the reason, then the operator and relevant shop stewards will be told
beforehand of the action that Management will be taking to regularize
the position.

This in no way alters the 15% paid for normal suggestions and only
applies where there is an old or new standard minute value, i.e. any
incidental material savings, etc. that may be combined when it will
still be as per the existing suggestions scheme.
The bonus payable for a given period is related to the rate of work during that period and is based on the calculation of performance.

The performance is calculated by dividing the SM's produced by the minutes worked and multiplying by 100.

The SM is such that the average competent operative applying himself under incentive conditions can produce 80 SM's in each hour worked.

This gives a performance of:

\[
\frac{80}{60} \times 100 = 133
\]

Unmeasured Work (i.e. periods of Unmeasured Work on otherwise measured sections)

i) Management will ensure that as much work as possible is measured. To achieve this Work Study will, where possible

   a) Use synthetic times and information or information as applicable from previous studies (this practice is gradually increasing).

   b) Put out temporary time values or temporary incentive schemes (this is current practice e.g. Morphy Richards refrigerator assembly lines). The temporary scheme or value to contain the agreed date on which it will terminate or be reviewed if a permanent value is not issued before this.

ii) All unmeasured work remaining will be credited at a 133 performance, and Management and operatives are to co-operate to ensure that efficient working is achieved under these conditions.

iii) a) Waiting time occurring during periods of occasional unmeasured work will be credited at the performance indicated by "Amendment 3" although wherever possible the operator concerned should be found alternative useful work.

   b) When a complete section is on unmeasured work for a period of a week, or more, (referred to as Unmeasured Sections) then waiting time will be included in with the unmeasured work i.e. payment when on an unmeasured scheme for a week or more will be 133 - no more and no less - providing that clause 4.2 is observed. Waiting time (and other information) is still to be accurately recorded.
iv) Foreman and Supervision will ensure that wherever possible unmeasured work will be shared as equally as possible between operators, thus keeping it to a minimum for each individual. This will of course be carried out within the practicalities of the demands of the production programme, experience of operators, etc., i.e. every attempt will be made not to penalise the very skilled operator.

v) Where both measured and unmeasured work are carried out in the same payment period, then it is essential that operators book this information accurately.

vi) Unmeasured work on all sections, including new work, new processes, etc. (e.g. Industrials, Cable and Relay) will be credited at a 135 performance as from the acceptance of this agreement.

5. Waiting Time (except in cases covered by clause 4)

Any time spent by operatives on duties approved by Management will be credited at the rate of 135 performance, i.e. 80 SM's for each hour booked.

Any time spent by operatives waiting for work or instructions, will be credited at the performance indicated by "Amendment 3" subject to being authorised by the Foreman.

6. Process Allowance

For machine operations process allowance covering unoccupied machine cycle time will be credited at a 135 performance to enable the operative to maintain an overall 135 performance.

Fixed Cycle Machines

Where an operation is completely controlled (i.e. in excess of 90%) by a fixed cycle time such that an operator is prevented from exceeding a 135 performance in any circumstances, a policy allowance will be negotiated between supervision and the operator concerned.

Where a machine operation is controlled in excess of 90% of a fixed machine cycle and the work content of the operation is in excess of 85% of the full cycle, such that an operator is prevented from exceeding a 135 performance (when using the correct amount of Relaxation and Personal allowance) then a policy allowance will be given based on the percentage work content and percentage chart (Appendix 'C'). Management will determine which machines are within this category.

Operatives in receipt of process allowance are required to perform other work within the process allowance time.
7. **Bonus Calculation**

   i) All satisfactory output quantities in the bonus period are multiplied by the appropriate SM Values. To this total is added credits for waiting time and other items at the appropriate performance given below. The resulting figure is known as the "Total Credits."

   ii) This is divided by the total clocked hours and performance calculated as follows:

   \[
   \text{Performance} = \frac{\text{Total Credits} \times 100}{\text{Clock Hours} \times 60}
   \]

   iii) Bonus is then calculated as:

   \[
   \text{Bonus} = \text{Rate for labour grade} \times \left(\frac{\text{Performance}}{100} - 1\right) \times \text{Total clock hours in the period}
   \]

   iv) Where performance is over 155, bonus is calculated as follows:

   \[
   \text{Bonus} = \text{Rate of labour grade} \times \left(155 - \frac{100}{\text{Performance}}\right) \times \text{Total clock hours in the period}
   \]

   \[
   \text{Plus} = \text{Rate for labour grade} \times \left(\frac{1}{\text{Performance}} - 1\right) \times \text{Total clock hours in the period}
   \]

   **Note:** The performance is reduced by 100\(^*\) as we are dealing with bonus, and the base rate payment, which covers the first 100\(^*\) points of performance, is separately calculated in the Payroll Department.

