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Glossary of Terms used in work study and organization and methods (O & M)

Glossaire des termes utilisés dans les études des temps, dans l'organisation et dans les méthodes

Glossar der Begriffe zur Verwendung in Arbeitsstudien, Organisation und Verfahren

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Foreword

This British Standard glossary is a revision of BS 3138 : 1969. The first edition, in 1959, was a milestone in the development of work study in the UK. Without doubt the glossary and its revised edition in 1969 have done much to dispel ambiguities and to provide a common terminology. For the past nineteen years the glossary has remained basically in its original form, the 1969 revision confining itself to relatively minor updating and an extension of the section on incentives.

During these years there has been considerable development in the techniques, particularly in the rationalization of differences between work study and related disciplines. In this revision, the committee has tried not only to reflect this development but also to anticipate, as far as possible, the direction in which development will continue. The most important change is in the extension of the glossary to integrate the closely related disciplines of work study and organization and methods, and this has led to the inclusion initially of a small section on organization study. The section on method study has been considerably extended to reflect developments in problem solving and other investigative methods, and a separate section now integrates the terms relating to work performance and control (including payment systems).

As a consequence of this fundamental restructuring, the diagram relating to method study (figure 2) has been redrawn to illustrate a more contemporary approach. Another important change is the addition of further examples illustrating the construction of standard time (figure 4). Previous examples showed the build-up of standard time only in terms of operator controlled work. This revision reflects the situation in much of industry today, in which it is quite common to have machine controlled work and relief operators involved.

Since the publication of BS 3138 : 1969, several new BSI glossaries have been issued dealing with related management and scientific disciplines such as production planning, quality assurance, project management, maintenance, metrology, data processing and statistical methods. Every effort has been made to coordinate the definitions in this revision with those for more recently established terminology and wherever possible, common definitions have been adopted; for certain terms which may be defined differently in other contexts, reference to this fact has been included. In some cases, however, it has not yet proved possible to reconcile incompatible definitions for terms used in certain disciplines, for example the term 'variance', which has been defined in the context of its application to statistics and to cost accountancy; these definitions differ conceptually from each other.

As an additional aid to communication between the various disciplines, a list of related terms and symbols, selected from other British Standards, is given in appendix A.

Work magnitude nomenclature. In the original glossary and elsewhere, some ambiguities exist in the meanings conveyed by the terms 'job', 'task', 'operation' and 'element' and their relationship to one another. The following basic hierarchy has been used throughout this revision.

job (36001)
(1) All the tasks carried out by a worker or group of workers in the completion of their prescribed duties and grouped together under one title (or definition).
(2) A defined area of accountability within an organization.

task (36002)
An identifiable part of a job, comprising a combination of operations.

operation (36003)
(1) The smallest unit of work used for a planning or control purpose.

NOTE. An operation may include more than one physical process.

(2) A combination of elements.

NOTE. This definition is similar to that given in BS 5191 : 13002.

element (42003)
A distinct part of an operation selected for convenience of observation, measurement and analysis.

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British Standard Glossary of

Terms used in work study and organization and methods (O & M)

Section one. General terms

No.	Term	Definition
10001	**work study organization & methods (O & M)**	The systematic examination of activities in order to improve the effective use of human and other material resources.
10002	**organization study**	The systematic and critical analysis of organizational structure(s) and relationships in order to make improvements.
10003	**method study**	The systematic recording and critical examination of ways of doing things in order to make improvements.
10004	**work measurement**	The application of techniques designed to establish the time for a qualified worker to carry out a task at a defined rate of working.
10005	**work performance control**	The application of work measurement techniques with other information to the appraisal of results and payment for work.

Section two. Organization study

2.0 Introduction

Management, as a subject, may be seen as the process of utilizing material and human resources to accomplish designated objectives, involving the activities of planning, organizing, directing, co-ordinating and controlling. *Management*, as a group of people, are those who perform the functions described above. Levels of management authority are usually expressed as top, middle or lower management.

In the foreword to the 1969 edition of this standard it was envisaged that future revisions would need to take more account of subjects closely associated with work study. This edition includes the following limited selection of organization study terms, which complement the method study terms in section three.

