Designation: E833 – 14

Standard Terminology of Building Economics[1]

This standard is issued under the fixed designation E833; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This terminology relates to the economic evaluation of building construction as used in other standards under the jurisdiction of ASTM Committee E06 on Performance of Buildings, and it does not necessarily correspond to the terminology used in other areas of accounting and economics.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E1699 Practice for Performing Value Engineering (VE)/Value Analysis (VA) of Projects, Products and Processes

E2691 Practice for Job Productivity Measurement

3. Terminology

adjusted internal rate-of-return (AIRR), *n*—the compound rate of interest that, when used to discount the terminal values of costs and benefits of a project over a given study period, will make the costs equal the benefits when cash flows are reinvested at a specified rate (syn. *financial management rate of return (FMRR)*).

allowance, *n—in construction design planning and estimating*, an allocation of money that is intended to be spent for a specific purpose.

DISCUSSION—An allowance is used in the absence of precise knowledge, and estimated, to be of one's knowledge, to ensure a full and complete estimate. Allowances cover events and activities that are normally directly controllable within a project plan.

annual value, *n*—a uniform annual amount equivalent to the project costs or benefits taking into account the time value of money throughout the study period (syn. *annual worth, equivalent uniform annual value*).

annual worth, n—See **annual value**.

annually recurring costs, *n*—those costs that are incurred in a regular pattern each year throughout the study period.

base date, n—See **base time**.

base time, *n*—the date to which all future and past benefits and costs are converted when a present value method is used (usually the beginning of the study period) (syn. *base date*).

baseline labor hour budget, *n*—a budget of direct labor hours created at the onset of a new construction project that approximates how many hours will be spent on any defined part of the project.

DISCUSSION—The budgeted hours are first assigned to the tasks on the project, and can be summed to determine budgeted hours for any cost code or for the entire project.

baseline plan, *n*—an established scope, cost, schedule, and technical performance plan against which the status of resources and the effort of the overall program or project activities are measured, assessed, and controlled.

benefit-cost analysis, *n*—a method of evaluating projects or investments by comparing the present value or annual value of expected benefits to the present value or annual value of expected costs.

benefit-to-cost ratio (BCR), *n*—benefits divided by costs, where both are discounted to a present value or equivalent uniform annual value (syn. *benefit-cost ratio*).

break even analysis, *n*—a technique for determining that value of a variable which results in benefits (savings) just equal to costs.

building decision, *n*—a decision regarding the design, financing, engineering, construction, management, or operation of a building.

building economics, *n*—the application of economic analysis to the design, financing, engineering, construction, management, operation, ownership, or disposition of buildings.

building system, *n*—an aggregation or assemblage of items joined in regular interaction or interdependence in buildings or building construction.

capital cost, *n*—the costs of acquiring, substantially improving, expanding, changing the functional use of, or replacing a building or building system.

[1] This terminology is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.81 on Building Economics.

Current edition approved April 1, 2014. Published May 2014. Originally approved in 1981. Last previous edition approved in 2013 as E833 – 13b. DOI: 10.1520/E0833-14.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

cash flow, *n*—the stream of monetary (dollar) values—costs and benefits—resulting from a project investment.

certainty equivalent technique, *n*—a technique used to adjust economic measures of project worth to reflect risk exposure and risk attitude.

DISCUSSION—Estimated project returns are multiplied by a certainty equivalent factor (CEF) to determine the *certainty equivalent* amount a decision maker finds equally acceptable to the estimated project returns.

code of accounts, *n*—a hierarchical, company-specific system for cost accounting, control, and management.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), *n*—also known as "Superfund," CERCLA prescribes actions and regulatory requirements for reducing risks to human health and the environment resulting from releases or threatened releases of hazardous substances into the environment.

condition index—descriptive or numeric rating used to represent the "condition" of the rated asset as of a stated point in time.

DISCUSSION—Examples of condition indices include quantitative scores (scale of 0-100; 0-10; 0-5) based upon statistically sampled data and associated deficiency curves or defined descriptors (good – fair – poor).

constant dollars, *n*—dollars of uniform purchasing power exclusive of general inflation or deflation.

DISCUSSION—Constant dollars are tied to a reference year.

construction contingency, *n*—the funds added to estimated and known costs in case of cost overruns during construction.

construction documents, *n*—materials that convey the physical, aesthetic, technical, performance, and administrative requirements necessary to initiate a contract for construction of the proposed project.

contingency, *n—in construction design planning and estimating*, a sum of money that is provided to cover the occurrence of unintended departures from the planned scope of work.