   (*100 or m.e.l. (Minimum earnings level)/equivalent performance)

The bonus week will normally end at 6.45 p.m. on Thursday. Bonus earned in that week will be included in the wages paid out on the Friday of the following week. Special arrangements will be made for weeks including Statutory Holidays.

8. **Bonus Rates**

   Each labour grade has its own bonus rate. These are given in Appendix 'A' together with the appropriate Base Rates and Earnings at a 133 performance for a 40 hour week.
The scheme is operated on an individual operator efficiency bonus and paid at a rate of 1d (old penny) per cent for the averaged efficiency achieved over the previous four returns.

N.B. Returns mean weekly time allowed - time taken = time saved.

Method of Calculating Operator's Efficiency

To obtain the average efficiency, a record sheet for each operator should be maintained (see Appendix I). Each week the performance of each operator will be recorded under the following headings:

(a) TOTAL HOURS ALLOWED:--
This is the sum of the TIME ALLOWED.

(b) TOTAL HOURS TAKEN:--
This is the sum of the TIME TAKEN.

(c) TOTAL HOURS SAVED:--
The sum of the hours saved.

The above information being taken from the Pink cards (Job cards) returned each week.

The last four entries under A, B and C will be separately totalled and the operator's percentage efficiency will be equal to:

\[ \frac{\text{The four last totals of hours saved}}{\text{The four last totals of hours allowed}} \times 100 \]

Payment for Holidays

Bonus payment during holidays period is paid at the same rate as previous week bonus.

Note: Bonus payment is not made during unauthorised absence of sickness.

On Leaving Company

Current week bonus is paid only. Bonus earnings in 'pipe line' are not payed.

On Joining Company

Four periods of 10% each are given to the operator to fill 'pipe line'.

Time Studies

Information regarding the establishing of 'TIME ALLOWED' and others are available from the Production Engineering Department.
### BONUS EFFICIENCY HISTORY SHEET

**NAME & CLOCK NO.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Hours Allowed</th>
<th>Hours Taken</th>
<th>Hours Saved</th>
<th>Efficiency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>50</td>
<td>40</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>75</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>60 250</td>
<td>40 175</td>
<td>20 75</td>
<td>30%</td>
</tr>
</tbody>
</table>

Calculated efficiency % = \( \frac{4 \text{ weeks aggregate hours saved}}{4 \text{ weeks aggregate hours allowed}} \times 100 \)

\[
= \frac{75}{250} \times 100 = 30\%
\]

**Worked example:**

If Buff or clock hours = 40 hours  
Bonus rate = 1d per per cent (old penny)  
Efficiency % = 30%  

Bonus Payment = \( \frac{30 \times 40}{240} \) = £5
GENERAL CONDITIONS OF THE INCENTIVE SCHEME

1) GENERAL
The incentive scheme is intended to enable operators covered by this scheme to increase their earnings by increasing their productivity.
All hours worked will be paid at incentive base rate together with a bonus dependent upon the performance achieved. Premium time and Holiday pay will continue to be paid at the latest agreed rates. (See Appendix A)

2) WORK VALUES
Work values for the various operations to be carried out will be determined by the Work Study Department by appropriate and recognised work measurement methods.
These methods will be expressed in ALLOWED MINUTES (AM’s) and will include suitable relaxation allowances (R.A)
The rest allowances include the time spent on the morning tea break, recovery from fatigue and personal needs.
Work values, once agreed will not be altered except in the following circumstances.
(a) By joint agreement between Management and Unions.
(b) Where an obvious error in calculation can be demonstrated.
(c) In the event of a method change or material change.
Whilst the majority of method changes will be introduced by management, it is possible for an operative to introduce a Method change only if:
1. The method has been approved by Supervision or,
2. The method has been authorised through the Suggestion Scheme Committee.
In the latter case the employee concerned should submit the new method on the appropriate Suggestion Scheme form and upon adoption by the committee will receive a monetary return dependent on the benefits to the Company i.e.
(a) A suggestion concerning another operative's work.
20% of the net savings over one year to a maximum of £200 at the time of acceptance of the suggestion.
(b) A suggestion concerning the suggestor's own work
(b) Cont'd

30% of the net labour saving over one year (calculated) on the difference between old and new Allowed Minute Values) plus 20% of any other saving, materials, tools etc., over one year to a maximum of £200 at the time of acceptance of the suggestion.