For further reference, attention is drawn to appendix A, which lists related terms and symbols in other British Standards. Among these are BS 3527 'Glossary of terms used in data processing', BS 4058 'Data processing flow chart symbols, rules and conventions' and BS 5191 'Glossary of production planning and control terms'.

20001	**management services**	Specialist groups or units established within organizations to assist and advise on improvements in executive management functions. NOTE. These groups usually embrace one or more of the following disciplines: work study, O & M, operational research, data processing, ergonomics, economic forecasting, industrial engineering.
20002	**strategic planning**	The process of deciding on the long term objectives and policies of an enterprise.
20003	**manpower planning**	A continuous process of making advance decisions about the recruitment, use and deployment of people.
20004	**system**	A coherent and logical arrangement of principles, people, data, material, components, plant(s) and/or procedures.
20005	**management audit** operations audit	A systematic examination of the policies and practices within an organization to assess their effectiveness.

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No.	Term	Definition
20006	**management by objectives**	The setting of objectives for a forthcoming period in consultation with superiors and the subsequent evaluation of performance in relation to the objectives set.
20007	**management by exception**	The basing of corrective action on the review only of significant deviations from targets, budgets or plans.
20008	**formal organization**	The planned or established structure of an enterprise designed to achieve specified objectives.
20009	**informal organization**	A supplementary structure within an enterprise that often develops spontaneously. NOTE. It may be 'for', 'against' or 'neutral' with regard to the achievement of specified organizational objectives.
20010	**organization chart** organogram	A graphic representation of an organization.
20011	**span of control**	The number of subordinates directly responsible to a manager.
20012	**chain of command** line of command	A relationship resulting from the successive delegation of authority within an organization.
20013	**procedure**	A specified sequence of actions performed in a job or task.
20014	**time span of discretion**	1. The period of time over which a person is allowed to operate without reference to his superior. 2. The period of time that will elapse between decision and accountability.
20015	**accountability**	The obligation to answer to higher authority for the results achieved in the execution of delegated duties.
20016	**feedback**	Information provided by a process or situation which may be used to modify inputs into the same process or situation to conform to the desired plan.
20017	**vertical specialization**	A form of organization in which a person performs many tasks for a few other persons.
20018	**horizontal specialization**	A form of organization in which a person performs a few tasks for many other persons.
20019	**job enrichment**	An increase in the 'vertical' loading of a job by combining it with some tasks and responsibilities normally performed by others in order to make the job more challenging and to increase responsibility.
20020	**job enlargement**	An increase in the 'horizontal' loading of a job by incorporating other tasks requiring similar levels of skill in order to increase variety.
20021	**job rotation**	The practice of periodically moving workers around a number of tasks in order to increase variety and reduce boredom.
20022	**autonomous group working**	The delegation of responsibility for achieving specified objectives within defined constraints to a group of workers.
20023	**job analysis**	The determination of the essential characteristics of a job in order to produce a job specification.
20024	**job description**	A written outline of the main tasks of a job.
20025	**job design**	The arrangement of the features of a job or group of tasks to satisfy the economic and/or social needs of the worker (see also term no. 34007 *work design*).
20026	**job specification**	A written statement of the essential characteristics of a job including necessary qualifications, duties, responsibilities and degree of authority of the job holder.

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No.	Term	Definition
20027	**personnel specification**	A statement of the personal attributes deemed to be required by a worker for the effective performance of a given job.
20028	**interface**	A boundary common to two or more systems, or other entities at which information flow takes place. NOTE 1. The systems may be different by nature (e.g. man/machine) or with regard to prime objectives (e.g. speed of delivery/quality). NOTE 2. This definition is compatible with that given in BS 4335 : 1975 (term no. 21011).
20029	**interdependence**	The extent to which the behaviour of the components of a system depend upon one another.

Section three. Method study

3.1 Problem selection and definition

31001	**terms of reference**	The definition of an assignment comprising scope, objectives, constraints, resource allocation, time limitations and other parameters agreed between the person(s) requesting a solution of the problem and those who are to seek a solution.
31002	**assignment**	The whole or part of a problem or situation given to a practitioner for investigation within the agreed terms of reference.
31003	**select**	The process of choosing by systematic means a specific problem to be solved, or area of work to be studied.
31004	**constraint**	A limiting factor which may inhibit the full realization of objectives.
31005	**feasibility study**	A study carried out to test the likelihood of a successful solution being obtained.
31006	**record**	The process of setting down information acquired during an assignment.
31007	**logic tree**	A graph in tree form which shows the essential logical structure of a sequence of actions, rules, law or regulations.
31008	**scale chart**	A chart showing the relationship between different levels of a problem so that the most appropriate level may be chosen for consideration.

