

FITECO

(Fire Termination Equipment Corporation)

PROJECT PLANNING MANUAL

Date 30-Oct-2010

SUMMARY

This Manual defines the “project plan” used by the Fire Termination Equipment Corporation (FITECO). It includes specifications on the constituents of the plan and presents suggestions on how to prepare an effective plan.

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1.INTRODUCTION

Every project at FITECO, no matter how large or small, requires a project plan. The plan must be produced and approved by the Project Manager and those to whom s/he reports before work begins on the project. Furthermore, as the project matures the plan must be updated to reflect current planning on a reasonable cycle, e.g., monthly.

Small projects might only have one page or two for a project plan. Larger projects will possibly have hundreds of pages making up their project plans.

There are many written works on how to prepare a project plan. The “references” page lists a few. This manual is not intended to replace such works; it is, however, a specification of requirements to be met by project management at FITECO and by others that will prepare project plans and submit them to FITECO as proposals.

Many will agree that software development has special project management, planning and control needs. Reference 3 has become the standard manual for software project management and augments this manual very well in presenting powerful techniques and

rules needed to control software development. The Reference is probably out of print. If a copy cannot be found, contact FITECO management.

2. THE PROJECT PLAN

Every project needs a plan. The plan is reviewed and approved by management and the “customer,” whether the customer is external to the company or an internal department instigating and usually funding a project. Work on a project should never begin before its plan is approved.

The plan is then used as a monitoring tool with actuals plotted against projected performance and expenditure. Typically the plan (or components thereof) is periodically sent to the customer, including the comparisons of the actuals vs planned and the projections.

By definition every project must have a single project plan. It is this plan which is of primary interest to the customer and the company management. This is true even in the case of a large, complex project which may be broken up hierarchically into smaller subprojects. The breakup of a large project into subprojects may be for the convenience of the project manager or it might be required by a customer. The fact that each subproject is managed as if it were a separate project does not obviate the need for overall project plan for the project. The project manager is responsible for maintaining consistency of format, style, and content between the overall project plan and the plans for the subprojects.

2.1. Why Plan?

There are many essential payoffs that come from planning:

- When a plan is prepared properly the process gives planner(s) a preview of a project’s idiosyncrasies: special needs, potential problems, etc. are often revealed giving management an important chance to avoid problems before they occur. A good planning exercise almost always leads to significant changes in approach compared to the one that was initially envisioned. The planning process is essentially a simulation of the project revealing most of its dynamics before the project work is even started.
- The plan is the primary tool that management uses to measure the health of a project. When progress is not the same as the plan it is an important warning to management that action is needed. The plan helps such warnings to come early so that there are still money and time available to the project to correct problems before they become irreversible.
- Plans can often become quickly irrelevant as knowledge is gained about a project, especially in Research and Development (R&D) projects. That requires

replanning and, again, management has an opportunity to rethink the project in light of the new knowledge and to prepare an even better plan.

- The project plan provides most of not all of the information most customers and upper managers will want to receive in progress reports and reviews.

While the list above reveals the benefits of planning, each item has its antithesis if there is no plan. Without a plan the project is often coordinated improperly with tasks being attacked in sequences that are failure-prone. And problems on a project are often not identified until resources are too far gone to permit constructive changes leading to success. If the excuse not to plan was to save time or money it is almost always discovered later that most of the work needed to plan in the first place usually has to be done to report progress (or lack thereof) to the customer or management.

2.2.Components of a Project Plan

A project plan includes the following:

2.2.1.Statement of Work (SOW)

The SOW is the document which specifies the work that must be done and what the customer expects from the project. The company is contractually obligated to satisfy the requirements of the SOW; it is therefore an important document. The detailed planning of the project must be guided strongly by the SOW.

2.2.2.Specification of Deliverable End Items

The final product(s) to be delivered to the customer as a result of the effort are listed as deliverable end items in the contract. Usually, these items are delivered at various stages throughout the project life rather than all at the completion stage of the effort.