NOTE:

Should the total annual savings on the first year amount to an award of more than £200 the difference will be paid to the suggestor when the full first year's savings have been realised.

Under no circumstances will the Company condone an operative introducing changes in methods without fulfilling the preceding conditions. This is vitally important for the following reasons:

(a) **SAFETY**

Unauthorised method changes may jeopardise the safety of the operator concerned or others.

(b) **QUALITY**

Unauthorised methods changes may result in a lower than acceptable quality level which is not readily apparent by normal inspection techniques causing serious problems and possible loss of business.

(c) **MACHINE AND TOOL LIFE**

Unauthorised method changes can reduce the effective life of machinery and tools to an uneconomic level.

A shop floor representative will be elected by the Shop Stewards Committee who will be responsible for liaising suggestor complaints to the members of the Suggestion Committee. This representative will not be a member of the committee, but may be called to attend committee meetings should his/her presence be required to clarify complaints.

In the event of creeping method changes being brought to light, whatever the reason, then the operator and relevant Shop Stewards will be informed beforehand of the action that Management will be taking to regularise the position. In these cases where the changes are less than 5% of the issued time standard then the value will be altered.

Cont'd
3. **PERFORMANCE**

The bonus payable for a given period is related to the rate of work during that period, and is based on the calculations of performance.

The performance is calculated by dividing the AM's produced by the minutes worked and multiplying by 100 thus:

\[
\text{AM's Produced} \times 100
\]
\[
\frac{\text{AM's Produced}}{\text{Minutes Worked}}
\]

The AM is such that the average competent operative applying himself under incentive conditions can produce 80 AM's in each hour worked. This gives a performance of:

\[
\frac{80 \times 100}{60} = 133
\]

4. **UNMEASURED WORK** (i.e. Periods of unmeasured work on otherwise measured sections).

a) Management will ensure that as much work as possible is measured. To achieve this, Work Study will, where possible:

1) Use all normal work measurement methods (See para 2)
2) Compile synthetics data either from previous or current studies.

b) All unmeasured work remaining will be credited at 133 performance and Management and operatives are to co-operate to ensure that efficient working is achieved under these conditions.

c) When a complete section is on unmeasured work for a period of a week or more, then waiting time will be included in with the unmeasured work i.e. payment when on an unmeasured scheme for a week or more will be 133 - no more and no less - provided that clause 4 (b) is observed. Waiting time (and other information) is still to be accurately recorded.

d) Foremen and Supervision will ensure that wherever possible unmeasured work will be shared as equally as possible between operators, thus keeping it to a minimum for each individual. This will, of course, be carried out within the practicalities of the demands of the production programme, experience of operators etc., i.e. every attempt will be made not to penalise the very skilled operator.

Cont'd
(c) When a complete section is on unmeasured work for a period of a week or more, then waiting time will be included in with the unmeasured work, i.e. payment when on an unmeasured scheme for a week or more will be 133 - no more and no less - provided that clause 4 (b) is observed. Waiting time (and other information) is still to be accurately recorded.

(d) Foremen and supervision will ensure that wherever possible unmeasured work will be shared as equally as possible between operators, thus keeping it to a minimum for each individual. This will, of course, be carried out within the practicalities of the demands of the production programme, experience of operators etc., i.e. every attempt will be made not to penalise the very skilled operator.

(e) Where both measured and unmeasured work are carried out in the payment period, then it is essential that operators book the information accurately.

(f) Unmeasured work on all sections except Plant Maintenance Department and Toolroom will be credited at a 133 performance. (separate agreements exist for these sections). See agreement No.11.

5. WAITING TIME

Waiting time will be credited at a 100 performance except where 4(c) applies. Wherever possible supervision will find alternative work for operatives affected, in an effort to keep waiting time to a minimum.

6. EXCESS TIME

Any time spent by operatives on duties approved by Management i.e. Add ops, Rectification etc., which are unmeasured will be credited at the rate of 133 performance.