DISCUSSION—A contingency is used in the absence of precise knowledge, and estimated, to be of one's knowledge, to ensure that a financial buffer is available within a budget. Contingencies assist in mitigating the effects of unplanned events and other risks that are normally not directly controllable within a project plan.

control signal, *n*—in construction, any series of data points which indicates deviation from the expected job progress in relation to labor, material, or finance, and indicates anomalies on the jobsite to the contractor, project manager, or job supervisor.

DISCUSSION—In Practice E2691, a control signal identifies any deviation from the labor productivity reference point.

cost analysis, *n*—subdividing the project estimate into component parts to find and compare their relationship to previously established historical costs.

cost effective, *adj*—the condition whereby the present value benefits (savings) of an investment exceeds its present value costs.

cost limitations, *n*—the budget boundaries for project elements.

cost model, *n*—the description of the project divided into discrete elements showing quantities and unit price for each element.

cost overruns, *n*—in project design or construction, or both, the unanticipated increase in cost due to factors such as unanticipated site conditions, changes in the cost of building materials, labor, weather, and labor disputes.

cost professional, *n*—in project design or construction, or both, a person engaged in the occupation of understanding, managing or estimating project costs, or a combination thereof.

current dollars, *n*—dollars of purchasing power in which actual prices are stated, including inflation or deflation.

DISCUSSION—In the absence of inflation or deflation, current dollars equal constant dollars.

current replacement value—engineering estimate of costs (in today's dollars) required to replace a facility at existing size and functional capability using current construction standards.

DISCUSSION—Includes costs for overhead, planning, design, construction, and construction management for the asset being reviewed; does not typically include land value or initial site clearing or earthwork costs. The current replacement value for a given building may include costs applicable to such site improvements as park benches, walkways, parking, service roads, and site utilities and such should be delineated based upon intended use of the term. Typical engineering estimates include costs for materials, equipment, supplies, and labor.

deactivation, *n*—the process of placing a facility in a safe and stable condition to minimize the long-term cost of a surveillance and maintenance program and to protect the workers, the public, and the environment.

decision analysis, *n*—a technique for making economic decisions in an uncertain environment that allows a decision maker to include alternative outcomes, risk attitudes, or subjective impressions about uncertain events in an evaluation of investments.

decommissioning, *n*—takes place after deactivation, and includes surveillance and maintenance, decontamination, dismantlement, surveillance and long-term monitoring, or any combination thereof.

decontamination, *n*—the removal of hazardous or radioactive material, or both, from facilities, soils, or equipment to preclude the occurrence of foreseeable adverse health effects.

design contingency, *n*—in project design/construction, the amount of funds added to the estimated construction costs to cover unanticipated construction costs due to the incompleteness of the design, where the contingency is inversely proportional to the level of completeness of the design documentation.

design development, *n*—the phase of a project consisting of drawings and document preparation to fix and describe the size and character of the building systems, material, and elements.

design program, *n*—the information detailing project function, purpose, and characteristics inclusive of floor area, functional spaces, equipment, and building systems.

desires, *n*—the functions that the value analysis team determines to be fulfilled if cost is not a factor, or functions which do not otherwise violate a constraint.

differential price escalation rate, *n*—the expected percent difference between the rate of increase assumed for a given item of cost (such as energy), and the general rate of inflation.

discount factor, *n*—a multiplicative number (calculated from a discount formula for a given discount rate and interest period) that is used to convert costs and benefits occurring at different times to a common time.

discounting, *n*—a technique for converting cash flows that occur over time to equivalent amounts at a common time.

discount rate, *n*—the rate of interest reflecting the investor's time value of money, used to determine discount factors for converting benefits and costs occurring at different times to a base time.

DISCUSSION—The discount rate may be expressed as nominal or real.

economic evaluation methods, *n*—a set of economic analysis techniques that consider all relevant costs associated with a project investment during its study period, comprising such techniques as life-cycle cost, benefit-to-cost ratio, savings-to-investment ratio, internal rate of return, and net savings.

economic life, *n*—that period of time over which an investment is considered to be the least-cost alternative for meeting a particular objective.

element, *n—in construction planning, design, specification, estimating, and cost analysis*, a significant component part of the whole that performs a specific function, or functions, regardless of design, specification, or construction method.

