## Terms and Definitions

| TERM | INFORMATION |
|---|---|
| Activity Completion estimates | Zero/100, conservative, no value until completed; 20/80, Pareto's rule, cautious, 20% at start; 50/50 - most popular |
| ADM | Arrow Diagramming Method - Activity On Arrow |
| Alderfer | ERG:**E**xistence needs (Physiological & Safety), **R**elatedness (Social), **G**rowth needs (Esteem & Self Actualization), Frustration/Regression; ERG theory suggests that, in addition to this fulfillment progression process, there also exists a frustration-regression process |
| Analogous estimating | Similar project, Top Down |
| AOA | Arrow is Activity and Node is Event (uses dummy), PERT, CPM only finish to start, work accomplished between events, activity represented by arrow, event oriented |
| AON | Node is Activity and Activity is Precedence, PDM, has lead and lag and 4 precedence relationships, activity represented by node, activity oriented |
| Backward Pass | Late Finish dates and Late Start dates for uncompleted portions of the network activities |
| Bar/Gantt Charts | Do not show inter-dependencies, Good for tracking actual vs. planned start and finish dates |
| Baselines | Scope, Schedule, Cost and Quality |
| Basic Quality tools | Flow charts, diagrams, Pareto charts, Cause and Effect diagram, graphs, control charts, checklists |
| Business Risk | Chance of profit or loss most risks are business risks; 1 of 2 business risk types |
| Cause & Effect Diagram | Ishikawa |
| Change requests | Always formal |
| Changes | Reflected in the project plan |
| Communications | Project Leader spend 45% of the time communicating with the team, 90% total |
| Configuration management | Physical and functional description of the product, keep it accurate, correct and complete |
| Conflict - Compromising | Lose-Lose, form of definitive resolution |
| Conflict - Collaborating/Problem Solving | Win-Win, Time consuming, ultimate resolution |
| Conflict - Forcing | Win-Lose, use as last resort |
| Conflict - Smoothing | Lose-Lose, keeps atmosphere friendly |
| Conflict - Withdrawing | Lose-Lose, appropriate for cooling off |
| Connotation | Thought attributed to the words |
| Content theories | Maslow, Alderfer, Herzberg, McClelland |
| Contingency Reserve | Within approved scope, budget, and schedule |
| Contract | 5 musts: Legal capacity, Mutual assent, Consideration, Legality, Appropriate |
| Contract Negotiation states | Protocol, probing, scratch bargaining, closure agreement [Principles of PM 236-237] |
| Control chart abnormalities | Out of control (exceeds control limits), Hugging (7 hugging the line), Cycle (repeating pattern of data points), Trend (7 or more reflect steady increasing or decreasing, Run (7 above or below the average) |
| Cost at Completion | Original Cost Estimate/CPI - predict cost over run |
| Cost Reports | Expenditure tables, histograms, s-curve |
| CPFF | **C**ost **P**lus **F**ixed **F**ee, Buyer high risk; Seller moderate risk, Provides that the seller be reimbursed for allowable costs for performing the contract, and in addition the seller receives a profit a fixed fee payment usually based on a % of estimated costs, for difficult and long research projects. [Principles of PM, pp 229-232] |