7. EMPLOYEE WELFARE

Any time spent by operatives on duties such as visits for First Aid, Blood Doning etc., will be credited for the time booked and authorised by supervision at the rate of 100 performance. For payment of time due to accidents at work which involve visits to hospital for treatment. See APPENDIX F.

8. PROCESS ALLOWANCE

For machine operations process allowance covering unoccupied machine cycle time will be credited at a 133 performance, to enable the operative to maintain an overall 133 performance. Operatives in receipt of process allowance are required to perform other work within the process allowance time.

9. FIXED CYCLE MACHINES

Where an operation is completely controlled (i.e in excess of 90%)
by a fixed cycle time and such that an operator is prevented from exceeding a 133 performance in any circumstances, a policy allowance will be negotiated between supervision and the operator concerned.

10. BONUS CALCULATION

(a) All satisfactory output quantities in the bonus period are multiplied by the appropriate A.M.Vis (Allowed Minute Values). To this total is added credits for waiting time and other items at the appropriate performance given above. The resulting figure is known as the 'TOTAL CREDIT'S'.

(b) This is divided by the total clocked hours and performance calculated as follows:

\[
\text{PERFORMANCE} = \frac{\text{TOTAL CREDITS} \times 100}{\text{CLOCK HOURS} \times 60}
\]

(c) Bonus is then calculated as:

\[
\text{BONUS} = \text{Rate for labour grade} \times (\text{performance} - 100) \times \text{Total Clock Hours in the period.}
\]

NOTE:

The performance is reduced by 100 as we are dealing with bonus. The base rate payment which covers the first 100 points of performance is calculated as:

\[
\text{Base Rate} = \text{Incentive Base Rate for labour grade} \times \text{Total Clock Hours} \div 40
\]

The bonus and Base Rate weeks will normally end at 6.45 p.m on Thursday. Wages for that week will normally be paid out on Friday of the following week. Special arrangements will be made for weeks including Statutory Holidays.

11. BONUS RATES

Each labour grade has its own bonus rate. These are given in Appendix A.

12. QUALITY

Credits for computation of bonus will only be given for work which is of a quality satisfactory to Management. Faulty work (due to the operator/s) will be required to be rectified before being accepted, or will not be accepted. Where faulty work is required to be rectified, or is not acceptable, appropriate deductions will be agreed between the operator and/or
gang leader, supervision and inspection.
Management reserve the right to suspend the operation of the
Incentive Scheme in the event of a deterioration of the quality
of production.

13. INDIRECT OPERATIVES
In due course Indirect Operatives wherever possible will
have work values for their work and will then earn bonus in
the normal manner.
Indirect operatives directly attached to a production section
e.g. Setters, Leading Hands, for whom no work values are issued,
will be paid on a bonus equal to the average pay performance on the
cost centre to which they are attached.
Indirect operatives not directly attached to a production
section e.g. Inspectors & Storekeepers, will be paid a bonus equal
to the average pay performance of the whole factory.

NOTE
This does not exclude the introduction of individual or group
incentive schemes based on Work Measurement, and other factors
to indirect operatives !— SEE PAY AND PRODUCTIVITY DEAL. APPENDIX D.

(14a) GROUP WORKING
Where operatives work in a group, a performance will be
calculated for the group of operatives, and each operative will
be paid at the performance for all hours worked in the group.
In the event of an operative working both individually and in
a group, in the same bonus period, credits for the work done in
each group (in accordance with the time spent in that group and
the performance of the group) will be combined, together with the
individual work done, to give an overall performance for the week.
An example of this type of calculation is given in Appendix B.
Group working will be extended in line with the Pay and Productivity
Deal 1971. See Appendix D.

(14b) INDIVIDUAL WORKING
Where operatives work as individuals a performance will be
calculated as stated in Clause 3 of this agreement,

(15) TRAINING
(a) NEWLY EMPLOYED OPERATIVES
Newly employed operatives will be paid during their training
period in accordance with agreement No. 7

(b) TRANSFERRED OPERATIVES

(1) Any operative who is transferred at Management request will receive during his training period, bonus equal to a 133 performance. For the method of determining the training period, see agreement No. 15.

The maximum period during which bonus at a 133 performance is guaranteed is set out in the Work Specification for the section concerned.