DISCUSSION—While through analysis, or by direct application, construction estimates categorized into elements (functional elements) with allocated costs, may be summarized in an **elemental cost summary** or **elemental cost analysis**; elements (functional elements) also provide a framework for consistent preliminary project description, outline, and performance specification, through all stages of planning, design, construction, and maintenance.

elemental cost analysis, *n—in construction planning, design, specification, estimating, and cost analysis*, a tabulation of cost categorized by **major group element**, **group element**, or **element**, or any combination thereof, to which a **parameter quantity**, or parameter quantities, has, or have, been applied to derive benchmark figures (rates, ratios, percentages, and so forth).

DISCUSSION—Elemental cost analyses are valuable tools in planning, estimating, and controlling construction cost through all stages of planning and design. The benchmark figures are primarily derived from underlying estimate detail but can, in some circumstances, be used directly to approximate estimates for other projects.

elemental cost summary, *n—in construction planning, design, specification, estimating, and cost analysis*, a tabulation of cost categorized by **major group element**, **group element**, or **element**.

engineering economics, *n*—the application of economic techniques to the evaluation of design and engineering alternatives.

equivalent uniform annual value, n—See **annual value**.

ex situ treatment, *n*—treatment, remediation, or cleanup of contaminated material in a treatment facility at a different location from the contaminated site.

field requirements, *n—in construction design planning and estimating*, the nonpermanent portion of construction cost that is essential to permit implementation of the construction work in the field.

DISCUSSION—Usually relating to permits, insurances, supervision, site set-up, and other requirements that permit the construction process, but excluding such temporary construction work as formwork, bracing, shoring, and other work required to install the permanent construction work.

financial management rate-of-return (FMRR), n—See **adjusted internal rate-of-return (AIRR)**.

first cost, *n*—costs incurred in placing a building or building subsystem into service, including, but not limited to, costs of planning, design, engineering, site acquisition and preparation, construction, purchase, installation, property taxes and interest during the construction period, and construction related fees (syn. *initial investment cost, initial cost*).

function, *n*—a purpose of the entire project or some portion thereof determined by the needs or desires of the user/owner and expressed in two words, an active verb and a measurable noun.

function analysis, *n*—an examination of the project consisting of (*1*) the determination of the project functions; (*2*) the examination and sorting of these functions into categories; (*3*) the selection of the critical functions and arrangement into a logical order; and (*4*) the determination of the project cost allocated to performing each critical function.

function, basic, *n*—a function that is necessary to achieve the primary purpose of a building system or element.

functional element, *n—in construction planning, design, specification, estimating, and cost analysis*; see **element**.

future value, *n*—the value of a benefit or a cost at some point in the future, considering the time value of money (syn. *future worth*).

future worth, n—See **future value**.

general overhead, *n*—the fixed cost associated with operation of the corporate or main office, plant, equipment, and staffing maintained by a contractor for general business operations.

DISCUSSION—General overhead costs may not be specifically applicable to a particular job or project.

group element, *n—in construction planning, design, specification, estimating, and cost analysis*, a significant component part of the whole that includes relevant **elements** which, as a group, perform specific function, or functions, regardless of design, specification, or construction method.

hazardous waste, *n*—waste that is listed as hazardous by the Environmental Protection Agency (EPA) or exhibits one or more of the following characteristics: ignitability, reactivity, corrosivity, or toxicity, as specified in the Code of Federal Regulations (CFR) part 261, or both.

DISCUSSION—EPA did not intend to regulate many common materials such as paper, wood, vinegar, detergents, and other waste as hazardous. As a result, EPA has developed a list of products that are considered hazardous waste and has developed criteria and test methods to determine if the waste has hazardous characteristics. These listings and testing criteria can be found in the CFR 261.

in situ treatment, *n*—treatment, remediation, or cleanup of contaminated sites and materials in place.

incremental cost (benefit), *n*—the additional cost (benefit) resulting from an increase in the investment in a building project (syn. *marginal cost (benefit)*).

inflation, *n*—a rise in the general price level, usually expressed as a percentage rate.

initial cost, n—See **first cost**.

initial investment cost, n—See **first cost**.

internal rate of return (IRR), *n*—the compound rate of interest that, when used to discount study period costs and benefits of a project, will make the two equal.