2.2.3.Work Breakdown Structure (WBS)

The actual implementation of the SOW is done by generating a WBS which is a separation of each task in the SOW into detailed subtasks. A carefully thought out and organized WBS is crucial for tracking the progress of the project to a successful completion. In particular, a good WBS has the following attributes:

- i. subtasks are defined such that unambiguous allocations of resources can be made by subtasks.
- ii. high risk components of the project (if any) are separated out as subtasks, and designated as risk items
- iii. the project can be time scheduled by subtasks
- iv. subtasks that culminate in deliverable end items can be identified

2.2.4.Milestones

Milestones are clear specifications of the demonstrable items that will appear as a result of (and as proof of) completion of each subtask in the WBS. This is especially important in the completion of high risk subtasks. Delivery of a specified “end item” is always a milestone, but subsidiary milestones are invariably defined by the Project Manager for purposes of project control and monitoring. Design review meetings are usually incorporated in the plan, for example, as milestones.

2.2.5.Labor Hour Loading by Task and Grade

After the preparation of the WBS and associated milestones the labor hour loading chart is prepared. This instrument specifies, for each subtask in the WBS, the number of hours needed from each labor “grade”. Labor grades are categories of disciplines or skill levels. For example, “Senior Electronics Technician” may be defined as labor grade “E”. Sometimes grades associate with specific individuals while in other cases a number of specific individuals may be able to perform the duties associated with the grade.

There is often much confusion between the “labor hour by task and grade” display and the project time schedule. When preparing the labor schedule only resource needs are considered. The scheduling of these resources with time comes later. Planners sometimes have great difficulty preparing the labor loading chart because they let preconceptions about labor grade availability influence the process. The process of planning the needed labor resources should be conducted with only the WBS in mind.

2.2.6.Schedule of Direct Labor Costs

Total labor hours by grade is excerpted from the schedule of Labor Hour Loading by Task and Grade (item 5, above) and placed on the Schedule of Direct Labor Costs. The hours are multiplied by labor hourly rates and summed on this schedule to get the total planned direct labor cost for the project. The labor hourly rates used for arriving at the direct costs do not necessarily correspond to the salary rates of individuals in the company.

Labor rates will be supplied by company management if they apply to labor grades already in the company work force. The project manager may have to contact human resource departments or do various searches to determine what current labor rates apply to grades to be hired or contracted in the future for the project.

2.2.7.Schedule of Other Direct Costs (ODC)

Materials and purchased outside services (or any other items not covered by inhouse labor resources) are itemized on this schedule showing price quotes or cost estimates for all items. The final material and ODC cost sums are used later in the preparation of the project cost plan.

2.2.8. Time Schedule

FITECO uses Gantt charts to depict the time schedule. Horizontal bars are used to indicate the duration of time required to complete each item in the WBS. Additionally, milestones are depicted by appropriate symbols on the time schedule, showing times of completion. High risk subtasks should be shown executed and verified as early in the schedule as practicable.

The time schedule is submitted in periodic reports of progress to upper management and also possibly to a customer as the project moves along. The status of the project is indicated by suitable codes on the chart. For example, hollow bars can be shaded to graphically depict completion percentages of each subtask. Hollow triangles or other symbols can be shaded when milestones are demonstrated. (Computerized charts may use other codes to show completion status). Used in this way, the time schedule is both a planning and a monitoring tool.

The time schedule is easy to lie about. It is essentially a mathematical result of other parts of the plan including labor resource estimates by grade, the available quantity of resources vs time and the “linking” of tasks in the WBS. Linking defines the sequence in which tasks must be completed. Many tasks cannot be started, or they cannot be completed, until other tasks are complete. These links constrain how resources can be applied to tasks. Availability limits on resources also constrain the schedule in important ways.

Special project management computer programs are needed to enforce the mathematical reality of the time schedule so that resources are applied consistently with their availability and task sequence requirements are met.