3.2 Recording data

32001	**model**	A representation of a situation using graphical, verbal or mathematical symbols, or physical means, by which the data can be examined, manipulated and evaluated.
32002	**process charts**	Charts in which a sequence of events is portrayed diagrammatically by means of a set of process chart symbols to help a person to visualize a process for the purpose of examining and improving it.
32003	**process chart symbols**	Symbols used for recording the nature of events. A set of symbols in common use is as follows:
	operation:	Indicates the main steps in a process, method or procedure. Usually the part, material or product concerned is modified or changed during the operation.
	transport:	Indicates the movement of workers, materials or equipment from place to place.
	permanent storage:	Indicates a controlled storage in which material is received into or issued from a store under some form of authorization, or an item is retained for reference purposes.

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No.	Term	Definition
	temporary storage or delay:	Indicates a delay in the sequence of events; for example, work or worker waiting between consecutive operations, or any object laid aside temporarily without record until required.
	inspection: Quantity or Quality	Indicates an inspection for quality and/or a check for quantity.
		NOTE 1. When two or more events take place together, the appropriate symbols may be combined, the predominant event being indicated by the outer symbol, e.g. a square with a circle in the centre indicates inspection combined with a subsidiary operation.
		NOTE 2. For 'program' or 'data' flowchart symbols, rules and conventions, see BS 4058.
32004	**flow process chart**	A process chart setting out the sequence of the flow of a product or a procedure by recording all events under review using the appropriate process chart symbols.
32005	**man type flow process chart**	A flow process chart which records what the worker does.
32006	**material type flow process chart**	A flow process chart which records what happens to material.
32007	**equipment type flow process chart**	A flow process chart which records how that equipment is used.
32008	**outline process chart**	A process chart giving an overall picture by recording in sequence only operations and inspections.
32009	**otis chart**	A flow process chart in which the symbols OTIS are given separate columns. The chart is formed by drawing a line from one column to another to illustrate the sequence of activities. OTIS stands for Operation, Transport, Inspection, Storage.
32010	**two-handed process chart**	A process chart in which the activities of a worker's hands (or limbs) are recorded in relationship to one another.
32011	**flow chart**	A graphical representation of a procedure, usually using symbols connected by flow lines.
		NOTE. This term is also defined in BS 3527 : Part 1 : 1976 (term no. 01-05-02).
32012	**columnar flow chart**	A flow chart in which specific meanings are attached to separate vertical spaces in which the symbols are placed. For instance, a column can include all the actions which affect a particular department or function.
32013	**systems chart** block diagram	A flow chart representing a complete system in outline.
		NOTE. The term *block diagram* is also defined in BS 3527 : Part 1 : 1976 (term no. 01-03-21).
32014	**flow diagram**	A diagram or model, substantially to scale, which shows the locations of specific activities carried out and the routes followed by workers, materials or equipment. Process chart symbols may be embodied in the diagram.
		NOTE. See also BS 4058.
32015	**relationship chart** interaction chart REL chart	A chart for comparing each member of a group with every other member. It is drawn so that a unique cell exists for each pair of members of the group. The comparison may be quantified by subjective assessment.
32016	**string diagram**	A scale plan or model on which a thread is used to trace and measure the path of workers, materials or equipment during a specified sequence of events.
32017	**multiple activity chart**	A chart on which the activities of more than one subject (worker, equipment or material) are each recorded on a common time scale to show their inter-relationship.
32018	**bar chart**	A chart on which activities are represented by lines drawn to a common time scale showing a sequence of operations.
		NOTE. This definition is identical with that given in BS 4335 : 1972 (term no. 10010).

