

# **PRACTICAL WORK BOOK**

**For Academic Session 2009**

## **COMMUNICATION MANAGEMENT**

**(TC-498)**

**For**

**BE (TC)**

**Name:** \_\_\_\_\_

**Roll Number:** \_\_\_\_\_

**Batch:** \_\_\_\_\_

**Department:** \_\_\_\_\_

**Year:** \_\_\_\_\_



**Department of Electronic Engineering  
NED University of Engineering & Technology, Karachi**

# **LABORATORY WORK BOOK**

**For The Course**

**TC-498 COMMUNICATION MANAGEMENT**

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# INTRODUCTION

Communication Management Practical Workbook covers those practical that are very knowledgeable and quite beneficial in grasping the core objective of the subject. These practical solidify the theoretical and practical concepts that are very essential for the engineering students.

This work book comprise of practical covering the topics of communication management that are arranged on modern theory. Above all this workbook contains a relevant theory about the Lab session.

# Telecommunications Laboratory

## CONTENTS

Lab No.	Dated	List of Experiments	Page No.	Remarks
1		1. To understand management cycle of telecommunication projects. 2. To become familiarize with the different tools and skills needed in a successful completion of telecommunication project.		
2		To conduct the feasibility study for selection of cell site for a mobile telephone system.		
3		1. To investigate the investment opportunities in Pakistan in telecommunication sector. 2. To analyze the trends in telecommunication sector in Pakistan.		
4		Making a work plan / Budget for a telecommunication project.		
5		To design the numbering system in a mobile telephone network.		
6		To maintain a Risk Register in a telecommunication project.		
7		To maintain a Issue Register in a telecommunication project.		
8		To write a status report for a telecommunication project.		

## **EXPERIMENT NO. 01**

### **OBJECTIVE:**

1. To understand management cycle of telecommunication projects.
2. To become familiarize with the different tools and skills needed in a successful completion of telecommunication project.

### **DESCRIPTION:**

The purpose of the exercise is to familiarize students with basic concepts and tools to participate in public or private, for-profit or not-for-profit organizations. More specifically, students are supposed to learn to analyze, plan, organize, lead, and control the work of others so that the organization will achieve its goals.

## **TELECOMMUNICATION PROJECT MANAGEMENT**

### **LIFECYCLE:**

The Lifecycle is comprised of four project phases:

