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Expert Group Meeting on Quality
Control in the Textile Industry

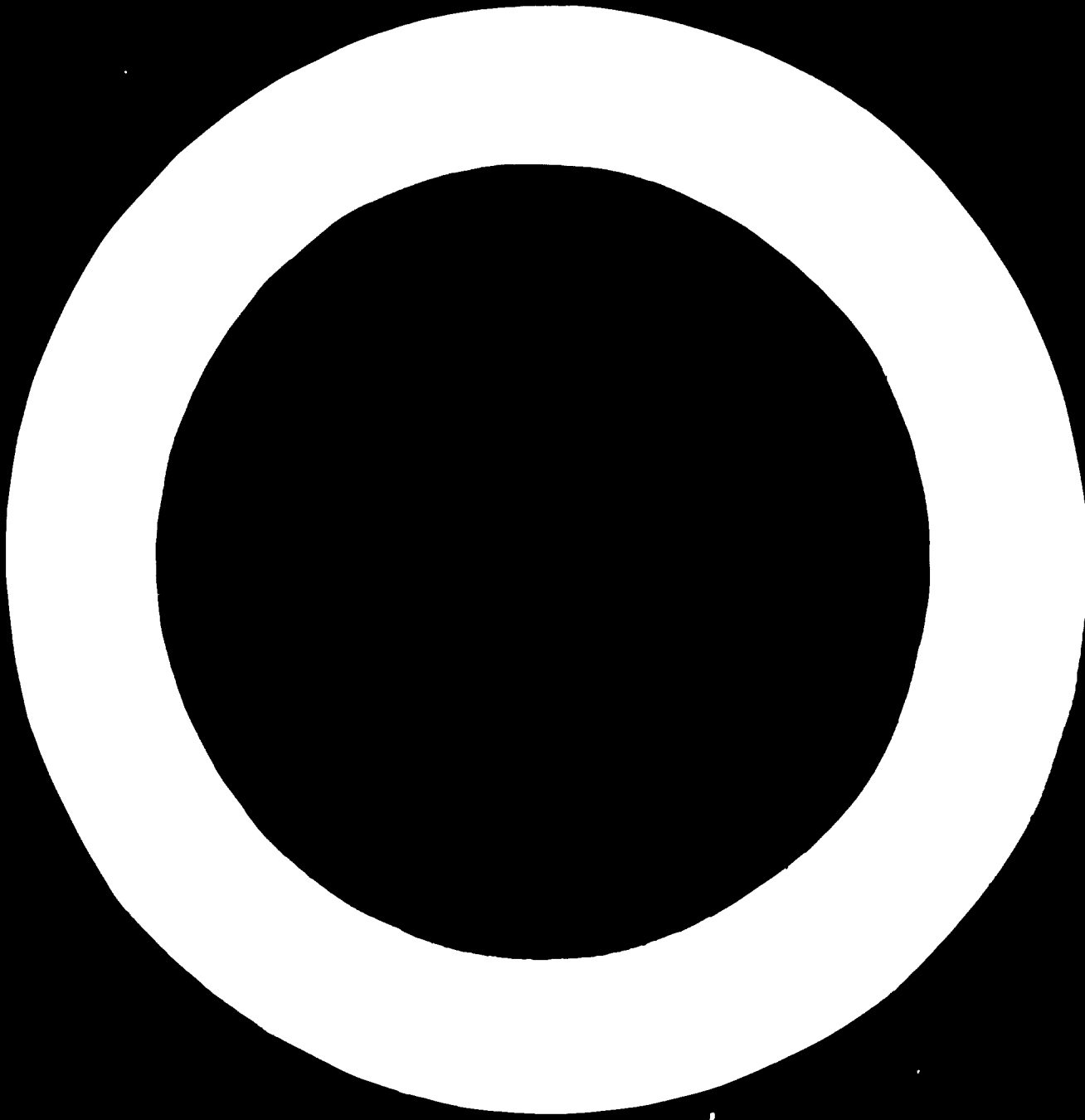## PSYCHOLOGICAL CONSIDERATIONS FOR AN EFFECTIVE QUALITY CONTROL PROGRAMME [1/]

by

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Summary

This paper concerns some broad aspects of quality control with emphasis on the psychological or human behavior factors which affect quality.