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No.	Term	Definition
32019	**gantt chart**	A bar chart used as a means of control on which work planned and work done are represented, showing their relation to each other and to time.
32020	**therblig***	The name given by Frank B Gilbreth to each of the specific divisions of movement, according to the purpose for which it is made. NOTE. Therbligs cover movements or reasons for the absence of movement. Each therblig has a specific colour, symbol and letter for recording purposes.
32021	**simo chart**	A chart usually based upon film analysis, to record on a common time scale the therbligs performed by different parts of the body.
32022	**predetermined motion time system chart** PMTS chart	A chart or form used in recording, by means of one of the predetermined motion time system codes, the movements taking place in any operation (see term no. 41003 for definition of *predetermined motion time systems*).
32023	**predetermined motion motion time system codes** PMTS codes	Codes which represent, through combinations of figures and letters, basic human movements and qualifying conditions (see term no. 41003 for definition of *predetermined motion time systems*).
32024	**cyclegraph**	A record of a path of movement, usually traced by a continuous source of light on a photograph which may be stereoscopic.
32025	**chronocyclegraph**	A cyclegraph in which the light source is suitably interrupted at a known frequency so that the path appears as a series of pear-shaped spots, the pointed end indicating the direction of movement and the spacing indicating the speed of movement.
32026	**micromotion photography**	A form of time lapse photography which records an activity by using a cine camera with shorter than normal intervals between frames. The resultant display shows a slowing down of the activity.
32027	**memomotion photography**	A form of time lapse photography which records an activity by using a cine camera with longer than normal intervals between frames. The resultant display shows a speeding up of the activity.
32028	**decision table**	A statement, in tabular form, of the actions to be taken when given sets of conditions are fulfilled. NOTE. This definition is similar to that given in BS 3527 : Part 1 : 1976 (term no. 01-05-01).

3.3 Analysis of situations

33001	**model building**	The process of designing and building a model from which to evaluate the known data of a situation and investigate possible improvements.
33002	**film analysis**	The frame-by-frame examination of a cine film of an operation to determine the state of activity of the subject during each exposure, to permit the preparation of an appropriate chart or record.
33003	**sensitivity analysis**	An analysis of the effect on the solution of a problem as the parameters are varied.
33004	**pareto analysis**	A method of representation in which items are sorted into order of numerical magnitude. NOTE. This definition is similar to that given in BS 5191 : 1975 (term no. 33020).
33005	**factor analysis**	An analysis of the factors or features of a problem, to identify them clearly and to examine their interaction.
33006	**value analysis**	A systematic inter-disciplinary examination of factors affecting the cost of a product or service, in order to devise means of achieving the specified purpose most economically at the required standard of quality and reliability.

*See figure 1.

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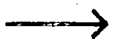
Symbol	Name	Colour
	Search	Black
	Find	Grey
	Select	Light grey
	Grasp	Red
	Hold	Gold ochre
	Transport load	Green
	Position	Blue
	Assemble	Violet
	Use	Purple
	Disassemble	Light violet
	Inspect	Burnt ochre
	Pre-position	Pale blue
	Release load	Carmine red
	Transport empty	Olive green
	Rest for overcoming fatigue	Orange
	Unavoidable delay	Yellow
	Avoidable delay	Lemon yellow
	Plan	Brown

Figure 1. List of therbligs (see term no. 32020).

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No.	Term	Definition
33007	**factor comparison**	The identification of factors common to a number of items to be compared, establishment of an assessment scale for each factor, and the assessment of each item, factor by factor, so that the items can be placed in positions of relative importance.
33008	**project network techniques (PNT)** project network analysis (PNA)	A group of techniques for the description, analysis, planning and control of projects which consider the logical interrelationships of all project activities. The group includes techniques concerned with time, resources, costs, and other influencing factors, e.g. uncertainty. NOTE 1. The terms 'program evaluation and review technique' (PERT), 'critical path analysis' (CPA) and 'critical path method' (CPM) refer to particular techniques and should not be used as synonyms for 'project network techniques'. NOTE 2. This definition is identical with that given in BS 4335 : 1972 (term no. 10003).
33009	**micromotion analysis**	The critical examination of a simultaneous motion cycle chart.
33010	**statistical analysis**	Analysis of data by the application of statistical methods.
33011	**variance**	1. *Statistical.* A measure of the dispersion of a population of values based on the mean squared deviation of individual values from the arithmetic mean. NOTE. This definition is similar to that given in BS 5532 : 1978 (term no. 2.33). 2. *Cost.* The difference between planned costs and actual results. NOTE. This definition is *not* compatible with that given in (1) above.
33012	**standard deviation**	The square root of the statistical variance, giving a usable measure of the spread of a distribution about a mean value (in the same units). NOTE. This definition is similar to that given in BS 5532 : 1978 (term no. 2.34).
33013	**analysis of variance**	1. *Statistical.* A method of partitioning the total variance of a set of values in order to assess whether the variance attributable to a particular source or sources differs from that attributable to random variance. 2. *Cost.* The examination of the difference between planned costs and actual results. NOTE. This definition is *not* compatible with that given in (1) above.
33014	**regression analysis**	A method of calculating a possible relationship between one set of values and a set of values on which the first set is believed to depend.
33015	**multiple regression analysis**	A method of calculating a possible relationship between one set of values and several other sets of values which are believed to affect it.
33016	**significance tests**	Statistical procedures intended to indicate whether some observed effect is the result of chance or may be attributable to some postulated hypothesis.

