

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CIVIL AND ENVIRONMENTAL ENGINEERING DEPARTMENT
CENTER FOR CONSTRUCTION RESEARCH AND EDUCATION

1.040/1.401
SYSTEM & PROJECT MANAGEMENT
SPRING 2004

**TERM PROJECT PHASE 3:
DATA COLLECTION**

DUE: APRIL 28, 2004

CENTER FOR CONSTRUCTION RESEARCH AND EDUCATION
CIVIL AND ENVIRONMENTAL ENGINEERING DEPARTMENT
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

I. DESCRIPTION

Term Project 3 is the final data-collection exercise for your term project. At this phase, you have to choose one of the two projects you proposed in Term Project 2, and gather extensive information on it. Because of this, you will NOT be required to submit a polished report. For this phase you may submit hard copies of your raw data in any form (this may include copies from project reports, proposals, computer printouts, screen shots or memos)—See note on confidentiality below. However, if you choose to submit hardcopies, they must be submitted to Professor no later than 1pm Wednesday, April 28. Remember that your objective here is to collect as much data as is necessary to support your arguments and analysis in the term project Part 4, and NOT to prepare a polished report.

The following questions are intended to guide and direct your data collection. Try to gather information that answers these questions, either in its initial (raw) form, or after some interpretation or analysis.

II. PROJECT EVALUATION

- What were the major anticipated achievements of the project and what resources were thought to be required in order to obtain those benefits (social, financial, strategic).
- Quantify Benefits (as \$ or utility) if possible.
- What activities were undertaken to evaluate the project?
- If the perceived benefits changed during the course of the project, how and why did they change?
- How realistic and relevant were the project goals and objectives?
- What changed as a result of the project?
- Are there more cost-effective ways to achieve the project's objectives?
- Feasibility Analysis
- Develop success indicators and their measures
- Identify technology, cost and schedule risk
- Identify Environmental Factors and risks
- Challenge potential risk & benefit buffers and sources of flexibility

III. PROJECT ORGANIZATION:

- Contractual arrangements with general contractors, suppliers, sub-contractors, and other internal organizations.
- Project organization requirements and selection process.
- Organizational type. If applicable, please include any external organizations such as clients, focus groups, consultants, and research groups that interacted with the main organizations. Also include the frequency, type of interaction, and rationale of the interactions.
- Process used to forge the organizational structure.
- Organizational Breakdown Structure (OBS).
- Management of personnel and flow of personnel into the project.
- Work Breakdown Structure (WBS).
- Leadership style and source of power on the project.
- Linear responsibility chart for the individuals and tasks on the project.

- Span of control for each manager on the project.
- Evaluation measures and reward system for members of the project.

IV. PROJECT PLANNING:

- Original estimated cost and Cost Breakdown Structure (CBS).
- Did the project have a project plan prior to the start of the project?
- Method used to establish budget (e.g. top-down, bottom-up, or combination).
- Original estimate of effort (e.g. person hours, and number of drawings).
- Original Estimated Completion Date.
- Original Schedule (see Note on Project Plan below).
- Life Cycle Analysis for the system and any decisions or analyses (e.g. cost estimates, revisions over time) made based on it.
- Resource profile with respect to time throughout the project including direct and indirect cost information.
- Information sources for estimating and planning.
- Learning considerations on the project.
- Describe any deterministic or stochastic estimation procedures.
- Criticality indices for activities or paths according to ABC categories.
- Planned stop and start conditions for any activities (i.e. splitting).
- Procedures for activity aggregation (e.g. based on Hammock activities, milestones, WBS, OBS, or dollar amount).
- Technical, procedural, or imposed precedence relationships or constraints considered to be driving factors.
- Lead or lag in important precedence relationships such as FS, SS, SF, FF.
- Describe the project simulation techniques used (if any).
- Describe any known looping in any activity or very erratic activities with rework and changes.
- Any overlapping or concurrent engineering practiced on the project including the effects of work progress and sensitivity from downstream and upstream activities.

V. PROJECT MONITORING

- Review Processes including type of review, review frequency, format, personnel involved, review results and follow-up.
- Earned Value Analysis including frequency and any decisions made based on it.
- Strategy used to monitor buffers and/or float.
- Methods of variance tracking.
- Effects of other projects on resources, time, or technology.
- A description of any performance measurements that the project used. Assess the usefulness of the measurements and look for correlation between the values of the measurements and the success or failure of the project.
- A description of any risk management techniques that were used during the program. Discuss the "return on investment" between the effort spent on the techniques and benefits of the risk program.
- How was the technical baseline managed?
- Direct cost of any added work and/or scope/program changes.
- Types of conflicts on the project and how they changed over time.

VI. PROJECT CONTROL:

- Process of committee decision-making.
- Use and effectiveness of committees.
- Describe any reorganizations that took place during the project and why (e.g. work changes or project evolution).
- Describe the delay classification, analysis, management and responsibility assignment methods used on the project for the main organization, clients, sub-contractors, and consultants.

VII. POST PROJECT LEARNING:

- Final or forecasted, actual project cost.
- Final or forecasted Completion Date.
- Actual required effort (e.g. person hours/days/weeks/months and no. of drawings) so far or forecasted.
- Percentage of final effort that was rework so far or forecasted.
- Of the degradation in productivity and/or work quality from optimal over the course of the project, what percentage was due to:
 - Prior work quality (in phase)?
 - Availability and/or quality of work from other phases?
 - Availability and/or quality of work from vendors, suppliers, and sub-contractors?
 - Skill and experience dilution?
 - Out-of-sequence work?
 - Schedule pressure?
 - Morale?
 - Overtime fatigue?
 - Scope changes?
 - Owner initiated changes? Contractor initiated changes? Designer initiated changes?
 - Others?
- Ratio of the number of revisions to the original work.
- Key factors contributing to the successes and failures of the project.
- Identify an area in which a model could have been developed for an uncertain or problematic task.
- Describe any repetitious work over time or at different locations in which line of balance could have been applied.

Provide a description and analysis of the project on how you may have improved the project to avoid some of the problems that occurred and strengthen the successes that were achieved.

While completing this task, please bear in mind that the objective is to provide enough information about the project so that a project manager not familiar with it may be able to review the material and have a clear understanding of the project's history. A good frame of reference for your data collection is to assume that the information you provide will be read by a new project manager who will take charge of the project. Also bear in mind that the story has to flow and be clear to the person reading it.

Notes on Data Collection:

1. Obtain information for major work phases or activities where relevant/possible
2. Use interviews and/or best-estimates where hard data is not readily available.
3. Think of interesting information that one may want to know about the project. Talk about a situation that may be interesting, challenging or unique. Identify a protagonist who addresses the situation. Talk about what happened and what could have been done in that situation by the protagonist. Identify at least one situation, protagonist and solution for each major area of evaluation, organization, planning, monitoring, control and learning.

Note on Confidentiality:

If the project you are working on contain proprietary information, or any sensitive information, you should protect this information as requested by the project manager working on the project. Some alternatives are to scale the data so that in a relative sense they are equivalent or you could also use percentages without a base number.

Note on Project Plan:

When developing and/or describing your project, please limit your overall analysis and presentation to Levels 1 and 2 as shown in the figure below. Extend your analysis to Level 3 (i.e. more in depth analysis and greater detail) when presenting issues that contained (or are anticipated to contain) high degrees of uncertainty or were (or anticipated to be) particularly challenging or important so that the individual reviewing your material has a good sense of the details and how they relate to the overall project.