investment cost, *n*—first cost and later expenditures which have substantial and enduring value (generally more than one year) for upgrading, expanding, or changing the functional use of a building or building subsystem.

labor productivity reference point, *n*—a ratio calculated at the beginning of a construction project, for the hours needed to complete one percent of the construction, based on the baseline labor hour budget.

life cycle, n—See **study period**.

life-cycle cost (LCC) method, *n*—a technique of economic evaluation that sums over a given study period the costs of initial investment (less resale value), replacements, operations (including energy use), and maintenance and repair of an investment decision (expressed in present or annual value terms).

maintenance, *n*—act of keeping fixed assets in an acceptable condition capable of performing intended function.

DISCUSSION—Maintenance includes preventive maintenance, normal repairs, replacement of parts and structural components, and other activities needed to preserve the asset so that it continues to provide acceptable service and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than, those originally intended.

maintenance and repair cost, *n*—the total of labor, material, and other related costs incurred in conducting corrective and preventative maintenance and repair on a building, or on its systems and components, or on both.

major group element, *n—in construction planning, design, specification, estimating, and cost analysis*, a very significant component part of the whole that includes relevant **group elements** which, as a group perform major specific function, or functions, regardless of design, specification or construction method.

marginal cost (benefit), n—See **incremental cost (benefit)**.

MasterFormat, *n*—a standard sequence of numbers and titles for organizing information about construction requirements, products, and activities (source 1995 edition of MasterFormat, published by CSI).

mathematical/analytical (M/A) technique, *n*—a technique of obtaining probability functions for economic measures of project worth without the repeated trials of simulation.

mean-variance criterion, *n*—a technique for evaluating the relative risk and return when choosing among competing projects that dictates that the project value with the higher mean (that is, expected value of project worth) and lower standard deviation be chosen.

minimum acceptable rate of return, *n*—the minimum percentage return required for an investment to be economically acceptable.

modified internal rate of return (MIRR), n—See **adjusted internal rate of return (AIRR)**.

needs, *n*—the functions that the value analysis team determines to be fulfilled by the product/project.

DISCUSSION—Needs are imposed by owners, users, and stakeholders. Needs can be violated, but the degree of violation will be considered in the evaluation of alternatives.

net benefits (savings), *n*—the difference between the benefits and the costs—where both are discounted to present or annual value dollars.

nominal discount rate, *n*—the rate of interest reflecting the time value of money stemming both from inflation and the real earning power of money over time.

DISCUSSION—This is the discount rate used in discount formulas or in selecting discount factors when future benefits and costs are expressed in current dollars.

non-installation hours, *n*—labor hours spent on activities other than installation, removal, or erection of material on the jobsite, including but not limited to hours spent on prefabrication, preassembly, job-layout, supervision, or job planning.

observed percent complete, *n*—a percentage number estimate, based on physical observation, that documents what portion of a jobsite task, cost code, or entire project has been completed.

office overhead, *n—in construction design planning and estimating*, the non-permanent portion of construction cost that is attributable to the prime contractor's home office (overhead) cost of doing business.

operating cost, *n*—the expenses incurred during the normal operation of a building or a building system or component, including labor, materials, utilities, and other related costs.

opportunity cost of capital, *n*—the rate of return available on the next best available investment of comparable risk.

overall rate of return (ORR), n—See **adjusted internal rate of return (AIRR)**.

owner, *n*—one who holds the title and is responsible for funding the project.

parameter quantity, *n—in construction planning, design, specification, estimating, and cost analysis*, a measure of the amount (quantity) of work included within a **major group element**, **group element**, or **element**, or any combination thereof, which, using standardized metrics, ensures consistent **elemental cost analysis** preparation and comparison.

payback method, *n*—a technique of economic evaluation that determines the time required for the cumulative benefits from an investment to recover the investment cost and other accrued costs (see **payback period; simple payback period**).

payback (PB) period, *n*—the time required for the cumulative benefits from an investment to pay back the investment cost and other accrued costs considering the time value of money.

portfolio analysis, *n*—a technique used to seek the combination of assets with the maximum return for any given degree of risk (that is, variance of the return), or the minimum risk for any given rate of return.

present value, *n*—the value of a benefit or cost found by discounting future cash flows to the base time (syn. *present worth*).

present value factor, *n*—The discount factor used to convert future values (benefits and costs) to present values (syn. *present worth factor*).

present worth, n—See **present value**.

present worth factor, n—See **present value factor**.

productivity differential, *n*—in job productivity measurement (JPM), a measurement of the percent difference between the labor productivity reference point and the current labor productivity for the given timeframe.

