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British Standard

Work study and organization and methods (O & M)

Part 4. Guide to work performance control

Etude de travail, organisation et méthodes (O et M)
Partie 4. Guide pour le contrôle des rendements

Arbeitsstudien, Organisation und Verfahren (O und M)
Teil 4. Leitfaden über die Beurteilung der Arbeitsleistung

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Foreword

In 1959 the first edition of BS 3138 'Glossary of terms used in work study' was published which was revised in 1969. In 1979, the second revision was published as 'Glossary of terms used in work study and organization and methods (O & M)'.

As BS 3138 has become increasingly used throughout the private and public sectors of British industry and throughout the world (the ILO* use it as a reference standard), BSI and some of the cooperating organizations for BS 3138 have received numerous enquiries as to how the various terms and disciplines interrelate with each other.

Accordingly it was decided to prepare, under the direction of the Quality, Management and Statistics Standards Committee, a new series of guides as BS 3375 to meet this need, and to reflect the four main sections of BS 3138.

To date, BS 3375 comprises the following Parts:

- Part 1. Guide to organization study
- Part 2. Guide to method study
- Part 3. Guide to work measurement
- Part 4. Guide to work performance control

In this Part, in addition to the conventional use of italic type for subclause headings, etc., defined terms (see clause 2) have been printed in italic type for ease of identification.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

*International Labour Organization.

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Guide

0 Introduction

0.1 Purpose of the guide

The earlier editions of BS 3138, the glossary of terms, contained sections devoted to terms encountered in 'specialized fields closely associated with *work study*'. In the 1979 edition of the glossary, these were incorporated in section five under the general heading of *work performance control*.

This earlier distinction is important because some of these specialized fields such as labour control or the construction of *incentive schemes* based on payment per unit of work, evolved from the establishment of *standard times for tasks*. Creating these standards is the nub of *work measurement* and strictly the province of the work study practitioner.

The other specialized fields under section five are not, however, uniquely the concern of the '*work study*' specialist. *Job evaluation*, *merit rating*, wage payment structures and numerous *incentive schemes* are not dependent on *work measurement* or *standard times for tasks*. These fields may well be the responsibility of those in production or personnel management. Nevertheless, in many organizations these disciplines have been recognized as closely related to *work study* and within the province of the practitioner. They are, therefore, an essential part of BS 3138.

This guide supplements BS 3138 by enlarging on the use of *standard times* for performance measurement, monitoring and control, both of labour and/or machines. Those fields not directly associated with *work measurement* are also expanded in this guide to show how systems of evaluation have been developed to compare *jobs* and merit, as well as other approaches to motivating individuals or groups for improved performance. Clause 5 of the guide is devoted to wages system structures and how these relate to working arrangements.

The guide aims to put the terminology of BS 3138 in the context of *tasks* being carried out by individuals or groups, either manually or in association with machines or plant. It does not embrace overall resources control, i.e. employment of assets, material utilization, waste control, etc. and many other factors which may have particular significance for particular organizations. While most organizations are subject to control through financial performance it is not the purpose of this guide to include systems of costing and management accounting which have to include, of course, work standards among their essential data. Clauses 3 and 4 of the guide deal with the means of control by indices based on achieved performance against *standard performance*. The remuneration of the individual according to the nature of the work and his performance in carrying it out is covered in clause 5.

0.2 Need for performance measures

In all situations where resources are used to achieve some objective, those initiating the action should be concerned with its effectiveness. Productivity terminology is concerned

with the 'input' measures relative to the resultant 'output'. A multitude of measures has been established for a wide range of manufacturing, processing and service situations. These measures should be selected to reflect most readily the effective use of the resources concerned.

In any business organization with profit as an objective, the return and the capital employed are essential measures. Their relation as an index is regarded universally as a basis for comparison. At a much simpler level, the measures of fuel consumed and distance covered will provide one basis for comparing the performances of, say, motor vehicles.

This guide is primarily concerned with those factors in the operational performance for which measures can be applied and monitored, for which comparisons can be made and hence controls instituted. However, for any organization where work is undertaken and objectives aimed for, there are certain factors that do not lend themselves to measurement. These include job satisfaction, the corporate image of the organization and its standing with the local and worker community. These factors have no ready measures but are important for the long-term success of the organization.

0.3 Control through performance measures

The organization, the machine operation, the processing plant or the work *task* will have some predetermined level of achievement based on particular measures and prescribed operating conditions. These conditions will, for example, assume *qualified workers*, stipulate materials and products to certain specifications and stipulate machine and process speeds together with safety and possibly other conditions that have to be met. BS 3375 : Parts 2 and 3 emphasize the importance of systematic and *critical examination* of all these factors to ensure optimum results.