(11) Any operative who is transferred at his own request will if retraining is necessary, be treated as a Newly Employed Operative (See Agreement No. 7).

(111) Any operative requesting a transfer must put his/her request in writing to their foreman and to the Personnel Department. Each request will be considered on its merits and according to production requirements and vacancies.

16. OPERATIVES LEAVING

Any operative leaving the company will, where calculation of current weeks performance is not possible, be paid bonus for his/her final week at the average rate earned in the four previous weeks. For the number of days, base rate and bonus to be paid. See Agreement No. 13.

17. GENERAL

Nothing in this document shall be taken as in any way modifying existing agreements between Management and Unions, nor in any way prejudicing any future negotiations.

NOTE 8—This document is not legally binding.

RG................

7th Feb. 1973
1. GENERAL

1.1 Objectives

It is agreed that this Agreement:

1.1.1 establishes fair payment levels for all categories of employee based on job grading and acceptable differentials between job grades;

1.1.2 provides, wherever practicable, financial incentives for employees related to performance and a payment system for time workers.

1.2 The Grade Structure

1.2.1 The grade structure consists of grades covering all hourly paid jobs. Appendix II lists the jobs in each grade. Time workers and incentive workers in the same grade will have the same basic rate.

1.2.2 An appeal against the grading of a particular job based on the job content will be considered in the manner specified in Appendix 'A' of the domestic procedures document.

1.3 Grade Transfers

1.3.1 It is agreed that employees will transfer between jobs to meet fluctuations in production requirements and to cover for absenteeism. The subsequent sections define the payment conditions following a transfer of job.

1.3.2 Transfer within a grade

Each employee can be required to undertake any job within his/her grade, provided that:

i. proper training and instruction are given on transfer to the new job, and

ii. adequate arrangements are made to protect bonus earnings.

1.3.3 Temporary transfer to a higher grade

An employee may be transferred temporarily to a job in a higher grade when a temporary vacancy arises (eg. through absenteeism or short term production requirements). The pay rates for the higher grade will take effect immediately on transfer and will cease when the employee returns to his/her normal job.
SECTION C - METHODS OF PAYMENT (Continued)

1. GENERAL (Continued)

1.3 Grade Transfers (Continued)

1.3.3 Temporary transfer to a higher grade (Continued)

If, as a result of such a transfer, the employee suffers a reduction in average hourly earnings, the employee will be paid at a rate equivalent to his/her average hourly earnings for the previous four weeks at the lower grade for a period not exceeding four weeks from the date of transfer. "Average hourly earnings" consists of basic pay plus bonuses or time work premium but excludes overtime premium.

1.3.4 Temporary transfer to a lower grade

An employee may be transferred temporarily to a job in a lower grade when a temporary vacancy arises (e.g. through absenteeism or short term production requirements). While on such work the employee will receive the pay rate for his/her normal job.

The lower rate will only be applicable should the transfer be:
1. at the employee's own request, or
2. as the result of a certified medical condition.

1.3.5 Permanent transfer to a higher grade

An employee may be transferred permanently to a job in a higher grade when a permanent vacancy arises and when his/her performance has been approved by Management. The pay rates for the higher grade will take effect from the date of permanent transfer.

1.3.6 Permanent transfer to a lower grade

An employee may be transferred permanently to a job in a lower grade:
1. at the employee's own request, or
2. due to a manpower surplus, see Page 9, para 2.2.2. Temporary transfers of operatives is already dealt with above. Permanent transfer due to a manpower surplus must be referred to the Production Manager by the Departmental Manager. The Production Manager in joint consultation with the Senior Stewards and the Operator(s) concerned will arrange such transfers. Every effort will be made to match job grades but where down-grading is the result of any such moves, then the four week Protection of Earnings will apply. The operators' names will be entered into a register maintained by the Production Manager and Senior Stewards jointly, and they will receive priority in the event of any higher graded jobs becoming available.
SECTION 'C' - MEASURES OF PAYMENT (Continued)

1. GENERAL (Continued)

1.3 Grade Transfer (Continued)

1.3.6 Permanent transfer to a lower grade (Continued)

ii. If more than two people on the register are (cont.) being considered for such a vacancy, then length of service shall determine who is offered first opportunity. Such vacancies will be advertised on a central vacancy board, or

iii. If the employee is unable to perform the higher grade job to the satisfaction of Management.