1. Initiation Phase
2. Planning Phase
3. Execution Phase
4. Closure Phase

The graphical relation between all these phases is shown in the fig. 1-1

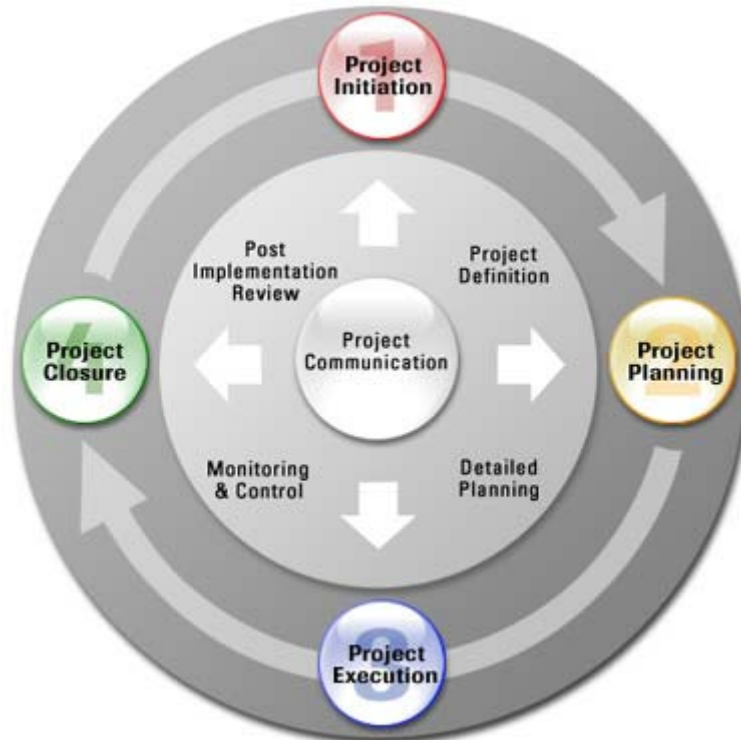


Fig. 1-1: The Project Lifecycle

### **Lifecycle - Initiation Phase:**

The Project Initiation Phase includes the activities required to initiate a project. This includes the documentation of a Business Case, Feasibility Study and Terms of Reference, the identification of the project scope, the appointment of the project team and the establishment of the project office as depicted by the following diagram.



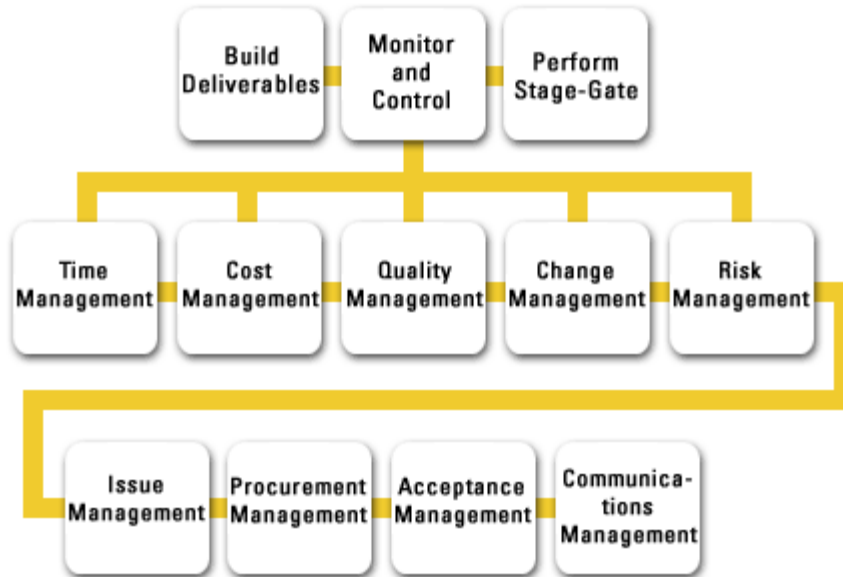
### **Lifecycle - Planning Phase:**

The Planning Phase involves the creation of project plans including a Project Plan, Financial Plan, Quality Plan and Risk Plan. These plans are created to ensure that all project phases, activities and tasks have been clearly identified and adequate resources and finances have been allocated. A preferred supplier may be selected to undertake project activities and supply product to the project as depicted by the following diagram.



### **Lifecycle - Execution Phase:**

This phase involves the execution of each activity and task listed in the Project Plan. While the activities and tasks are being executed, a series of management processes are undertaken to monitor and control the deliverables being output by the project. This includes the identification of changes, risks and issues, the review of deliverable quality and the measurement of each deliverable being produced against the acceptance criteria.



**Lifecycle - Closure Phase:**

Project Closure, otherwise known as 'Project Close Out', involves releasing the final deliverables to the customer, handing over project documentation, terminating supplier contracts, releasing project resources and communicating the closure of the project to all stakeholders. The last remaining step is to undertake a Post Implementation Review to quantify the overall success of the project and list any lessons learnt in a formal report for future projects. The generic steps are provided by the following diagram.



**RESULT:**

## **EXPERIMENT No. 2**

### **OBJECTIVE:**

To design the feasibility report for selection cell site in a mobile telephone system.

### **DESCRIPTION:**

With increasing demands of mobile telephones, cellular service providers are increasing their service area, therefore new cell are introduced in the system. Before installing the base station and other equipments in a new cell, a feasibility study has to be conducted to analyze the benefits of the new cell.

