# FRAMEWORKS FOR SELECTED ENGINEERING PROJECT MANAGEMENT REPORTS


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**Published by:** Feed Forward Publications (www.feedforward.com.au)
**Date:** October 2006
**Issue:** 1.0

# 1. INTRODUCTION

## 1.1 PURPOSE OF THIS BOOK

Businesses and projects rely on well-structured reports to ensure accurate communication about goals and objectives, requirements, designs, measuring and recording progress, etc. There is some truth in the saying that engineers don't make products, but that they make reports describing the products to be made by other members of the technical team. Unfortunately, many engineering and management reports are, for a variety of reasons, not conveying its message as clear as it should. In order to alleviate this problem - particularly for engineers and managers in the early stages of their careers – this book contains suggested **frameworks** for a selection of commonly used engineering project management reports. (Two other books by the same authors contain frameworks for *system engineering reports* and *general management reports*.)

This book is intended as a **reference guide**, from which ideas can be sourced about the typical structure and contents of commonly used engineering project management reports. The book does not provide blueprints for all reports that a project manager might ever have to write, but it provides **guidelines** which should be **tailored** and **adapted** by common sense and experience, in order to suit specific circumstances.

The philosophy underlying this book is: ***contents follow structure*** - i.e. first carefully think about, and decide upon a report's structure, and then systematically fill in the contents. It is often when bits and pieces of contents are randomly gathered and combined, that irrelevant ideas are included in a report. Many report writers are reluctant to discard good-looking and nice-sounding ideas, once it had been gathered with great effort. However, when a report structure is defined first, the gathering of information becomes focused, and unnecessary material is either not collected at all, or it can be filtered out systematically.

It is not suggested here that once a report structure had been chosen, that this structure may then never be changed. However, by having a baseline structure, systematic and rational changes - instead of haphazard ones - can be made to the structure, in order to ensure an effective report. Very few people would first build a house and draw up the plans afterwards, but this mistake is far too often made when engineering and management reports are prepared.

## 1.2 SCOPE OF THIS BOOK

This book is about ***frameworks*** for project management reports typically compiled in engineering businesses. It is neither intended as a handbook on report writing (refer to NAGLE 1996 for this), nor as a detailed textbook on project management. However, a few thoughts on the major generic

elements of reports and on report quality assurance are provided in this chapter; as well as a brief definition of project management.

The following types of reports are addressed in subsequent chapters of this book: *Contract Proposal; Project Plan; Progress Report; PERT (Program Evaluation and Revision Technique) Report*; *Trade-off Study Report; Technical Notes*; *and Minutes of a Meeting*. Each of these reports is briefly discussed in terms of its typical purpose and scope, followed by a suggested framework for the report.

## 1.3 GENERIC ELEMENTS OF A REPORT

This section provides an overview of the typical major elements of engineering and management reports. It is again emphasised that the layout and contents of each of these elements must be tailored to suit specific requirements.

### 1.3.1 TITLE PAGE

The title page of a report should typically show the report's title, the authors' names, the issue date, name of the organisation issuing the report, report reference number, revision status (edition number), and a list of people to whom the report is distributed.

### 1.3.2 EXECUTIVE SUMMARY / ABSTRACT

Providing a concise summary of engineering and management reports tells readers what the report is all about and enables them to ascertain whether the report contains relevant information for them, or maybe rather for someone else in their team. The summary should provide an overview of the whole report, and should not merely be a copy of the introduction or the final conclusions. It is normally included just before or just after the table of contents, but it might also be a section in the introductory chapter. After reading the executive summary / abstract, there should be no doubt in the reader's mind about:

- the reasons why the report was compiled;
- the issues addressed in the report; and
- the main conclusions and/or recommendations made in the report.

### 1.3.3 TABLE OF CONTENTS

Besides a normal table of contents, a list of appendices, a list of tables, and a list of figures and/or photographs, plus the relevant page numbers, can also be included in order to:

- provide the reader with an overview of what information is provided in the report by means of appendices, tables, figures, and photographs; and
- to make it easier for the reader to locate these when referred to in the text.

decision-makers, the author can ensure that the report is in line with the organisational goals and policies. To conduct a proper report review, it is essential to:

- review the report, and not its author;
- schedule report reviews as part of the project plan;
- issue the same version of the report to be reviewed, to all the reviewers;
- involve reviewers who can contribute to the improvement of the report;
- discuss the report and the comments in a structured manner;
- reach conclusions on all the important issues discussed; and
- note the decisions taken, for incorporation into a revised version of the report.