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| CPIF | **C**ost **P**lus **I**ncentive **F**ee, Seller is paid for allowable performance costs along with a predetermined fee and an incentive bonus, Long performance period with hardware & development test requirements; compute incentive based on savings; Original price = 10,000, fee = 1,000, 80/20 share; final price 8,000 buyer pays 8,000+1,000+400 (20% of 2,000 savings) [Principles of PM, pp 229-232] |
| CPM | **C**ritical **P**ath Method, most likely estimate; predicts project duration by analyzing with sequence of activities has the last amount of schedule flexibility, early dates forward pass; late dates backward pass |
| CPPC | **C**ost **P**lus **P**ercentage of **C**osts, Buyer assumes risk, provides for reimbursement to the contractor for allowable costs due to contract performance. Additionally, the contractor receives an agreed-upon percentage of the estimated costs as a profit. Although prohibited for in federal government, used in private, particularly construction industry [Principles of PM, pp 229-232] |
| Crashing | Analysis of costs and schedule to compress schedule, increase in project cost |
| Critical Path | Calculate slack (zero or minimum slack), longest path for earliest completion |
| Crosby | Quality is free, doing things right the first time, 14 step plan, 4 absolutes: Conformance to requirements, Prevention not detection, Zero defect, Measurement is the cost of non conformance |
| Cumulative cost curve | Cumulative planned & actual cost schedules |
| Cumulative CPI | Sum of individual EV (BCWP) divided by sum of AC (ACWP), used to forecast project cost at completion |
| Customers | Costs 5 times the resources to obtain a new customer than to keep an existing |
| Data Date | As of date |
| Delphi method | Scope planning, Expert Judgment |
| Deming | 85% due to poor quality (management) 15% to the team |
| Deming 14 Points | Create constant message; Commitment to continuously improve quality; Focus on prevention; Do not award contracts to lowest; Improve constantly and forever; Quality training; Supervision coach and mentor; Drive out fear; Eliminate barriers; Eliminate slogans; Eliminate management by objectives; Remove barriers to pride of workmanship; Institute education & self-improvement; Create an organization to support 1-13 |
| Denotation | Meaning or idea conveyed |
| differentiation | separating by specialties |
| Doctrine of waiver | relinquishing one party's right because of lack of enforcement of those rights |
| EAC | Actuals to date plus remaining budget/CPI (use when current variances are typical), Actuals to date plus new ETC; actual to date plus remaining budget |
| EAC or LRE (latest revised estimate) | EAC = BAC/CPI, ACWP = remaining BAC/CPI, ACWP + ETC, ACWP = remaining BAC |
| Earned Value | BCWP |
| Earned Value | Positive CV/Negative SV = task not started or has started and not enough resources; Negative CV/Negative SV = cost overrun & schedule slippage; Negative CV/Positive SV = money spent to crash; positive CV & SV = under budget & ahead of schedule |
| EMV | probability of occurrence X gain or loss |
| Estimate - budget | -10 to +25%; used for initial funding |
| Estimate - definitive | -5 to +10%; bottom up |

## Terms and Definitions

| TERM | INFORMATION |
|---|---|
| Estimate - order of magnitude | -25 to +75%; early in project for ball park |
| Executing Processes | Require the highest level of ongoing activity throughout the project |
| Extrapolation | Most accurate estimating, like prototyping |
| Fast tracking | Doing in parallel, usually increases the risk |
| Feigenbaum | Originator of total quality control |
| FFP | **F**irm **F**ixed **P**rice, It is an agreement where the contractor agrees to furnish supplies or services at a specified price that is not subject to adjustment because of performance costs. It is best suited when reasonably definite production specifications are available and costs are relatively certain. Lump sum - used most often; Seller has most risk [Principles of PM, pp 229-232] |
| Float | time delayed from early start w/o delaying project finish |
| Formative Quality Evaluation | Reviewing specifications at key points in the project life cycle to determine how the project is proceeding and make necessary corrections |
| Forward Pass | Early start and early finish for uncompleted portions of network activities |
| FPIF | **F**ixed **P**rice **I**ncentive **F**ee, The most complex type of contract, which is composed of a target cost, target profit, target price, ceiling price, and share ratio, usually used when contracts are for substantial sum and involve a long production time. This enables the seller to develop production efficiency during the performance of the contract. target cost 100,000, target price 110,000, target profit 10,000, ceiling price 12,000, share ratio 70/30; if cost above 120,000 no profit [Principles of PM, pp 229-232] |
| Fragnet/subnet | Subdivision of a project network diagram usually representing a sub project; used when project has identical or nearly identical features |
| Free float | Time delayed from early start without delaying ES of immediately following activities |
| Gantt | Easy to use, report status, start stop dates, no interdependencies or impact of task change |
| GERT | Allows conditional and probabilistic treatment, allows loops |
| Hammock | An aggregate or summary activity |
| Hanger | An unintended break in network path, usually caused by missing activities or missing logical relationships |
| Herzberg | Motivational theory (content): Hygiene Factors (admin policies, working conditions, salary, personal life, relationships, status security) vs. Motivating Agents (recognition, work content, responsibility, professional growth) |
| Heuristics (integration) | Probability of completing project is lowest and risk/uncertainty highest at beginning; cost & staffing lowest at beginning; ability of stakeholders to influence cost and final product highest at beginning. |
| Heuristics (time) | Each time resources are doubles see 50% improvement in schedule; last 10% of budget involved 30% of the total project; allocate scarce resources to the critical path first |
| Human Resources Management | The art and science of directing and coordinating human resources throughout the life of a project by using administrative and behavioral knowledge to achieve predetermined project objectives of scope, cost, time, quality, and participant satisfaction. |
| Integration | Project Plan Development, Project Plan Execution, Integrated Change Control |
| Interface management | Identifying, documenting, scheduling, communicating, and monitoring interfaces related to the product and project |
| Invoice | 2/10 net 30; total due in 30 days, 2% discount if paid in 10 days |