### **THEORY:**

The concept of frequency reuse is very important in mobile telephone system which is achieved by dividing the whole service area into cells. The total allocated bandwidth and total available channels are distributed in the cells. In this way a same channel can be used in many cells. In this way the system can support more user with increase in the allocated bandwidth.

### **PROCEDURE:**

Following information is to be collected for the area of cell

1. Expected number of users within the cell
2. Average traffic intensity per user within the cell.
3. The required grade of service (G.O.S)
4. Total number of available channel in the system as well as in the cell.
5. Maximum acceptable channel to interference ratio.
6. Required transmitter power.
7. The cost of equipments that are to be installed for the required transmitter power.
8. Other related information.

### **RESULT:**

From comparison of benefits and cost, it is decided whether or not to install the construct the new base station.



## **EXPERIMENT NO. 3**

### **OBJECTIVE:**

1. To investigate the investment opportunities in Pakistan in telecommunication sector.
2. To analyze the trends in telecommunication sector in Pakistan.

### **DESCRIPTION:**

Telecommunication sector is growing very fast in Pakistan for last few years. The objective of this exercise is to analyze the opportunities for future investment in telecommunication sector in Pakistan.

### **PROCEDURE:**

The students are required to collect following information.

1. Geographical importance of Pakistan.
2. Trends in overall economy of Pakistan.
3. Overall investment opportunities.
4. Trend in telecommunication sector.
  - Basic telephony.
  - Mobile telephones.
  - Value added services.
5. Telecommunication Policy of Pakistan.
6. Other related information.

Based on collected information, students are required conclude for investment opportunities.

### **RESULT:**

## **EXPERIMENT NO. 04**

### **OBJECTIVE:**

Making a work plan / Budget for a telecommunication project.

### **DESCRIPTION:**

Before starting any new service, it is necessary to completely plan the procedure and methodology of the system. The purpose of this exercise is to develop the steps and stages for making an effective work plan. The term “work plan” refers to the set of activities, resources and dependencies needed to complete the project. The budget represents the amount of money available to spend on the project. The budget represents the amount of money available to spend on the project.

### **PROCEDURE:**

Consider the following techniques before you begin the estimating process.

1. Get a clear picture of the work that is being estimated.
2. Determine who should be involved in the estimating process.
3. Determine if there are any estimating constraints.
4. Determine multiple estimating techniques to utilize if possible.

### **Estimating Effort:**

Effort hours must be estimated first, before duration and cost estimates can be prepared.

Use the following process to estimate effort hours.

1. Determine how accurate your estimate needs to be.
2. Create the initial estimate of effort hours.
3. Add specialist resource hours.
4. Consider rework (optional).
  - Add into the original estimate.
  - Add as separate activities.
  - Add as blocks of time.
6. Add project management time.
7. Add contingency hours.
8. Calculate the total effort
9. Review and adjust as necessary.
10. Document all assumptions.

### **Estimating Duration:**

Effort hours can be converted to duration activities using the following process and techniques.

1. Estimate the productive hours per day.
2. Determine how many resources will be applied to each activity.
3. Factor in available workdays
4. Take into account any resources that are not full time.
5. Factor in multi-tasking productivity loss for part-time resources.
6. Calculate delays and lag-times.
7. Identify resource constraints.

8. Document all assumptions.

### **Estimating Costs**

You can estimate costs after you have assigned your resources.

1. Estimate labor costs.
2. Estimate non-labor costs.  
Generally, however, non-labor costs include:
  - Hardware and software
  - Travel expenses
  - Training
  - Team building
  - Facilities
  - Equipment
  - Material and supplies
3. Document all assumptions.