The effect of human behavior on quality control has in many cases been handed down through accepted dictums rather than established facts. In addition, the whole subject of quality control and its measured results is not a finite one as are, for example, production control and industrial engineering. We must recognize, as well, that in considering human behavior as it affects quality control on a world-wide basis, we must take into account cultural differences and varying levels of industrialization. It is important to recognize that there is usually more than one way to achieve the desired quality control results. Therefore, this paper is not a "how to" manual, but rather a presentation of the various aspects of human behavor and their relation to quality control.

## Pre-Eminence of the Human Factor in Quality Control

As automation increases, the human factor, rather than becoming less important, is actually more important. Physical environment, information about the task, and the employee's identification with the goals of the organization will be predominant in the human factor.

Too often management uses the excuse that human performance problems related to quality control arise from insufficient motivation on the part of the employee, without looking more deeply at the basic causes and possible cures.

Lasting changes can be effected by changes in the job itself, by technological change, and by adequate training.

Communication of definite quality standards, proper employee selection and training, with adequate follow-up and instruction on job performance are a prerequisite. Tracking down the causes of quality control problems must be done systematically.

Account must also be taken of the employee's ability, sensory perception, agility, and motivation. We must structure jobs to take these skills into account so as to achieve the expected quality end result.

The role of supervision is all-important in its effect on human behavor.

Experience, however, is less important than is usually considered because in most cases, to say that an individual has 20 years' experience really means that he has, say, one year's experience multiplied 20 times.

## Motivating for Quality

From a psychological aspect, a key step in considering quality control must be identification of needs. Such things as direction of organization resources and their commitment, analysis of quality control tasks relating to human relationships and setting of specific quality control goals are of utmost importance as far as the individual employee is concerned.

Employees have the desire to learn and participate, and are prepared to build on present skills. Management must inform the employee about his progress.

There is much published material on motivation, but very little on what steps are necessary to improve motivation. We must examine the job and assign responsibilities fairly. It is a fact that where the supervisor does an effective job of supervising, he also achieves a high level of motivation among his subordinates.

We must give the employee a sense of responsibility, a sense of achievement, and a means to challenge himself to improve performance.
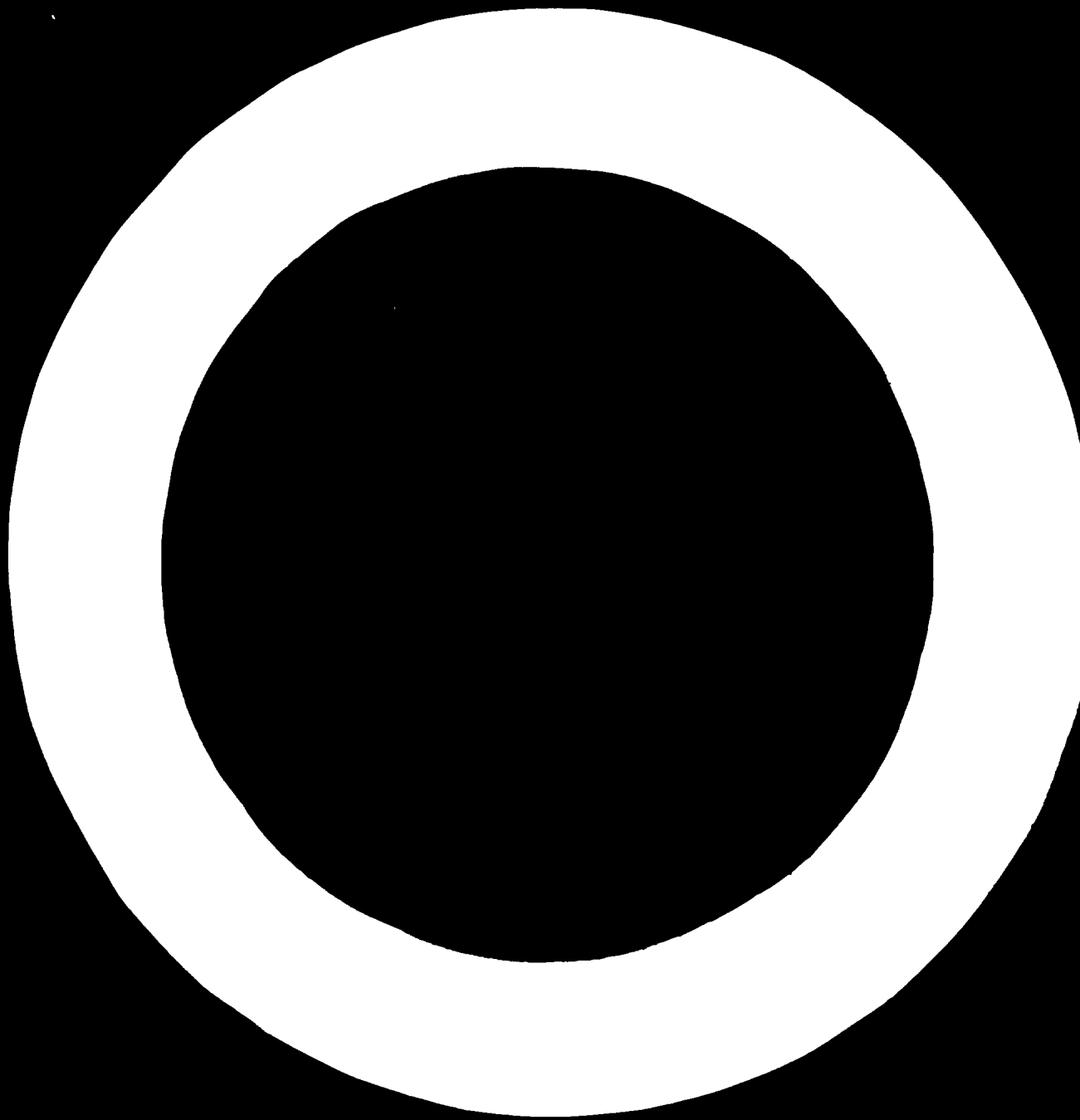
# PSYCHOLOGICAL CONSIDERATIONS FOR AN EFFECTIVE
## QUALITY CONTROL PROGRAM