The pay rates for the higher grade will be maintained from the date of transfer for a period of four weeks, after which the pay rates for the lower grade will apply.

1.3.7 Job Grade Structure

Refer to schedules maintained in Works or Production Manager's office for details of all jobs and grades.
1. GENERAL (Continued)

1.4 Junior Rates

Junior rates apply to hourly paid employees other than apprentices. These employees will be paid the following proportion of the adult basic rate and bonus rate or time work premium for their job grade:

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage of Adult Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Adult</td>
</tr>
<tr>
<td>19</td>
<td>Adult</td>
</tr>
<tr>
<td>18</td>
<td>Adult</td>
</tr>
<tr>
<td>17</td>
<td>80</td>
</tr>
<tr>
<td>16</td>
<td>70</td>
</tr>
<tr>
<td>15</td>
<td>60</td>
</tr>
</tbody>
</table>

1.5 Starting and Training Rates

1.5.1 A new starter requiring training will be paid the basic rate for the lowest job grade (Grade 1) during the initial training period for their job or for four weeks whichever is the shorter.

1.5.2 New starters who can satisfy Management that, by virtue of their previous experience and/or training, they are equipped to carry out work in job grade 2 or above, may be started in the appropriate grade subject to a vacancy existing in that grade.

1.5.3 Progression through the grades will depend on vacancies being available and the suitability of the applicant.

1.5.4 An employee undergoing training for a higher-graded job will be moved progressively through the job grades to reach the appropriate job grade at the satisfactory completion of training.

1.5.5 An existing employee undergoing unproductive retraining for a higher graded job will be paid at a rate equivalent to his/her average earnings over a normal working week on the basis of the previous four weeks. Progression towards the higher job grade may be made as specified in 1.5.4, above.
1.5 Starting and Training Rates (Continued)

1.5.6 An existing employee undergoing unproductive retraining for jobs in the same job grade will be paid at a rate equivalent to his/her average earnings over a normal working week on the basis of the previous four weeks. The length of the retraining period will be at the discretion of the Training Manager.

1.5.7 An employee training another will be paid at a rate equivalent to his/her average earnings over a normal working week on the basis of the previous four weeks for the time involved.

2. TIME WORK PAYMENT

2.1 Time workers will be paid at the appropriate basic rate for their grade plus a time work premium. The time work premium will be 15% of the basic rate for the job. Time workers' rates are shown in Appendices III and IV.

3. INCENTIVE WORK PAYMENTS

3.1 General

3.1.1 Individual or group incentive payments, related to the performance of the job holder, will be introduced wherever appropriate. Payment will only be made for good work. Payment for rejected work, not the operator's fault, will be at the discretion of the supervisor of the line concerned.

3.1.2 The bonus earnings at standard performance (100 BS) will be 20% of the gross earnings for 40 hours for all employees on incentive schemes, (see Appendices V and VI). The same bonus rate will apply for performance within each 5 point band, (see Appendices VII and VIII).

3.2 Payment for Waiting Time, Unmeasured Work and Experimental Work

3.2.1 Each occurrence of waiting time must be recorded on the employee's daily work sheet and authorised by the operator's immediate supervisor.
3. **INCENTIVE WORK PAYMENTS** (Continued)

3.2 **Payment for Waiting Time, Unmeasured Work and Experimental Work (Cont'd)**

3.2.2 Hours on unmeasured work will be paid at time work rate, and authorised waiting time will be paid at the employee's basic rate for the grade for those hours, that is 80% of the employee's earnings at standard (100 BS).

3.2.3 Time on experimental work will be paid at a rate equivalent to the average hourly earnings over the four previous weeks.

3.3 **Learning Allowances**

3.3.1 An employee undergoing training or re-training and producing good work against measured standards will receive learning allowances for a pre-determined period.

3.3.2 During the learning period, the employee's actual performance will be calculated daily against the measured standard. A learning allowance will then be added determined as follows:

\[
\text{Learning Allowance} = 75\% \times (100 - \text{actual operator performance})
\]

The pay performance will equal the actual operator performance plus the learning allowance.

The pay performance will be used to calculate the bonus rate.

3.3.3 An employee under training who achieves an actual operator performance above 100 BS will not receive learning allowance for that day.

4. **OTHER PAYMENTS**

4.1 **Shift Premium**

4.1.1 Shift premiums will be paid in accordance with National Agreements. These premiums will be calculated on the basic rate for the job grade and age.