Study sheet created by Karen Walkup
2002

## Terms and Definitions

| TERM | INFORMATION |
|---|---|
| IRR | **I**nternal **R**ate of **R**eturn, The value of *r* that results in zero NPV, % rate that makes the present value of costs = to the present value of benefits |
| Ishikawa | 7 tools of statistical quality control for root cause analysis |
| Juran | 10 steps to quality improvement |
| Kaizen | Make small improvement every time a process is repeated |
| Kanban | Allowing work to move forward only when the next work area is ready to receive it |
| Kinesic | Body language |
| Lag | Creates delay or gap, can lengthen duration |
| Lead | Creates schedule overlap that can shorten duration |
| Leading/Leader | Establishing direction, aligning people, motivation and inspiring. |
| Management Reserve | Change in project scope and cost baseline |
| Management Styles | Autocratic (dictatorial) - low risk well defined projects; Laissez-faire (anything goes) - R&D projects; Democratic (participative) - most effective, not quick |
| Managing | Consistently producing key results expected by stakeholders |
| Maslow | Hierarchy of needs - Physiological, safety, social esteem, self actualization |
| Mathematical analysis techniques | CPM, PERT, GERT |
| McClelland | Achievement motivation - Achievement, power, affiliation/association |
| McGregor | Theory X/Y |
| Median | The point at which the sample is divided into two equal halves (middle value), if even average of 2 middle numbers |
| Monte Carlo Analysis | Schedule risk assessment - calculates a distribution of likely results; statistical tool for budget, schedule and resource allocations |
| Near critical activity | Activity that has low total float |
| Negotiation techniques | deadline, surprise, limited authority, missing man, fair and reasonable, delay, reasoning together, confusing the opponent, withdrawal, unreasonable, arbitration, fait accompli |
| Network analysis | CPM, PERT, GERT |
| Operational Definitions | Metrics |
| Order of precedence | Schedule, representations and other instruction, contract clauses, other documents (exhibits, attachments, SOW), specifications |
| Parametric | square footage |
| Pareto's principle | 20% account for 80% of problems |
| PDM | **P**recedence **D**iagramming **M**ethod, activity on node; activities are linked by precedence relationships to show the sequence of activities, also called arrow on node (AON) |
| Performance measurement baseline | Change only intermittently, usually in response to scope change |
| PERT | Event oriented network analysis technique, used to estimate project duration when there is a high degree of uncertainty with individual duration estimates, applies CPM |
| PERT expected value | Used for R&D; used to estimate project duration |
| Planned Value | Planned budget, sum of approved cost estimates, cost performance measurement baseline, previously BCWS |
| Power Sources | Formal (positional), Reward (power to give rewards), Penalty (power to provide negative consequences), Expert (recognized level of skill or knowledge), Referent (admiration & loyalty) |
| Present Value (PrV) | Value today of future cash flows PV = Mt/(1+r)t M = amount of payment t years from now, r = interest rate, t = time period |
| Privity of contract | Contractual relationship between buyer and prime contractor |
| Process theories | Theory X/Y, Contingency, Goal setting, Expectancy, Reinforcement, Equity |
| Product Scope | Measured against product requirement |