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I would like to set the framework of this paper by considering those aspects of quality control which appear to me to be most fundamental to the broad application of quality control, and also to our specific discussion of the psychological or, as I would prefer to call them, the human behavior factors which play a role in controlling quality.

At the outset, I would like to say that the quality control function has more than its share of dictums which have come to be accepted (all too frequently) as proven, and are too seldom scrutinized from a "real life" standpoint. All too often, the quality control department tends to mushroom to the point where it almost becomes an end to itself -- rather than being recognized as a means to that end, namely, the manufacture of products of acceptable prescribed quality level. Further on in this paper we will address ourselves to some of these too readily accepted dictums, many of which are very closely related to human behavior patterns, both of "blue collar" employees and of supervision.

Secondly, we must never lose sight of the fact that quality control, effective or otherwise, has some very tangible results in terms of product quality. However, although its effects are tangible, the quality control function tends to operate in a less easily recognized and measured framework than, say, production control. We can easily get a better appreciation of this by merely considering the difference which we recognize in

our use of language when we differentiate between "quantitative" versus "qualitative" characteristics of any given product or process. We can illustrate this simply by considering how it is relatively more difficult to grade a piece of fabric as first or second quality, than to determine the efficiency at which it was produced. This is especially true in cases where the quality is marginal. As a result of this, and rightly so, the practice of quality is open to many more different approaches than other functions. Thirdly, since we are here under the good auspices of UNIDO, let us address ourselves specifically to the quality control aspect as it relates to industry in developing countries.

It seems to me that one of the pitfalls into which it is all to easy to stumble is that of assuming that the same methods and approaches to quality control which work in industrialized countries, can -- or even should -- be equally applicable to developing areas. Understanding this differentiation, it is especially significant when we are talking of such aspects of human behavior as are related to training and supervisory styles. We have to recognize at all times not only differences which are due to different levels of industrialization, but also differences due to cultural circumstances.

The fourth point which has to be recognized is that in the case of quality control, more than in other functions or departments, there is usually more than one way to achieve the desired results. Unlike the other more definable functions or disciplines (such as costing or industrial engineering), the practitioner of quality control has alternate avenues at his disposal, and what makes quality control so fascinating (and also frustrating), is that after we have installed all our testing procedures and sampling plans and

process checks, it is usually the human element which plays the major role in determining product quality. This is why the behavioral aspects of quality control are often the most significant ones.