### **Build the Workplan and Budget / Approach:**

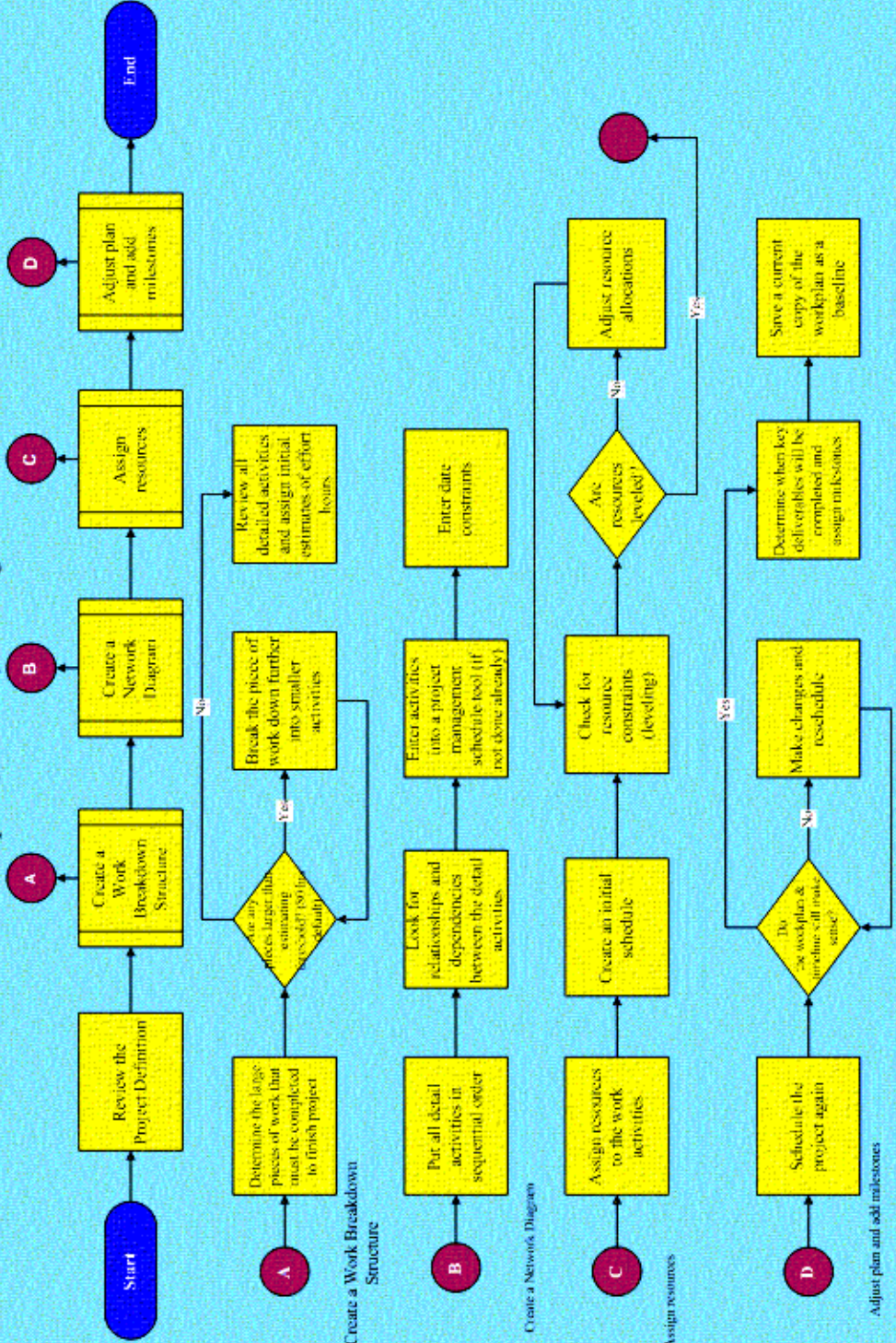
The following information gives more detail and examples of the areas that can be described.