Managers/planners are often tempted to divide the total number of labor hours available per week into the total needed hours to define the time schedule. That can be disastrous! The REAL schedule can often be 4 times or more longer than one that does not consider the constraints. That is why time scheduling should always be done using project planning software as described in a separate section, below.

2.2.9. Summary Cost Plan

This plan is usually presented as a graph of projected cost (in dollars) vs time. Costs cover Direct Labor and Other Direct Costs (ODC). In the cost plan the dollars allocated for labor hours and ODC should be shown as separate items, for convenient cost following during the life of the project. It should be noted that the cost plan does not include profit. Also (although this may vary from project to project) the cost plan usually does not include overheads- only direct costs.

2.3. Pitfalls in Planning

The importance of a realistic and well thought out project plan cannot be overemphasized. The often quoted phrase, “failing to plan is planning to fail” is very

appropriate in project planning. Often, the reason for a project running into trouble can be traced to poor planning.

Following are typical pitfalls in project planning:

1. Casual Planning: The temptation to draw up a project plan in a hurry must be avoided. Project planning must be taken seriously, and deserves the allocation of adequate time and effort.
2. Lack of Detail/Excessive detail: A plan which is not sufficiently detailed makes it impossible to track the progress of the project either in performance or cost. On the other hand, an excessively detailed plan is a meaningless exercise in planning.
3. Unrealistic Expectations: A plan which relies for success on unrealistic estimates of the availability of resources (quality and quantity of labor, hardware, software etc.) is guaranteed to fail. The candidate project manager's assessment of what it takes to execute a project must be as realistic as possible.

3.KEEPING PLANS CURRENT

Some salient quotes:

Plans are of little importance, but planning is essential – Winston Churchill

Plans are nothing; planning is everything. – Dwight D. Eisenhower

It's tough to make predictions, especially about the future – Yogi Berra

The point is: planning is essential but plans must change as a project moves along toward completion. As a project progresses and more is learned about its challenges and solutions it becomes very clear and very soon that the initial plan no longer works. In fact, any attempt to force the initial plan onto the project and demand the obsolete plan be followed can be very harmful to the project. This is often done by poor managers.

The initial plan gives the manager and all members of the project team a clear view of what to do NOW, what the objectives are, what the cost and schedule targets are, what “completed” looks like and so on. But when more is learned the directions on many fronts will need to change.

The project plan will therefore need to be updated on a regular basis. The results can often be dramatic. People might be assigned to different tasks. Some tasks might be dropped altogether while new ones are born. The sequence or order of work can often change (called “task linking” in the project management software parlance), etc.

4.COMPUTER TOOLS FOR PROJECT PLANNING

The specifications for the project plan presented in previous sections can be satisfied using either manual or automated methods. When this manual was first written a program called “Super Project Expert” or “SPJ” was used. SPJ ran on IBM and compatible PC/AT computers. SPJ receives the WBS, labor and fixed resource definitions, etc., and generates many of the schedules required by the specifications of Section 4.

Since the early versions of this manual were written the SPJ program has dropped out of sight and is evidently no longer supported or marketed. The program called “Microsoft Project” (Reference 2) came along later and has evidently taken over the world for use as a standard project management computer program. The functions and displays of SPJ and Microsoft Project are quite similar. The most important thing that these programs do is “level” resources. They receive a definition of resources (e.g., labor hours vs skill level or “labor grade”) and ensure that these resources are only used at the daily level available. [For example, they don’t allow one person to work 50 hours a day because the rest of the plan needs it as do human planners from time to time!] An optimization algorithm minimizes the time schedule required based on specified resources and the rest of the plan.

Thus, even though manual planning is possible, it is extremely time-consuming if a correct schedule is to be produced. The computer software is a powerful aid to planning.