Recognizing the above framework for this subject, I would make the point that this paper is not intended to be a "how to" manual. To try and prepare it in such a fashion would be to misrepresent the basis of human behavior as it relates to the quality control function. Rather, it is intended to present a number of different facets which relate to the psychological aspect of achieving required quality levels. The practitioner of quality control, in going through the various points raised, must question himself on how they will affect his own quality control activities in the textile mill.

## The Pre-Eminence of the Human Factor

As the textile industry becomes more capital intensive, and as equipment becomes more sophisticated and tends to greater automation, there is a danger that we may begin to consider the human component as a less and less important factor. In fact, nothing could be more dangerous.

No matter how sophisticated our equipment and process controls may become, the most critical consideration in attaining and maintaining quality objectives remains the people component. It is the decisions of individuals and their reactions to given situations that will determine process and product quality, rather than the machinery and process and control instruments per se. People will still play the major role. People must select the raw materials; they must decide the process flows; they must assemble, inspect, package and service the products.

Our view of the people factor in quality control must therefore be broader than simply the process operator or machine tender. More than any other function, quality control encompasses a broad spectrum of responsibilities at all levels in the textile mill. It is not simply the weaver or the spinner who can cause off-standard quality, but rather the decisions made by all levels of the organization which can and do play a major role all the way from the attitude toward quality of the president or the managing director, through the quality control supervisor's relationships with production management, down to the floor sweeper's conscientiousness (or lack of it) in ensuring a working area that is regularly cleared of thread waste. It is worth noting, to take a specific example and, for argument's sake, suggest that a traveling suction cleaner can do much of the "sweeping", we must not forget that somebody still has to make sure that the sweepers function effectively. From a quality aspect, all we are doing is simply placing the responsibility at a different operator level. Now, instead of the sweeper, it is the second hand or the foreman who has the prime responsibility for ensuring, in this case, quality floor cleaning.

Whatever the task, therefore, it is always subject in a greater or lesser degree, to various types of human error. In the context of employee behavior patterns, the quality control practitioner must be alert to the manner in which behavior affects the quality of people's work, and what can be done to change their behavior patterns so as to minimize or eliminate the chance of human error.

Obviously, it is this which will inherently result in improving and maintaining quality levels.

To examine this from another viewpoint, it is true to say that the qual-itay of human performance -- whether it be in terms of quantity of output, or cost, or product quality -- is determined by individual characteristics such as physical environment, information on the taks which is provided to the employee, and the degree to which the employee identifies with the goals of his organization. All of these charactieristics, individually and in combin-ation, will determine how well people perform.

## A Major Management Misconception

I would now like to address myself to one of the subjects which is too often, unfortunately, taken as one of the "self evident truths" and which is often used as the basis for excuses by management to explain why quality of process or product is not up to what it should be. I am referring here to what I believe is one of the major management misconceptions prevalent in industry today, namely, the belief that most human performance problems relating to quality can be cured first and foremost by improved motivation. This is especially true in the case of quality, precisely because it is rel-atively intangible, and because off-quality often results from relatively minor human performance lapses, such as failure to clean a machine resulting in fly or dirt, or forgetting to check a particular adjustment or machine setting on, for example, a loom. Since most reward systems are tied in to output or attendance, it is much easier to relate them to reward through com-pensation. In the case of quality, we too easily assume that people make poor quality "because they don't try hard enough", or are not "properly motivated". Perhaps the employees' efforts are motivated too much in another direction at the expense of quality.

So often we hear the plantive cry, "If only people would **just try harder**". One of the reasons why this approach is so plausible and has so many disciples is that very often "inspirational" type programs or drives, or prize programs are tried and do result in improved quality. Unhappily, such programs have results which are fleeting. Any changes produced by crash programs to improve attitudes and motivation and to be limited and transitory. It is being recognized to a greater extent that even those programs which are intended at more basic changes in human performance through better employee screeing and selection and training programs, often fail to have the desired impact which was originally expected.