## Terms and Definitions

| TERM | INFORMATION |
|---|---|
| Project Communications Management | Communication Planning, Information Distribution, Performance Reporting, Administrative Closure |
| Project control | Schedule, Budget, Resource allocation |
| Project Coordinator | Staff function - authority to assign work and act as communications channel, shares authority with the sponsor, small to medium size projects |
| Project Cost Management | Resource Planning, Cost Estimating, Cost Budgeting, Cost Control |
| Project Expediter | Functional position acts as a staff assistant to a Departmental manager who has ultimate responsibility for the project - functions as a facilitator, low risk/low cost projects |
| Project HR Management | Organizational Planning, Staff Acquisition, Team Development |
| Project Integration Management | Project Plan Development, Project Plan Execution, Integrated Change Control |
| Project Life Cycle | Concept, Development, Implementation, Control, Close Out |
| Project Life Cycle Planning | Spend 25% of time |
| Project Plan | Charter, Approach, Scope Statement, WBS, cost estimates, responsibility assignments, scheduled start dates, schedule & cost, performance baselines, major milestones & target dates, key staff, major risks, subsidiary management plans, open issues |
| Project Plan is used to: | Guide project execution, Document project planning assumptions, Document project planning decisions, Facilitate communication among stakeholders, Define key management reviews as to content context and timing, Provide baseline for progress measurement and project control [PMBOK p. 43] |
| Project Procurement Management | Procurement Planning, Solicitation Planning, Solicitation, Source Selection, Contract Administration, Contract Close Out |
| Project Quality Management | Quality Planning, Quality Assurance, Quality Control |
| Project Risk management | Risk Management, Risk Identification, Qualitative Risk Analysis, Quantitative Risk Analysis, Risk Response Planning, Risk Monitoring and Control |
| Project Scope | Measured against project plan |
| Project Scope Management | Initiation, Scope Planning, Scope Definition, Scope Verification, Scope Change Control |
| Project selection - benefit measurement | Scoring models, comparative approach, benefit contribution or economic models |
| Project selection - constrained optimization | Mathematical models |
| Project selection - generalized techniques | Decision trees |
| Project selection models | Benefit measurement methods, Constrained optimization methods, Generalized techniques (decision trees) |
| Project Time Management | Activity Definition, Activity Sequencing, Activity Duration Estimating, Schedule Development, Schedule Control |
| Pure Risk | Insurable, building damages; involves only a chance for loss and no chance for profit |
| Quality | Goal of 3-5% of cost devoted to quality |
| Quality | Conformance to specifications and fitness for use |
| Quality control | Focuses on correctness |
| Random causes | Normal process variation |
| Range | High value minus low value |
| Resource Leveling | Any form of network analysis in which schedule decisions (start and end dates) are driven by resource concerns |
| Responsibility matrix | Identifying interface points - tool to manage resources |
| Risk - Avoidance | Risk not accepted |
| Risk - Reduction (control) | Most common - plan to mitigate |
| Risk - Retain | Decision to accept risk |