As mentioned before, the time schedule that first comes out of the project planning software is often much different than expected. In fact, it can be a total shock to the planner! It is almost always the case that the project will go through several phases of replanning before a schedule is produced that is acceptable to a customer. The replanning cycles often involve very dramatic changes: decisions to descope, plans to contract some of the work out, changes in hiring plans, redefinition of requirements and specifications, etc. The plan that emerges from this process will be much stronger and more realistic than the original plan but will often look very little like the original!

5.TECHNIQUES FOR PROJECT PLANNING

Experienced project planners have their special techniques for preparing plans that can guide a project to success. This section presents a few of them.

5.1.Being Realistic

Realism is often hard to come by but essential to project planning. As a planner gains experience s/he tends to develop intuitions about what it REALLY takes to do things and what estimates are simply too little too late.

For example, many planners don’t like to see something like 2 hours being allocated for a WBS task. They will point out that nothing ever gets done in 2 hours. By the time the worker refreshes his/her memory on what is to be done, goes to get a cup of coffee (or 2),

uses the washroom, completes documentation of the task which is always necessary, etc., 2 hours are gone and the job is not done. It simply does not pay to be unrealistic. It just leads to trouble later.

There are many hidden tasks that the experienced planner will be sure to include. For example: management. Part of a project is managing it- preparing plans, policing documentation, going to meetings, etc. Putting adequate resources in a plan to cover management is often neglected.

Documentation is another activity that is often shortchanged in planning. But it will often represent the most important product of the activity! Documentation should never be neglected and time to do it should be generously allocated.

And meetings—they are often called ad-nauseum by management and/or customers. Agreements with management must be made to constrain the time going into meetings by personnel working on projects before a project plan is approved and before work on a project begins. If management defaults on the agreements (which often happens) the project manager must then confront the issue and renegotiate the plan. Otherwise the project will get into trouble!

5.2. Project Organization- Putting Risky Tasks First

The good project planner organizes a project for maximum success. S/he partitions the tasks carefully and evaluates the risk to successful completion of each task. High risk tasks are attacked first if at all possible to allow a maximum time for recovery in case unforeseen difficulties arise.

In contrast the poor project manager performs the easy and comfortable jobs first and leaves all the hard stuff until last. S/he pretends the real items are not there and allocates excessive resources to easy “fringe” items because they are fun and non-threatening.

5.3. Intermediate Deliverables

An important thing to do in a project plan is to clearly define what “done” looks like! A good project planning practice is to plan for intermediate deliverable items to prove that subtasks have in fact been completed. These intermediate deliverables should be specified in sufficient detail and scope to fully demonstrate completion. Items such as documentation often slip by only to become major (unexpected) elements of cost later. The intermediate deliverables should thus stress completeness. They should often involve some type of a test or an inspection to prove they are really there. It is amazing how often workers will advise that a task is complete only to admit later that something wasn’t tested or inspected, or necessary approvals have not been secured.

The experienced and perceptive planner will find ways to make those milestones solid, and using testable/provable deliverables is a way to accomplish this.

6. CLOSING REMARKS

The project plan is an essential management tool. It can make the difference between success and failure, for the project, and sometimes for the whole company. Its importance cannot be overestimated.

There is art as well as science in project planning. The new planner might find the process uncomfortable with many hidden mysteries. However, as experience is gained the planner develops important techniques and intuitions. Something that is planned unrealistically will often stand out dramatically to the experienced planner. The natural ability to add tasks to a project that must be done but might be forgotten or neglected by the inexperienced becomes well developed. Many subsidiary skills are developed by the planner too, making him/her a very important part of the whole organization's management structure.

Good project planners and managers are extremely valuable to any company. Such individuals are often in contact with upper management and the customer as well. So the skill can be a powerful seugway to promotion.

7. References

1. Gerard M. Blair, Planning a Project, [Planning a Project](#)
2. Microsoft Project; [Project Management Software](#)
3. Phillip Bruce and Sam Pederson, "The Software Development Project, Planning and Management," John Wiley, 1982 (The Silver Book).