However, we can obtain more permanent improvements in quality performance by developing and evaluating new equipment, materials, techniques and operator aids. It is therefore essential for management to recognize that the potential for improving quality through changes in the job itself and its over-all (and quality control) environment is more meaningful and lasting than changes which result from strict motivational programs. Recognizing this puts the responsibility more squarely where it belongs, that is, on the shoulders of management or direction of the company to ensure adequate training, a proper environment and technological advance.

## The Need for Definite Quality Standards

One of the problems related to quality is confusion, especially on the part of process operators, as to exactly what constitutes acceptable or unacceptable quality. While some off-standard quality is obvious, mostly it is in the marginal areas where individual judgments may differ. This points out the absolute need for quality standards to be as clearly defined as possible.

Communication is the key to this, and it must be backed up by a supporting policy from top management. Also, let us not forget that in most cases off-quality usually occurs at the process which is under the control of the machine operator. Nothing is more demoralizing to the employee than to recognize that quality levels are often compromised by higher supervision levels.

## An Over-all Approach to Initiating Quality Control

The over-all approach to quality control from a human behavior standpoint must be built on the following foundation.

1. **Employee Selection.** The selection of top personnel is an important phase of this program. By a series of tests for a particular job, the individual's potential after training can be measured, since the tests are unbiased and factual. What cannot be determined through tests is the drive or ambition of a person. That must be determined in a personal interview. His ability to do a job, however, can be established by testing.

2. **Training.** The training program should be set up at each plant. Every new employee should be entered in the training program from the very first day and make to feel part of the company and responsible for a particular job. Training should begin with a plant orientation tour in order to acquaint the new employee with what is being done and what the final product is. Emphasis should be placed on correct work methods to promote quality, rather than on speed or quantity, since once the employee knows what is expected, is shown how to perform his task, and is able to communicate with his supervisor, quality and quantity will follow.

Records of the employee's daily progress should be kept and reviewed with him once a week, pointing out his strengths and weaknesses. The training program should include:

- **work** methods
- **knowledge** of work **stations**
- **quality**
- **housekeeping**
- **safety**
- **plant** regulations
- **work** schedules.

Continued attention should be paid to the new employee even after the training program has been completed. Proper training and continued supervision will result in -

- reduced labor turnover
- reduced absenteeism
- better employee morale
- increased production
- improved quality.

3. <u>Job Performance</u>. After the employee has been trained, quality can be built into the product by instruction in -

. What - explaining what he has to do as well as the succeeding processes which will be performed after his, in order to give the employee a feeling of participation in the final product.

. How - explaining the best way to accomplish his job.

· Why - there may be reasons for performing a task in a certain way. Once the employee knows what, why and how, doubt and confusion are eliminated and he can perform his job with confidence and pride in his work.

These three steps lead to mutual communication between employee and supervisor, enabling the supervisor to motivate the employee toward the proper performance of his job and makinghim feel a significant part of the entire operation.

Work records and control charts should be maintained and management and employee kept informed. These, however, should never be used as a club against the employee. If quality falls below standards, the supervisor should ask himself these questions:

- Were the proper tools available?

- Were instructions correct?

- Was the employee trained properly? If so, have the methods been changed?

- Was the product correct when it reached the work station?

- Was the planning adequate?

- Is the employee motivated by

- top management

- middle management

- supervisor?

These matters should be discussed with the individual, who knows more about the product he is handling than anyone else.

Problems can be solved through a systematic approach, in the following manner:

- Identify the problem

- Pinpoint its cause

- Determine the solution

- Take the necessary action

- Follow up to see that it is being carried out.

## Human Behavior in Quality Control

The quality control practitioner must be aware of and take into account the following related factors:

. **What** are the characteristics of the individual worker in **terms of** **ability**, sensory perception, agility and motivation?

. **What** is the quality performance level which should be specified **(are** **the** standards realistic)?

. **Does** the worker have the right equipment and tools to do the **job?** Does he have sufficient lighting, enough space? If any of these **are** deficient, what is the resulting impact on quality? The impact of **these** **on** operator behavior must be recognized.

. **What** is the consequence of off-standard quality? Is it highly **evident?** The significance of this is that in some instances, if the "fault" **is** highly visible but easily corrected, it may not be worthwhile to **make** **the** effort to eliminate it even if its consequences are relatively **serious.** In general, we ask ourselves, how is the corrective action related to the defect in quality?