Study sheet created by Karen Walkup
2002

## Terms and Definitions

| TERM | INFORMATION |
|---|---|
| Risk - Transfer (deflect) | Share with another - e.g. contractor |
| Risk analysis/assessment | Identification and Quantification |
| Risk Averse | <EMV |
| Risk management | Risk Response Development & Risk Response Control |
| Risk Neutral | Equals to EMV |
| Risk Seeking | > EMV |
| Rolling wave planning | Provides progressive detailing of the work to be accomplished throughout the life of the project |
| S Curve | Cumulative costs, labor hours, etc, plotted against time |
| Sample - variable sampling | Characteristic or property that can be measured |
| Sampling - acceptance | Select sample size, determine # of defects per lost - inspect |
| Sampling - attribute | Yes/No - visual defects |
| Sampling - special attributes | Continuous sampling, chain, skip-lot |
| Scope | Sum of products and services |
| Scope change | Affect performance measurement baseline |
| Scope Verification | Focuses on Acceptance; Output of Scope Verification |
| Shingo | Just In Time, Zero Quality Control |
| Slack | Used in PERT for float |
| Solicitation Planning | Documenting product requirements and id potential sources |
| Source of Conflict by Phase | Concept - project priorities & admin procedures; Planning - project priorities and schedules; execution - schedules & technical issues; Close out - schedules & resources |
| Special causes | Unusual events |
| Specification | Performance is what, technical is how |
| Standard Deviation | 6 sigma (-3 to +3) 1 = 68.26%, 2=95.46%, 3=99.73%, as sample size increases standard deviation decreases |
| Standard Deviation | Square of the variance; larger the SD greater its variability and risk; more time allowed with higher SD |
| Strategic planning | Top Down, 5 or more years |
| Subsidiary Change Control | Scope Change Control, Schedule Change Control, Cost Change Control, Quality Control, Risk Change Control, Contract Administration [PMBOK p 48] |
| Sunk costs | This type of cost includes dollars already invested in the project. These costs are out of the Project Manager's control and beyond the project's budget; therefore, regardless of what is done, sunk costs cannot be recovered and will not affect the project's outcome. |
| Tactical planning | Bottom Up, 1-3 years |
| Taguchi | Quality designed in not inspected, Minimize deviation from target, Cost of Quality |
| Taguchi/Ishikawa | Process Analysis method (cause and effect) |
| Trend analysis | Relationship between 2 or more pieces of corresponding data, plotted on x/y chart |
| VAC | **V**ariance **A**t **C**ompletion, BAC-EAC = best estimate of project costs |
| Variance | Planned-Actual, % of variance (variance amount/planned)/100 |
| Variance | Scattering of #s around the mean |

# Formulas

| | |
|---|---|
| **COST FORMULAS** | |
| CV = Cost Variance | **EV - AC** |
| A negative variance indicates a cost overrun | BCWP-ACWP |
| (+ under budget, - over budget) | |
| | |
| SV = Schedule Variance | **EV - PV** |
| (> 0 = ahead of schedule; < 0 behind schedule) | BCWP-BCWS |
| | |
| If CV is positive and SV is negative | Either the task has not started or it has started and not enough resources have been applied |
| If CV is negative and SV is negative | The costs are overrun and the schedule is slipping |
| If CV is negative and SV is positive | This indicates that money was spent to crash the schedule |
| If CV is positive and SV is positive | The project is under budget and ahead of schedule |
| | |
| CPI = Cost Performance Index | **EV/AC** |
| (=1.0 perfect performance, < 1.0 poor, > 1.0 exceptional) | BCWP/ACWP |
| How efficient is my cost | |
| | |
| SPI = Schedule Performance Index | **EV/PV** |
| (-1.0 perfect performance, <1.0 poor, > 1.0 exceptional) | BCWP/BCWS |
| How efficient is my schedule | |
| | |
| EAC = Estimate At Completion | **AC + ETC** |
| | This formula is used when past performance shows that the original estimating assumptions were fundamentally flawed or that they are no longer relevant because of a change in conditions; Actuals to date plus a new estimate for all remaining work. |
| | **AC + (BAC - EV)/CPI (where CPI is cumulative CPI)** |
| | This formula is used when current variances are seen as typical of future variances; Modified by a performance factor. |
| | **AC + BAC - EV** |
| | This formula is used when current variances are seen as atypical and Project Manager's team expectation is that similar variances will not occur in the future; Actuals to date plus remaining budget (BAC-EV) |
| | |
| ETC = Estimate to Complete | **BAC - EV** |
| | (BAC-BCWP) /CPI |
| BAC = Budget at Completion | Sum of total project budget |
| | |
| VAC = Variance At Completion | VAC = BAC - EAC |
| How far off will I be at the end of the project? | |
| | |
| CV% = Cost Variance Percentage | CV% = CV/EV*100 |
| How far off is my cost? | |
| | |
| SV% = Schedule Variance Percentage | SV% = SV/PV*100 |
| How far off is my schedule? | |
| | |
| VAC% = Variance At Completion Percentage | VAC% = VAC/BAC*100 |
| | |
| **Variable and Type** | **Earned Value Description** |
| PV = Planned Value (BCWS) | The cost of what I planned to get done |
| EV = Earned Value (BCWP) | The value of the work actually done |
| AC = Actual Cost (ACWP) | The totals of costs incurred in a given period |
| | |
| **Other Formulas** | |
| Straight Line Depreciation | Cost- Salvage/Time |
| Double Declining Balance | Double the SL Depreciation; $ X original cost - accumulated depreciation |
| Sum of Years (SOY) | (Cost-Salvage) X year/sum of years (3-2-1/6) |
| | |
| Future Value | D(r+1) to the # of periods |
| Simple Interest | Interest = Principle X Rate X Time |
| Compound Interest | FV (Future Value) = Deposit (1 + rate) ; Principle/ (r+1) to the # of periods |
| | |
| Communication Channels | # Of Team Members (t) X (t-1)/2 |
| | |
| Expected Value | Optimistic + (4XMost Likely) + Pessimistic/6 |
| Standard Deviation | Optimistic-Pessimistic/6 (one deviation is the difference between EV and SD) |
| Standard Deviations | 68.26, 95.46, 99.73 |
| | |
| Variance | Planned - Actual; % Variance = Variance/Planned |
| | |
| EMV = Expected Monetary Value | probability X amount of Stake (probability is frequency/# of possible; amount at stake = cost of loss and least cost to restore |
| | |
| NPV = Net Present Value | Initial payment of 12,000, annual discount rate of 10-% cost or revenue/(1-r) to the t |
| | Sometimes called discounted cash flows, assumes that there is a minimum desired rate of return and that all future cashflows are discounted to the present time. It is the sum of all the discounted cash flows, both outgoing and incoming, over the life of the project. |
| | If the NPV is a positive value, the project is desirable, and if negative, the opposite would be expected. |