### 1.3.4 CONFIGURATION MANAGEMENT

It is important to formally keep track of a report's revision status, and to clearly indicate this on the report. Once a report had been issued, changes to the report should be made in a controlled manner. It can lead to chaos if different team members use different versions of a report. In large organisations, there is normally a documentation configuration management department whose task it is to keep track of a report's development and distribution status; and who formally controls any changes made to reports.

A useful practice to assist with document configuration management is to "number" draft issues of a report alphabetically (*Issue A, Issue B, Issue C*, etc.), and to number the real issues numerically (*Issue 1, Issue 2, Issue 3*, etc.). The "letter issue" reports are normally for internal use and still subject to major changes, while the "number issue" reports are the more final ones and for external distribution (if applicable). When only small changes are made to a "number issue" report, designations like *Issue 1.1*, *Issue 1.2*, etc. can be used.

## 1.4 PROJECT MANAGEMENT

A *project* is an organised combination of resources such as manpower (staff), materials, machines (equipment), and money - often called the 4 Ms - in an effort to translate an idea to a useful product or service. *Management* is commonly defined as embracing the following elements:

- **Planning** - requirements definition and -analysis, defining tasks to satisfy the requirements (work breakdown), when (scheduling), and with what (resources required / budgeting).
- **Organising** - choosing a suitable organisational structure and assigning responsibilities to organisational positions.
- **Staffing** - Filling the chosen organisational structure with the right people and keeping it filled.
- **Directing / Leading** - using aspects such as leadership, delegation, and conflict management to create a suitable work atmosphere, and to motivate people to do what needs to be done in the best possible way.
- **Controlling** - measuring actual performance, comparing it with desired performance, and taking

# 2. CONTRACT PROPOSAL

## 2.1 PURPOSE AND SCOPE OF A CONTRACT PROPOSAL

A *contract proposal* is a description of services and/or products offered to a client, and of the basic conditions under which these will be delivered by the contractor. The proposal can either be written in response to a client's *request for proposal (RFP)* or it can be an "unsolicited proposal" aimed at convincing a potential client of the need for the particular services / products. The aim of the report is to eventually let it form the basis for a contract between the contractor and the client.

The level of detail addressed in a contract proposal depends on factors such as the monetary value of the proposed contract, and the mutual trust between client and contractor. For very large contracts, the legal advisors of the parties involved will scrutinise the proposal carefully, and will draft an extensive contract. (It is often said, somewhat cynically, that a contract is merely the written expression of two parties' distrust of each other. This implies that unless there is a basic level of mutual trust between two parties, it is better for them not to do business with each other, instead of them trying to cover every potential loophole by means of a contract.)

## 2.2 FRAMEWORK FOR A CONTRACT PROPOSAL

**Exhibit 1** and **Exhibit 2** provide two examples of frameworks for a contract proposal. The first one contains a structure and brief descriptions of the required contents for each section; while the second example contains a somewhat different structure, but without the descriptions of the required contents. (Also refer to HELGESON 1994 for an extensive guide on writing contract proposals.)

**Exhibit 1: Framework for a Contract Proposal**

| **1. INTRODUCTION** |
|---|
| Describe the purpose and scope of the contract proposal, e.g.: *"This document contains a proposal by [Contractor name and address] for providing [description of services or products], to [Client name and address]. The intention is to let this document form the basis for an agreement between [Client] and [Contractor], regarding [Contractor's] role in providing the defined services (or products). This is the first (second, third, .....) round proposal, which is still open for discussion and adaptation, in order to suit [Client's] specific needs. (**OR**: This is the final proposal, following negotiations between [Client] and [Contractor]; and it now needs to be confirmed by means of an order placed by [Client] on [Contractor].)"* |
| **2. INTERPRETATION OF THE REQUIREMENT** |
| Briefly describe the background of the requirement (either as identified in the client's request for proposal, or from a situation analysis done by the contractor); and give a list of envisaged services or products which will address this requirement, e.g. *"[Contractor] interprets [Client's] requirement as follows: ...."*. It is essential to reach consensus about what the client's real requirements are. By writing the requirements down in this part of the document, uncertainties can be removed. |