DISCUSSION—In Practice E2691, job productivity is defined as the rate of production over time, and measures the ongoing and periodic changes in productivity over time. If more hours are used than planned due to the difficulty of installation, errors, or rework, the job productivity differential will be negative. If fewer hours are used than planned, the job productivity differential will be positive.

program, *n*—See facility program.

radioactive waste, *n*—waste that emits radiation, generally alpha or beta particles, often accompanied by gamma.

rate of return, *n*—the percentage yield on an investment per unit time.

real discount rate, *n*—the rate of interest reflecting that portion of the time value of money related to the real earning power of money over time.

DISCUSSION—This is the discount rate used in discount formulas or in selecting discount factors when future benefits and costs are expressed in constant dollars.

real dollars, n—See **constant dollars**.

reconciliation, *n*—a comparison of two or more estimate values by independent cost professionals for the purpose of reaching consistency in the estimate assumptions, parameters, and scope of work.

remediation, *n*—to restore or clean up, or both, sites contaminated with hazardous, toxic, or radioactive substances or wastes, or any combination thereof.

replacement cost, *n*—building component replacement and related costs, included in the capital budget, that are expected to be incurred during the study period.

resale value, *n*—the monetary sum expected from the disposal of an asset at the end of its economic life, its useful life, or at the end of the study period.

reserve, *n—in construction design planning and estimating*,a sum of money, usually held by management (Client) to be disbursed only when project requirements are changed.

Resource Conservation and Recovery Act (RCRA), *n*—a congressional mandate that requires the management of regulated hazardous waste and requires that permits be obtained for facilities (both private and public) that treat, store, or dispose of hazardous waste.

DISCUSSION—RCRA also establishes standards for these facilities and requires corrective actions (for example, remediation) of past releases of hazardous waste from regulated waste management units.

retrofit, *n*—the modification of an existing building or facility to include new systems or components.

risk-adjusted discount rate (RADR), *n*—a discount rate that has been adjusted to account for risk.

DISCUSSION—When using the RADR technique, projects with anticipated high variability in distributions of project worth have their net benefits or returns discounted at higher rates than projects with low variability.

risk analysis, *n*—the body of theory and practice that has evolved to help decision makers assess their risk exposures and risk attitudes so that the investment that is *best for them* is selected.

DISCUSSION—This definition is restricted to the types of analyses described in ASTM Building Economics standards, and is not necessarily consistent with how the term is used in reference to analyses in such areas as the environment or health.

risk attitude, *n*—the willingness of decision makers to take chances or gamble on investments of uncertain outcome.

DISCUSSION—Risk attitudes are generally classified as risk averse, risk neutral, or risk taking. Risk averse decision makers would prefer a sure cash payment to a risky venture with known expected value greater than the sure cash payment. Risk neutral decision makers act on the basis of expected monetary value. They would be indifferent between a sure cash payment and a risky venture with expected value equal to the sure cash payment, and would therefore accept a fair gamble. Risk takers prefer a risky venture with known expected value to a sure cash payment equal to the expected value.

risk averse (RA), n—See **risk attitude**.

risk exposure, *n*—the probability of investing in a project whose economic outcome is different from what is desired (the target) or what is expected.

risk neutral (RN), n—See **risk attitude**.

risk taking (RT), n—See **risk attitude**.

salvage value, *n*—the value of an asset, assigned for tax computation purposes, that is expected to remain at the end of the depreciation period.

savings-to-investment ratio (SIR), *n*—either the ratio of present value savings to present value investment costs, or the ratio of annual value savings to annual value investment costs.

schematic design, *n*—the phase of a project during which the initial solutions to the program are prepared by the design professional through the use of plans and sections and system's descriptions.

sensitivity analysis, *n*—a test of the outcome of an analysis by altering one or more parameters from an initially assumed value(s).

simple payback (SPB) period, *n*—the time required for the cumulative benefits from an investment to pay back the investment cost and other accrued costs, not considering the time value of money.

stakeholders, *n*—anyone who affects the project or is affected by the project; other than the owner/user.

study period, *n*—the length of time over which an investment is analyzed (syn. *life cycle, time horizon*).

sub-element, *n—in construction planning, design, specification, estimating, and cost analysis*, a component part of an **element** that performs a specific function, or functions, regardless of design, specification, or construction method.

sunk cost, *n*—a cost that has already been incurred and which should not be considered in making a new investment decision.

surveillance and long-term monitoring (SLTM), *n*—activities, conducted after remediation, such as monitoring, repairing and replacing parts, record keeping, maintenance, and other activities that are required to maintain an adequate level of human health and environmental protection from hazardous and radioactive waste residues.