The control of any work situation has three essential *elements*. Firstly, the setting of targets or standards. Secondly, the monitoring of performance by comparing achieved results with the standard and finally the development of the control action by examining the causes of departure from *standard performance* and initiating corrective action. Controls need to be developed to produce the earliest possible anticipation of events. The need for corrective action is most often revealed by the trends in variations from the standards.

For work *tasks* carried out by the individual under unrestricted conditions, *standard performance* assumes the production of 60 *standard minutes* per hour and is designated 100 on the *British Standard rating scale*. This is covered fully in BS 3375 : Part 2. Control of worker or labour performance in this instance is through a comparison of achieved performance with *standard performance*.

Similarly, control by the comparison of measures of *standard performance* or achievement with actual results has very wide application in many situations. Financial measures are most often used, as illustrated briefly in 0.2. BS 3138 is however particularly concerned with the control of labour effectiveness in carrying out *tasks* or machine operating. Separate measures for the performance of the machine as a production unit are also defined.

Possibly the most important contribution of the work study practitioner to the efficient and profitable operation of manufacturing, processing or service activities is the provision of measures for *work performance control*. Neglect of this control results in a waste of resources which is reflected in overmanning and/or low output.

0.4 Wage payment and reward

Labour as a resource has a cost represented by the wages paid. This payment is related to three factors. Firstly, the nature of the *job* with its prescribed duties, skills and responsibilities. Secondly, the rate relative to the time spent at the workplace. This could be an hourly or weekly rate especially for manual work or a monthly or annual salary for many executive grades. The third factor, where it applies, may depend on performance achieved. This is covered more fully in 0.5.

Pay rates are usually the result of negotiation between the employee, his representatives and the employer. The *basic wage rate* will be subject to increments and allowances where work is carried out beyond the normal agreed working hours or under some abnormal conditions. Some agreements stipulate a guaranteed minimum weekly payment irrespective of hours worked.

Not all *attendance time* is spent in *productive work*. For purposes of labour control, it is necessary to categorize certain non-productive activities and ensure that there is a means of recording the time which these occupy within the *attendance time*.

Variations in the payment made for different *jobs* are increasingly being based on an evaluation of the factors that make up the demands of the *job* for the individual carrying it out. There are various methods of *job evaluation* as defined in BS 3138.

0.5 Motivation and payment by results

The third factor in many *wage plans*, referred to in 0.4, can be the additional financial reward related to the performance in carrying out *tasks*. This additional incentive payment often has a proportional relationship to the basic wage or salary.

However, there are exceptions to this, the more usual, arrangement for relating pay to performance. In some traditional industries and 'outworking' situations, the earnings of the worker are wholly dependent on the work done at some predetermined job price or piecework rate. The time taken does not form part of the calculation. There are also *bonuses* paid to groups of workers based on the level of success of the whole enterprise. These schemes offer opportunities for profit sharing to all employees.

In addition to the financial reward, there are other factors which can motivate the worker to satisfactory levels of performance. The creation of sound organization and attention to good communications and work environment are management responsibilities for which reward systems are no substitute. These aspects are covered in BS 3375 : Part 1.

Schemes for relating financial incentive to work performance have varying degrees of sophistication. Among the simpler approaches is that of *merit rating* where the performance of each individual with respect to a number of factors is judged or evaluated, points are awarded on some scale of merit and the financial reward is related to the points. However, one of the best measures is that provided by a comparison of the *standard times* for *tasks* with the actual time spent on them. This gives a *labour performance index* that can be related to a pay scale to ensure a sufficient additional payment over *timework rate* if *standard performance* is achieved.

As stated in 0.4, most agreements on pay and conditions stipulate a guaranteed minimum wage irrespective of performance. The trend has been for higher guaranteed minimums or basic wages to form a higher proportion of total earnings. Correspondingly, the percentage of earnings made up by financial incentives has fallen. However, some reasonable earning potential at *standard performance* is needed if there is to be the necessary motivation.

The skill shown by the work study practitioner in constructing the *incentive scheme* is the ability to judge the required level of reward at varying levels of performance. This may be strictly proportional for some situations but, in others, a geared relation may have advantages. This is covered much more fully later in this guide (see clause 5).