From a quality control viewpoint, the quality control organization **must** ensure that:

. **The** jobs are so structured that the skills required for **acceptable** quality performance coincide with the actual skills of employees.

. **Auxiliary** aids such as tools and instruction sheets are available **to** **enhance** the skills of the personnel involved in quality control **itself.**

. **The** right information and standards are available to control and **increase** quality performance.

. Selection of suitable quality control department personnel, **and the** development of an awareness of quality is essential.

**Relative** to this last point, the effect of a management philosophy **which is** **committed** to quality cannot be overemphasized.

## The Role of Supervision

While top management must establish an atmosphere of quality awareness, and while it is the operators who have the prime and immediate contact with the process and its quality performance, it is the supervisors at the first and second level who are the men on the firing line. In looking at the psychological aspect of quality control, we must never forget that it is this level of supervision which has the responsibility for ensuring quality production at each process. It is this level which has to see to the implementation of necessary changes. Therefore the supervisor finds himself as the man in the middle.

All this is easier said than done. We have seen the tendency to over-rely on motivation as an end to itself. Many supervisors have taken concentrated courses on how to be better supervisors and how to communicate with employees, etc., etc., only to find themselves confused to the point where one supervisor who returned from one such course in "Supervision for Foremen" stated: "If I believe what I've just been listening to for a week, I get the impression that my role as a supervisor is to make my department people happy". While in no way minimizing the importance of foremen knowing how to communicate with their subordinates, the important point for us to grasp seems to be that the role of the supervisor is neither to make his people happy nor, at the other extreme, to coerce them to results. However, to put it simply, the key role of supervisors is to work through people towards company goals and objectives. While this is true for supervision in general, it is especially so where the supervisors are involved in quality control aspects. This is because quality is essentially a staff function, and in addition to pressures from above and below, quality control supervisors are also subjected to influences from their counterparts in production and engineering functions.

In performing his role of working through people to achieve quality objectives, the quality control practitioner's most important resource must be his skill in handling people. Any quality control system ceases to function without human skills. Taking this one step further, we must recognize that people are not born with the skills and knowledge required for quality control. The question which must then be asked in each instance is how these can be developed, and how much effort this learning of skills requires.

When we consider the line or department supervisor's role in quality control (as opposed to the quality control department personnel themselves), it is important to recognize the difference between individual supervisors in the emphasis they place on various parts of the job. Some emphasize decision making, others planning, others communicating and developing subordinates. In terms of McGregor's classic differentiation between the Theory X and Theory Y style of leadership, what style is the most effective? I will touch upon this point briefly later.
(*)

## The Role of Experience

From a quality control aspect, is it true to say that the more experienced employees produce better quality? In general, alas, the answer must be no. To the extent that operators' skills are adequately taught, experience becomes less and less of a factor in ensuring quality. Several experiments have demonstrated that all too often when we talk of an individual with 20 years' experience, we are really considering experience of, say, one year multiplied 20 times over. The further away we progress from a craft approach, the less experience becomes a factor.

*See Douglas McGregor: "The Human Side of Enterprise", McGraw Hill Book Co., 1960

In this connection, it is again essential to recognize that the development of skills and knowledge is an <u>intermediate</u> step towards an ultimate goal of improving quality performance. We must not fall into the trap of treating experience as an end to be sought, but we must rather recognize its true role in the acquisition of skills or knowledge, which in themselves are only means to the end objective of specified quality levels. If skills, knowledge and experience are treated as end products, learning tends to become inefficient because we start to place stress on developing skills which are not required for job performance. (In the case of developing countries, it seems to be especially important for management to have their priorities in these areas clearly defined. Otherwise, quality related programs mushroom completely out of hand to no good purpose.)

## Identifying the Needs of Quality Control

From a psychological aspect, a key step in considering quality control must be the identification of needs. Specifically, the individual charged with supervising the quality control function must have answers to what product or process aspects of quality must be considered. Who is to do this, and how? What skills are essential, and how can learning be made more efficient?

There are no pat answers which can be given, but the following guidelines are suggested as a practical aid to establishing and directing a quality control function from a human behavior standpoint.