# ORGANIZATIONAL STRUCTURE INFLUENCES ON PROJECTS

| Project Characteristics | Functional | Weak Matrix | Balanced Matrix | Strong Matrix | Projectized |
|---|---|---|---|---|---|
| Project Managers Authority | Little | Limited | Low to Moderate | Moderate to High | High to Almost Total |
| % of Performing Organization's Personnel Assigned Fulltime | Virtually None | 0-25% | 15-60 % | 50-95% | 85-100% |
| Project managers Role | Part-time | Part-time | Full-time | Full-time | Full-time |
| Common titles for Project Managers Role | Project Coordinator/ Project Leader | Project Coordinator/ Project Leader | Project Manager/ Project Officer | Project Manager/ Program Manager | Project Manager/ Program Manager |
| Project Management Administrative Staff | Part-time | Part-time | Part-time | Full-time | Full-time |

Study sheet created by Karen Walkup

# TYPES OF CONTRACTS

| | |
|---|---|
| CPPC | **C**ost **P**lus **P**ercentage of **C**osts, Buyer assumes risk, provides for reimbursement to the contractor for allowable costs due to contract performance. Additionally, the contractor receives an agreed-upon percentage of the estimated costs as a profit. Although prohibited for in federal government, used in private, particularly construction industry [Principles of PM, pp 229-232] |
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| FPIF | **F**ixed **P**rice **I**ncentive **F**ee, The most complex type of contract, which is composed of a target cost, target profit, target price, ceiling price, and share ratio, usually used when contracts are for substantial sum and involve a long production time. This enables the seller to develop production efficiency during the performance of the contract. target cost 100,000, target price 110,000, target profit 10,000, ceiling price 12,000, share ratio 70/30; if cost above 120,000 no profit [Principles of PM, pp 229-232] |
| FFP | **F**irm **F**ixed **P**rice, It is an agreement where the contractor agrees to furnish supplies or services at a specified price that is not subject to adjustment because of performance costs. It is best suited when reasonably definite production specifications are available and costs are relatively certain. Lump sum - used most often; Seller has most risk [Principles of PM, pp 229-232] |
| T&M | Time and Materials, Hybrid type of contractual arrangement that contains aspects of both cost-reimbursable and fixed-price-type arrangement. Based upon performing a prescribed amount of work, previously agreed upon by both the seller and buyer, where the seller is paid for amount of time it takes to accomplish the work. The seller also provides, but is reimbursed, for the materials to complete the work. |