1 Scope

This Part of BS 3375 defines the objectives and establishes procedures for *work performance control*. It supplements BS 3138 by enlarging on the use of *standard times* for performance measurement and control, both of labour and/or machines. Those fields not directly associated with *work measurement* are also expanded in this guide to show how systems of evaluation have been developed to compare *jobs* and merit, as well as other approaches to motivating individuals or groups for improved performance. The guide also covers wages system structures and their relation to working arrangements.

The guide puts the terminology of BS 3138 in the context of *tasks* being carried out by individuals or groups, either manually or in association with machines or plant. Clauses 3 and 4 deal with the means of control by indices based on achieved performance against *standard performance*. The remuneration of the individual according to the nature of the work and his performance in carrying it out is covered in clause 5.

NOTE. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 3375, the definitions given in BS 3138 apply.

NOTE. See paragraph 5 of the foreword.

3 Measurement of performance

3.1 General

Performance measurement is concerned with the effective use of resources. The resources considered here are people, machines, or people and machines working together. Other resources which are very important to management, but which are outside the scope of this guide, include finance, raw materials, energy, etc. and have their particular measures, usually based on costs. Performance measurement is essentially a measure of efficiency of use of these defined resources in a given situation in a given period of time.

Within *work performance control*, performance measurement covers three basic areas, as follows.

- (a) The measurement of performance while working:
 - (1) for people, this measure is *operator performance during working time*;
 - (2) for machines, this measure is *machine efficiency index*.

This measure determines how effectively these resources are being used while they are working.

- (b) The measurement of performance while in attendance or available for work:

- (1) for people, this measure is *overall performance*;
- (2) for machines, this measure is *machine effective utilization index*.

This measure of performance indicates overall effectiveness during the period when these resources are available for work.

- (c) The measurement of performance against maximum available time. This measure is an overall measure like the measure in (b) but covers total available time. This total time is:

- (1) for people, *attendance time plus absence time*;
- (2) for machines, *machine maximum time*.

Although this particular measure is not often used, it is still a very valuable measure of performance.

3.2 Work

3.2.1 Producers. Traditionally work has been undertaken by people with possibly some assistance from machines. *Work study* and BS 3138 have been applied primarily to people, rather than machines, at work. However, moving further and further into mechanization and, indeed, into the use of robots to replace people, the measurement of performance has to cater for both people and machines. *Work performance control* needs to be exercised in all areas where work is performed, even in areas where robots are used entirely. Robots can slow down, breakdown, produce incorrect levels of quality or stop working just like people.

The areas to which performance measurement can be applied can be considered as:

- (a) people working independently of machines;
- (b) people working with machines;
- (c) machines working independently of people.

3.2.2 Situations. Just as the producers have traditionally been people, the situations to which performance measurement has been applied have been in manufacturing industry. However, performance measurement can be used in any area of activity where work is performed by any of the producers. The terms 'producers', 'production' and 'productivity' have been synonymous with manufacturing but the scope of performance measurement can include a wide variety of 'producers' including the following:

- (a) manufacturing;
- (b) distribution;
- (c) service or repair or maintenance;
- (d) process industries;
- (e) clerical or administration, etc.

These areas can be part of a larger organization or stand-alone industries. Indeed, they can be anywhere where *jobs, tasks or operations* are carried out whether by people or machines or a combination of both.

Within these situations, further consideration has to be given to repetition of the *tasks*, i.e. whether the work is:

- (1) high volume, repetitive work; or
- (2) medium volume, repetitive but mixed work; or
- (3) low volume, highly variable work.

These situations, both people or machine based, all call for differing approaches to *work measurement*, performance measurement and *work performance control*.

3.2.3 Units of count. Performance measurement has two constituents, input and output: input in the form of time, whether by people or machine, and output in terms of work done, whether in terms of time (*standard units of work*) or units of output (number of items produced per period, number of metres of cloth produced, etc.). It is important that all users of units of count understand what is required in terms of output. Although work study practitioners understand terms such as *standard hours* and *standard minutes*, it is important that those who produce output and those who control it should also understand the units involved.

While the basic calculations for performance remain unchanged, it may well be advantageous to issue and count work in terms of other units rather than in terms of time only. More useful in repetitive work and easily understood are such units as:

- (a) number of cars per hour, shift or week on an assembly line;
- (b) number of claims processed per day or week in an insurance company;
- (c) number of boxes packed;
- (d) volume of liquid produced in process plant, etc.

Whatever means are used to count work done, it may well be that the same units are used to indicate performance, i.e. the number of cars produced, etc. What is important is that those units are understood and reflect a sensible unit of count for the *job*. For example, to issue and count work