  . It is essential to ensure that the resources of the organization are
    allocated to the quality control effort. Unless management makes a com-
    mitment to allocate these resources, the program will flounder.

  . Secondly, the needs for quality control in the various departments must

be clearly recognized. Nothing is more frustrating to all involved than to have quality control personnel putting their effort into areas which other line personnel do not consider relevant or feasible. In the long run this will undermine the quality control department's "credibility".

Thirdly, and related to the last point, the tasks of quality control must be analyzed in terms of details and responsibilities. This often helps to focus on the human relationships between quality control and other functions.

Fourthly, the quality control department must be willing to be measured in terms of its achievements in meeting its goals in performance. From a motivating aspect, it is highly desirable to set specific performance objectives in quality control. These may range from such goals as "to install a quality control program for a specific department by a certain date", to "reducing the incidence of slubs from X to Y", or "improving yarn evenness from A% CV to B% CV". The important thing is for quality control to police its own performance against prescribed objectives.

In terms of the skills and knowledge aspect, the key man in the quality control area must ensure that in imparting the skills necessary for quality, the following key factors are present.

A.  The employee must have the desire to learn.

B.  The employee must be capable of building on his present level of skills or knowledge or ability.

C.  The employee must participate in the learning process to the greatest extent possible.

**9. The employee** must receive feedback on how well he is learning -- and later on -- how well he is meeting quality criteria.

## Motivating for Quality

There is no shortage of published material on the subject of <u>motivation</u>. (A suggested bibliography is appended.) Unfortunately, what has not been adequately recognized and prepared is the topic which examines the steps necessary to <u>improve</u> motivation. It is this last point which is the most critical to quality control and other supervisory personnel. (Most of the literature on the subject seems to be written by industrial psychologists <u>for other</u> industrial psychologists, rather than for the harried first line supervisor, who must in the final analysis bear the prime responsibility for motivating his employees. Too often, the first level supervisor with the best intentions in the world is confused in deciding what specific steps he should take to motivate his subordinates to better quality. He is uncertain whether he should change the job, or his people, or is he himself the chief cause of their difficulties? Should he leave more decisions to them? Or should he meet with them more often? How often should he reprimand them, and so on, and so on.

In answer to these points, the following guidelines are offered.

. The most practical approach and the one with the most realistic and permanent results is to examine the job itself and examine whether, in fact, a change in the job itself could resolve the quality problems. This should <u>always</u> be the first step, and is especially valuable when the quality problems are related to factors on which operators or employees have a "monitoring" rather than a "causative" effect. For example, how often haven't we all come across the situation where the weaver is held

responsible for excessive start-up marks when, in fact, this is caused
by yarn which is too weak or by looms which are badly adjusted. Cases
like this, saying that it is up to the weaver to start the loom up
without marking obscures the real cause. (Often where the weaver, as
in this example, is capable of coping with such problems and not cause
the faults to be evident, this merely encourages others to disregard
the true nature of the fault.)

From the aspect of the supervising and its impact on quality performance,
it is a fact that where the supervisor does an effective job of super-
vising, he automatically achieves a high level of motivation in his sub-
ordinates. At the risk of over-generalization, it is true to say that
the most effective supervisors are also above average in being aware of
the relationship between their employees and in considering the employees'
needs. The other important trait for motivating by supervisors is flex-
ibility in leadership.

The supervisor has to be capable of recognizing the times when he must
assume an autocratic rather than a democratic leadership style, and vice
versa. He must recognize situations and skills of his subordinates so
that when the situation calls for him to delegate a role, he clearly
does so. That way the effective managers workloads is also most often a
critical test of his leadership, and has a real bearing on how his sub-
ordinates react then and in future situations.

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conclusion, I would like to suggest that for too long we have been ap-
ng our "people problems", at least in the industrialized countries by
at them in the context of "human engineering". By this I mean that we

have relied too much on the industrial engineering aspects without due regard for considerations relating to human behavior. For example, we have instituted programs to analyze jobs into fine elements and identifiable motions; we have trained people in these minute and standardized segments; and then we have urged, wheedled or cajoled them to perfo m harder. Failing the above, we have transferred them, fired them, or put up with poor quality performance from them.