4.1.2 The shift premiums for night shift and evening shift working are set out below:

1. **Night Shift Premium is ONE THIRD** of the basic rate for the normal night shift hours, (see Appendix I).

2. **Evening Shift Premium is ONE FIFTH** of the basic rate for normal evening shift hours, (see Appendix I).
4. **OTHER PAYMENTS** (Continued)

4.2 **Overtime Premium**

4.2.1 Overtime premiums will be paid in accordance with National Agreements. These premiums will be calculated on the basic rate for the job grade and age.

4.2.2 Overtime premium is paid for hours worked in excess of the normal working hours of the day. In the case of lateness, overtime premium will not normally be paid until the hours worked exceed the normal working hours.

4.2.3 The overtime premiums are set out below:

i. **Day Shift Overtime Premium** is **ONE THIRD** of the basic rate for the **FIRST TWO** hours worked before or after normal day shift hours, and **ONE HALF** of the basic rate for any additional hours.

ii. **Night Shift Overtime Premium** is **ONE HALF** of the basic rate for hours worked before or after normal night shift hours during the week.

iii. **Evening Shift Overtime Premium** is **ONE FIFTH** of the basic rate for the **FIRST FOUR** hours worked before or after normal evening shift hours, and thereafter as for Day Shift, i.e., **ONE THIRD** of the basic rate for the **NEXT TWO** hours and **ONE HALF** of the basic rate for any additional hours.

iv. **Saturday Overtime Premium** is **ONE HALF** of the basic rate.

v. **Sunday Overtime Premium** is **FULL** basic rate.

4.3 **Long Service Cash Bonus**

A cash bonus will continue to be paid annually to those hourly paid employees who qualify as defined from time to time in Appendix IX.

4.4 **Holiday Payment**

Holiday payment will be made in accordance with the arrangements defined from time to time in Appendix X.
## APPENDIX VII

### Bonus Rates - Male

<table>
<thead>
<tr>
<th>Grade</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Hourly Rate</td>
<td>43.16</td>
<td>45.49</td>
<td>47.62</td>
<td>50.15</td>
<td>52.49</td>
<td>58.32</td>
<td>64.15</td>
<td>73.48</td>
</tr>
<tr>
<td>Bonus Rate at B.S. Performance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>83 - 87</td>
<td>2.69</td>
<td>2.85</td>
<td>2.98</td>
<td>3.14</td>
<td>3.28</td>
<td>3.65</td>
<td>4.01</td>
<td>4.60</td>
</tr>
<tr>
<td>88 - 92</td>
<td>5.40</td>
<td>5.69</td>
<td>5.98</td>
<td>6.27</td>
<td>6.56</td>
<td>7.29</td>
<td>8.02</td>
<td>9.19</td>
</tr>
<tr>
<td>93 - 97</td>
<td>8.10</td>
<td>8.52</td>
<td>8.97</td>
<td>9.40</td>
<td>9.84</td>
<td>10.94</td>
<td>12.02</td>
<td>13.77</td>
</tr>
<tr>
<td>103 - 107</td>
<td>13.48</td>
<td>14.22</td>
<td>14.94</td>
<td>15.68</td>
<td>16.40</td>
<td>18.22</td>
<td>20.05</td>
<td>22.97</td>
</tr>
<tr>
<td>108 - 112</td>
<td>16.18</td>
<td>17.06</td>
<td>17.94</td>
<td>18.81</td>
<td>19.68</td>
<td>21.87</td>
<td>24.06</td>
<td>27.55</td>
</tr>
</tbody>
</table>

All rates are New Pence per hour.
## APPENDIX VIII

**BONUS RATES - FEMALE**

<table>
<thead>
<tr>
<th>Basic Hourly Rate</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37.76</td>
<td>39.80</td>
<td>41.84</td>
<td>43.86</td>
<td>45.93</td>
<td>51.03</td>
</tr>
</tbody>
</table>

**Bonus Rate at B.S. Performance:**

| 83 - 87 | 2.36 | 2.49 | 2.61 | 2.74 | 2.87 | 3.19 |
| 88 - 92 | 4.72 | 4.97 | 5.23 | 5.48 | 5.74 | 6.38 |
| 93 - 97 | 7.08 | 7.46 | 7.84 | 8.23 | 8.61 | 9.57 |
| 98 - 102 | 9.44 | 9.95 | 10.46 | 10.97 | 11.48 | 12.76 |
| 103 - 107 | 11.80 | 12.44 | 13.07 | 13.71 | 14.35 | 15.94 |

All rates are New Pence per hour
APPENDIX X

REVISED WAGES SYSTEM FOR HOURLY PAID OPERATORS

INITIAL GRADING

A Production operator will be graded in one of five grades depending on age, as detailed in Appendix A. The initial grading will be in relation to current performance for existing operators. New staff will, without exception, always be placed in Grade 85.