- Discuss whether any broader company initiatives or strategies impact the structure of this project.
- Identify any constraints or time-boxes in terms of budget, effort, time or quality, and the impact to the project.
- Describe any company standards that will impact how the project is executed.
- Note any company or industry best practices that will have an effect on the project.
- Describe other options for the overall approach and why you chose the options you did over the others. Note why you think this approach has the best chance of success over the others.
- Talk about how the deliverables will be supported and maintained after the project ends. Also indicate whether the approach was influenced by support and maintenance implications.
- Discuss any other related projects that are completed, in progress or pending that influenced the approach for this project and why.
- Discuss, at a high level, how the project will progress from start to end and the interdependencies between the high-level phases and stages.
- Discuss any techniques that might be of interest to the reader. For instance, if the requirements will be gathered in a three-day Joint Application Design (JAD) session, you can note this in the approach.
- Note whether new technology or new processes are being utilized and why.
- Identify any unusual staffing requirements, such as consultants or outside specialists, and explain why you need them.
- Describe the use of outsourcers, contractors or vendors, especially if they are doing significant work.

The complete block diagrams of Work plan building procedure and estimating procedures is shown.

# Project Management Process

## Workplan (Schedule) Building Procedures





**Build the Workplan and Budget / People Management:**

In large organizations, or on large projects, you may have the luxury of full-time resources for your entire team. However, in many (or most) situations, the project manager must utilize shared and part-time resources to complete the work. Some resources may be working on multiple projects, while other resources may be working in support (or operations) roles as well. The process of gaining and retaining resources in this environment can be difficult, and is partly the result of how your organization is structured.

The project manager should gain agreement on resources two months in advance. The resources should be confirmed again at the next monthly staff allocation meeting. The project manager should double-check resources again two weeks before the start date, and follow-up with a reminder one week out. You are much more likely to have the resources available when you need them if you take these proactive steps.

**RESULT:**

## **EXPERIMENT NO. 05**

### **OBJECTIVE:**

To design the numbering system in a mobile telephone network.

### **DESCRIPTION:**

In any telephone network the numbering system plays very important role. Each user has to be assigned a unique number. In mobile telephone system numbers determine the location of the mobile station (whether it is local or roaming). Every mobile network has its own numbering system. The numbers allotted to an area depends on the expected number of users in the area.

### **NUMBERING SYSTEM OF NEW MOBILINK NUMBERS (0301)**

The numbering system for new Mobilink NDC 0301 is shown below.

<b>Cities</b>	<b>Numbering Level</b>
Lahore	4XXXXXX, 84XXXXX
Gujranwala	66XXXXX, 864XXXX, 874XXXX
Sialkot	61XXXXX, 861XXXX, 871XXXX
Gujrat	62XXXXX, 862XXXX, 872XXXX
Sargodha	670XXXX, 671XXXX, 672XXXX, 673XXXX, 674XXXX, 860XXXX
Khushab	677XXXX
Bhalwal	679XXXX
Kasur	680XXXX, 681XXXX, 682XXXX, 683XXXX
Mandi Bahauddin	686XXXX, 687XXXX
Hafizabad	688XXXX
Narowal	689XXXX
Sahiwal	690XXXX, 691XXXX, 692XXXX, 869XXXX
Faisalabad	70XXXXX, 71XXXXX, 865XXXX, 866XXXX
Gojra	723XXXX
Pakpattan	724XXXX, 725XXXX
Jaranwala	726XXXX, 727XXXX
Tobatek Singh	728XXXX, 729XXXX
Okara	73XXXXX
Multan	74XXXXX, 863XXXX, 873XXXX
Rahim Yar Khan	761XXXX, 762XXXX, 763XXXX, 764XXXX, 867XXXX, 877XXXX
Kamalia	767XXXX
Bhawalnagar	768XXXX
Jhang	769XXXX
Bahawalpur	77XXXXX, 868XXXX
Mianwali	780XXXX
Khanewal	781XXXX, 782XXXX
Layyah	784XXXX, 785XXXX