3.4 Creativity

34001	**brainstorming**	The controlled use of free expression, by which a team of people interact to produce solutions to a problem.
34002	**lateral thinking**	A mode of thought characterized by attempting to find new standpoints from which to view the problem, not being constrained by conventional logic.
34003	**vertical thinking**	A mode of thought characterized by strict logic.
34004	**critical examination**	The systematic analysis of information about a problem, procedure or activity by which it is subjected to exhaustive challenge with regard to need, simplifications, combination, sequence, and alternatives.
34005	**progressive elimination**	A procedure of seeking to eliminate something from consideration first by challenging it as a whole and then aspects of it in increasingly greater detail.

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No.	Term	Definition
34006	**questioning technique**	A means by which critical examination is conducted, using: (a) *Primary questions.* The first stage, in which the fundamental need for performing each activity recorded, and its means, sequence, place and person are questioned, and justification is sought for each reply. (b) *Secondary questions.* The second stage, in which the remaining essential activities are subjected to further questions to determine alternatives and to select those which are practicable and preferable.
34007	**work design**	The procedure of designing in advance all the features of a task or job, specifying the way the operator will work, how he will relate to his work place, the physical and social environment, and all other relevant aspects.
34008	**heuristic procedure**	A procedure that involves some degree of experimentation e.g. trial and error each successive stage towards the solution taking into account the error determined in the previous stage. NOTE. The term 'heuristic method' is defined in BS 3527 : Part 2 : 1976 (term no. 02.01.01) and the term 'heuristic methods' is defined in BS 4335 : 1975 (term no. 50013).
34009	**successive limited comparisons**	A method of arriving at a solution by making successive small changes in the real situation, and testing to see if they have had the desired effect.

3.5 Choice and evaluation

NOTE. Choice and evaluation of competing solutions should take account of net present value and changing price levels.

35001	**decision tree**	A diagram displaying successive and alternative decisions in the face of chance events together with the final outcome of every alternative.
35002	**decision matrix**	A matrix showing the resultant interaction of various strategies.
35003	**ratio analysis**	A method of appraisal by examining the behaviour of appropriate indices. NOTE. The indices are usually obtained by dividing one descriptive parameter by another e.g. profit divided by number of employees, which is a dimensional ratio, or profit divided by turnover, which is non-dimensional.
35004	**cost benefit analysis**	The measurement of resources used in an activity and their comparison with the value of the benefit to be derived from the activity.
35005	**cost effectiveness**	A measure of the resources to achieve a given result, expressed in financial, social and/or environmental terms.
35006	**discounted cash flow (DCF)**	A method of relating future cash inflows and outflows over the life of a project or operation to a standard value (usually present value) using discount rates based on compound interest.
35007	**attribute lists**	A list of qualities ascribed to a particular object or system, prepared so that these may be validated against the needs of the situation.
35008	**cost ratio**	A numerical relationship obtained by relating a cost measure of an activity or product to an independent measure of another aspect of that activity or product.
35009	**financial ratio**	A numerical value (or percentage) obtained by relating monetary measures in accounts (usually profit and loss accounts and balance sheets) with one another.

3.6 Activities (*see also note to foreword*)

36001	**job**	1. All the tasks carried out by a worker or a group of workers in the completion of their prescribed duties and grouped together under one title (or definition). 2. A defined area of accountability within an organization.
36002	**task**	An identifiable part of a job, comprising a combination of operations.

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