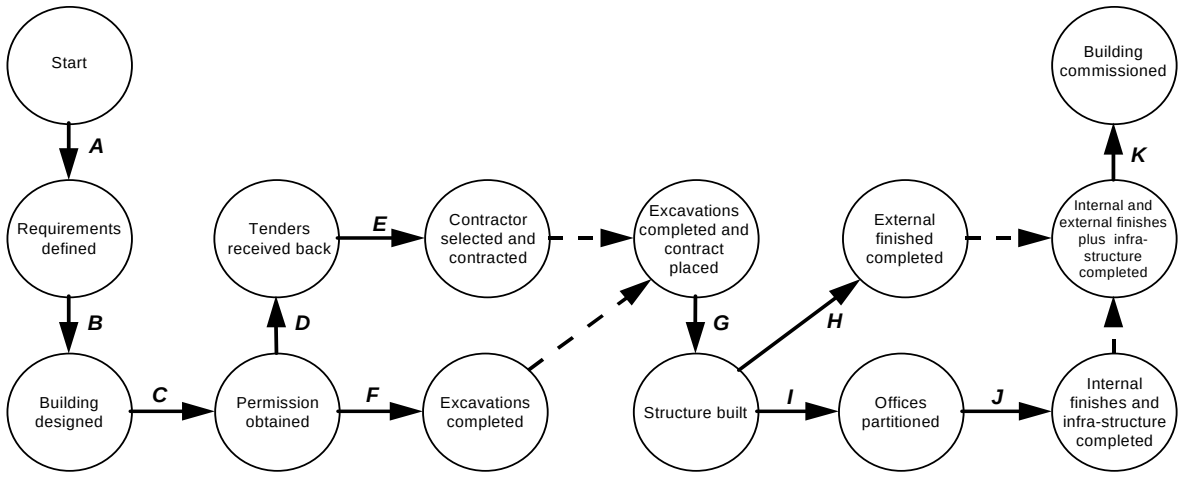
Sometimes a client is not exactly sure what needs to be done. There can be various reasons for this situation - e.g. a generic requirement was merely rolled down from a higher-level client. Sometimes, inexperienced project managers merely pass generic requirements down from one level to another until it finally reaches someone who must figure out what needs to be done. Another reason for uncertainty can be that it is a research and development task, with uncertain outcomes. In order to prevent an open-ended contract in such cases, a statement along the following lines can be included in the contract proposal: *"This proposal is based on information received from the client (or from .....). Since there are still uncertainties regarding the client's exact requirements, this proposal defines the general direction for undertaking the tasks. The extent of the tasks will be limited by the time scales, and by the available money for the work. The intention is, however, to help [Client] reach the stage where ..... will be achieved, by delivering the outputs as defined in chapter 3 of this proposal. Should new information become available, which drastically changes the scope of work, a revised contract will have to be negotiated."* (A statement like this requires mutual trust between the client and the contractor, but it reduces uncertainties.) Alternatively, the contract can be split into phases, each with its own contract proposal – e.g. (1) Requirements definition, where the contractor first helps the client to define the requirements more precisely; (2) Addressing the defined requirements; and (3) Follow-up work.

## 3. ENVISAGED ROLE OF *[CONTRACTOR NAME]*

### *3.1 TASK BREAKDOWN*

The task breakdown is a very important part of the contract proposal, since it defines what will be done by the contractor. A top-down approach, whereby the overall task is split into smaller tasks, and each of these is in turn split into smaller tasks, down to a level of single tasks, is recommended. The definition of tasks can conveniently be done as shown in Table Ex.1-1. Note that each activity should have at least one output (which can act as input for further activities).

*Figure Ex.7-1: Example of a PERT Network*




## 3. SUMMARY / CONCLUSIONS

Provide a summary of the PERT analysis results - as shown in the following table. Conclusions drawn from the results can also be included in this section of the report.

*Table Ex.7-2: Example of Summary of PERT Results*

| | |
|---|---|
| Project: | Construction of new office building |
| Earliest possible finishing time (EF), based on TE values | 92.67 weeks |
| Critical path (tasks with zero float) | A-B-C-D-E-G-I-J-K |
| Project variance = $\sigma^2$ (variances of critical tasks) | 10.00 |
| Project standard deviation: $\sigma$ = (Project variance)$^{1/2}$ | 3.16 weeks |
| 95% confidence that project will be completed within ($EF \pm 2\sigma$)? | 86 to 99 weeks |
| 99% confidence that project will be completed within ($EF \pm 3\sigma$)? | 83 to 102 weeks |