DISCUSSION—In many cases, it is not technically and economically feasible to clean or remediate sites or facilities to unrestricted use. As a result, one of the practical measures to ensure the safety of the public, and to provide a buffer between the public or the environment and the remaining hazardous and nuclear materials, wastes, and contamination is through the performance of SLTM activities. SLTM activities occur at the end of the project after remediation is complete or when remediation is not possible.

surveillance and maintenance, *n*—activities such as monitoring, inspection, maintenance, replacement and repair of components and parts that are required for a site or a facility prior to remediation.

system productivity, *n*—the ratio of the labor hours allocated to physical construction put in place,[3] over the total labor hours used for completion of the project.

target cost, *n*—the planning expenditure, determined in cooperation with the cost professionals and the design team, for project elements.

task outline, *n*—a general plan of the estimating work to be performed.

time horizon, n—See **study period**.

time value of money, *n*—the time-dependent value of money stemming both from changes in the purchasing power of money (that is, inflation or deflation), and from the real earning potential of alternative investments over time.

toxic waste, *n*—waste, based on the physical, chemical, radiological, or biological nature of the substance, and when exposed (that is, inhaled, ingested, or absorbed) to the human body, can cause acute or chronic injury or disease

uncertainty, *n*—lack of certain, deterministic, values for the variable inputs used in an economic analysis of a building or building system.

UNIFORMAT II *UII*, *n*—a hierarchical breakdown structure of construction work ordered by **elements**.

DISCUSSION—Primarily designed for cost management (planning, control and analysis) during the planning, budgeting, and design phases of construction, its hierarchical elemental breakdown structure is also used for qualitative – text rich– reports (preliminary project description, condition assessment, asset description), and other quantitative – text and numerical – purposes (value engineering, risk analysis, preliminary time schedule, building information modeling).

useful life, *n*—the period of time over which an investment is considered to meet its original objective.

user, *n*—one who actively, physically occupies, conducts business, provides service for uses of the product within facility/project.

utility function, *n*—a function that shows how utility (that is, satisfaction) varies with money or income.

DISCUSSION—The utility function shows the decision maker's risk attitude.

[3] Construction put in place is defined in the C30 series report from the U.S. Census Bureau on "Value of Construction Put in Place," http://www.census.gov/.

value, *n*—an expression of the relationship between function and resources, where function is measured by the performance requirements of the customer and resources are measured in cost for materials, labor, and time required to accomplish that function. E1699

value analysis (VA), *n*—the procedure for developing and evaluating alternatives to a proposed economical design that best fulfills the needs and requirements of the user/owner of the building. (Also referred to as *value engineering*.)

value analysis team leader (VATL), *n*—the individual who facilitates the **value analysis**.

value engineering (VE), *n*—the application of value methodology to projects, products, and processes for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with the required performance, reliability, quality, and safety (syn. *value analysis (VA)*). E1699

value methodology, *n*—a systematic procedure used to improve the value of a project/product/process by examining its functions and resources using analytical, creative, and evaluation techniques. E1699

DISCUSSION—The procedure, normally conducted in a collaborative and multi-disciplined team workshop format, includes: (*1*) information phase; (*2*) function analysis phase; (*3*) creative phase; (*4*) evaluation phase; (*5*) development phase; and (*6*) presentation phase. The procedure is referred to as the job plan.

work breakdown structure (WBS), *n*—a hierarchically structured list of work packages and activities, that defines the total work scope of a project, identifies and organizes the relationships of the work packages and activities to each other, and provides the basis for effective project planning, management, and control.

DISCUSSION—Work packages are deliverables that can be assigned for planning and execution to a subordinate level of authority and control, as sub-projects, and may be further subdivided into discrete activities.

workshop effort, *n*—the exclusive, intense concentration of the VA team on the project during the workshop period.

worth, *n*—the value as defined in monetary terms of a specific function identified.