UP-GRADING

Movement to a higher grade will be dependent on operators' performance which will be measured and published weekly.

Should actual performance be in excess of five points more than the existing grading for two consecutive weeks, the operator can apply for up-grading to the next grade. The up-grading will be only for five points at any one time.

The two consecutive weeks together must consist of at least 70 production hours for a full-time operator, or in the case of a part-time worker, production hours must equal 87 1/2% of normal working hours.

Production hours do not include shop work, waiting time or absence from work.

DOWN-GRADING

If there is a reduction in performance in excess of five points the following procedure will apply:

(a) After two consecutive weeks, the operator will be personally informed of the situation by the supervisor.

(b) After three consecutive weeks the operator will be informed by letter.

(c) After five consecutive weeks the operator's grading will be reduced to that corresponding to actual performance in the 5th week to the nearest higher position on the scale, i.e. if performance is 86 the operator will be placed in grade 90.

(d) The revised weekly rate of pay will apply from the beginning of the 6th week.

GUARANTEED WAGE

The wage rate applied to each grade will be guaranteed to an operator until it is either revised by up-grading or down-grading. This rate of pay will be used for calculating overtime payment and for holiday pay.
OPERATOR PERFORMANCE CONTROL

The job card procedure is used at present will continue and each operators weekly performance measured. A full schedule of operators performance will be published at the end of each week.

INTRODUCTION OF NEW SYSTEM

(a) The initial grading of existing operators will be based on average performance over a period of six weeks from the week commencing 6th January 1968.

(b) The existing times allowed for each job will require revision to such an extent that an average operator placed on grade 100 will be able to achieve 100 minutes work in a Standard Time Allowed of 100 minutes (plus a possible time allowance for fatigue).

WAGES SYSTEM

Examples of the calculation of operator performance is shown in Appendix B and definitions of the terms used are as follows:

Operator Grading

The five operator grades are based on a 5% difference from an average operator i.e. an 85 Grade operator is 15% below average and a Grade 115 operator is 15% above average.

Standard Job Time

This is the time allowed for an average operator i.e. who is in Grade 100.

Points Rating

To calculate the points rating time saved or lost is expressed as a percentage of Standard Job Time.

Actual Operator Grading

The actual grade of each operator for the week's performance is calculated by adding or deducting the points variance to or from the operators grade.
### System Examples

<table>
<thead>
<tr>
<th>Operator Grading</th>
<th>Operator A</th>
<th>Operator B</th>
<th>Operator C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90</td>
<td>100</td>
<td>110</td>
</tr>
</tbody>
</table>

(A) Standard Job Time

<table>
<thead>
<tr>
<th>Time Taken</th>
<th>Operator A</th>
<th>Operator B</th>
<th>Operator C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 mins.</td>
<td>100 mins.</td>
<td>100 mins.</td>
</tr>
<tr>
<td></td>
<td>106 mins.</td>
<td>103 mins.</td>
<td>84 mins.</td>
</tr>
</tbody>
</table>

(B) Time Saved

<table>
<thead>
<tr>
<th>Lost</th>
<th>Operator A</th>
<th>Operator B</th>
<th>Operator C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6 mins.</td>
<td>3 mins.</td>
<td>16 mins.</td>
</tr>
</tbody>
</table>

Operator Rating

<table>
<thead>
<tr>
<th>Variance in Points (B) as % of (A)</th>
<th>Operator A</th>
<th>Operator B</th>
<th>Operator C</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6)</td>
<td>(3)</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

**Actual Operator Grading**

<table>
<thead>
<tr>
<th></th>
<th>Operator A</th>
<th>Operator B</th>
<th>Operator C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>94</td>
<td>97</td>
<td>116</td>
</tr>
</tbody>
</table>