In the final analysis, I believe that we can summarize by saying that the basic direction to improved motivation must lie in giving the employee a _sense of responsibility_, in providing the operator a _sense of achievement_, and lastly, by giving him the means to _challenge himself_ to improve performance.

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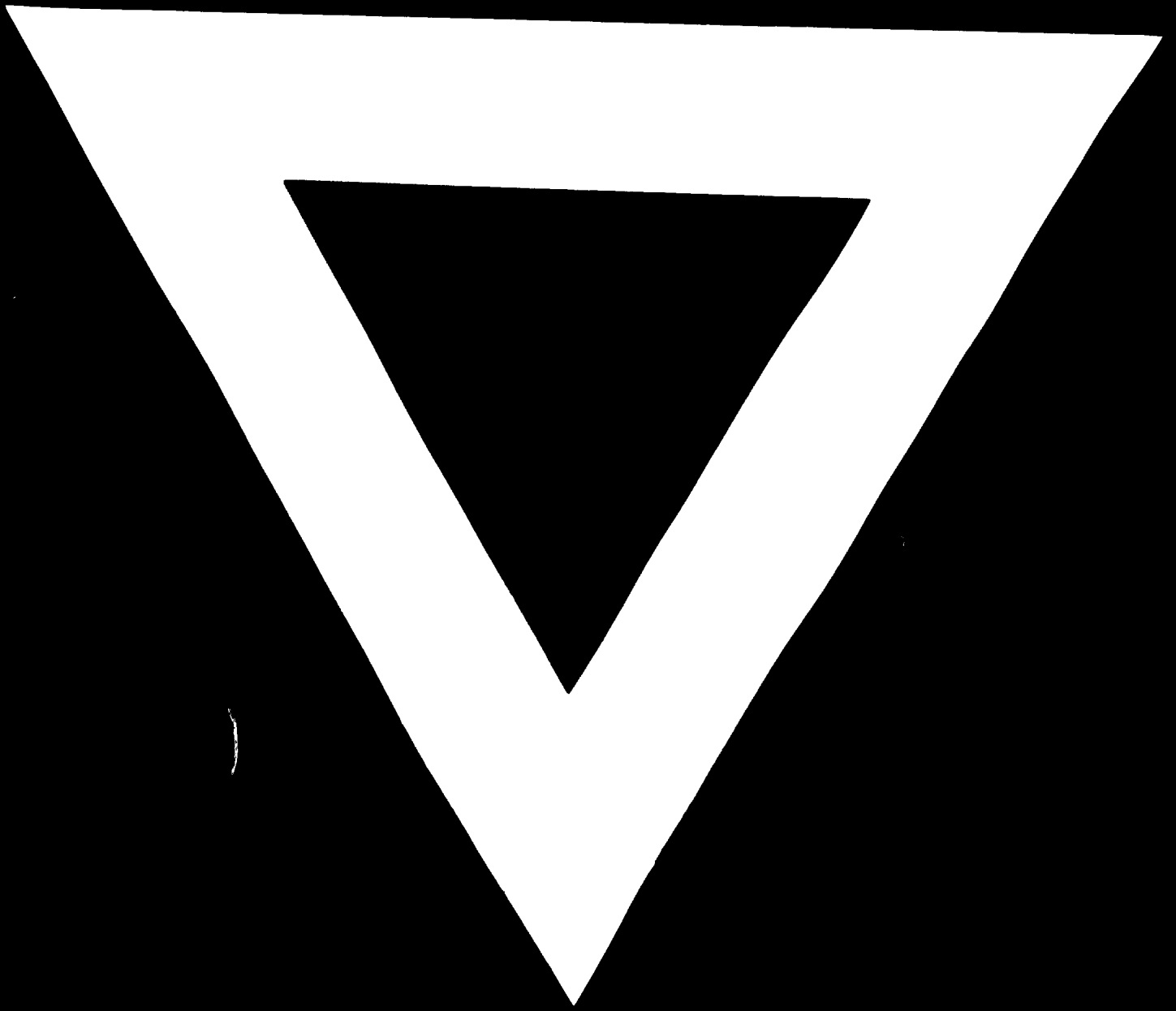**Ford, Robert:** Motivation Through the Work Itself, AMA Inc., 1969

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