<b>Cities</b>	<b>Numbering Level</b>
Muzafargarh	787XXXX, 788XXXX
DG Khan	790XXXX
Chishtian	791XXXX
Hasilpur	792XXXX
Vehari	793XXXX, 794XXXX
Chiniot	796XXXX, 797XXXX
Chunian	798XXXX
Burewala	799XXXX
Islamabad/Pindi	50XXXXX, 51XXXXX, 54XXXXX, 55XXXXX, 850XXXX, 854XXXX, 855XXXX, 856XXXX
Jhelum	851XXXX, 58XXXXX
Attock	570XXXX, 571XXXX, 572XXXX, 573XXXX
Chakwal	577XXXX, 578XXXX
Talagang	579XXXX
Abbotabad	810XXXX, 811XXXX, 812XXXX, 813XXXX, 814XXXX
Peshawer	88XXXXX, 89XXXXX, 858XXXX, 859XXXX
Mardan	818XXXX, 819XXXX
Mingora	852XXXX, 853XXXX
Kohat	815XXXX, 832XXXX
Swabi	834XXXX, 835XXXX
Bannu	875XXXX
Nowshera	876XXXX
D I Khan	879XXXX
Karachi	2XXXXXXX, 33XXXXX, 82XXXXX
Sukkur	831XXXX, 340XXXX, 341XXXX, 342XXXX, 343XXXX
Larkana	347XXXX, 348XXXX
Dadu	349XXXX
Hyderabad	837XXXX, 35XXXXX
Quetta	37XXXXX, 838XXXX
Nawab Shah	380XXXX, 381XXXX
Ghotki	382XXXX, 383XXXX
Jacobabad	384XXXX

**RESULT:**



## **EXPERIMENT NO. 06**

### **OBJECTIVE:**

To maintain a Risk Register in a telecommunication project.

### **DEFINITION:**

The *Risk Register* records details of all the risks identified at the beginning and during the life of the project, their grading in terms of likelihood of occurring and seriousness of impact on the project, initial plans for mitigating each high level risk and subsequent results.

### **RISK REGISTER:**

It usually includes:

- a unique identifier for each risk;
- a description of each risk and how it will affect the project;
- an assessment of the likelihood it will occur and the possible seriousness/impact if it does occur (low, medium, high);
- a grading of each risk according to a risk assessment table (refer to *Table 1*);
- who is responsible for managing the risk;
- an outline of proposed mitigation actions (preventative and contingency); and
- in larger projects, costings for each mitigation strategy.

This Register should be maintained throughout the project and will change regularly as existing risks are re-graded in the light of the effectiveness of the mitigation strategy, and new risks are identified. In smaller projects, the *Risk Register* is often used as the Risk Management Plan.

### **Why would you develop a Risk Register?**

A *Risk Register* is developed to:

- provide a useful tool for managing and reducing the risks identified before and during the project;
- document risk mitigation strategies being pursued in response to the identified risks and their grading in terms of likelihood and seriousness;
- provide the Project Sponsor, Steering Committee/senior management with a documented framework from which risk status can be reported;
- ensure the communication of risk management issues to key stakeholders;
- provide a mechanism for seeking and acting on feedback to encourage the involvement of the key stakeholders; and
- identify the mitigation actions required for implementation of the risk management plan and associated costings.

### **When would you develop a Risk Register?**

Initial risks must be identified and graded according to likelihood and seriousness very early in the Project. Once the project is approved the Risk Register should be fully developed.

**What you need before you start:**

- Knowledge and understanding of the project.
- Knowledge and understanding of the Key Stakeholders.
- Knowledge and understanding of appropriate types of risk management activities, or where to obtain them.
- Any of the following optional documents - Project Proposal/Brief, Project Business Case.

**EXAMPLE OF RISK REGISTER:**

PROJECT TITLE: \_\_\_\_\_ File No.: \_\_\_\_\_  
 Risk Register as at Date: \_\_\_\_\_  
 Project Manager: \_\_\_\_\_  
 Project Scope: \_\_\_\_\_

Rating for Likelihood and Seriousness for each risk			
L	Rated as Low	E	Rated as Extreme (Used for seriousness only)
M	Rated as Medium	NA	Not Assessed
H	Rated as High		

Grade: Combined effect of Likelihood/Seriousness					
Likelihood	Seriousness				
		Low	Medium	High	Extreme
	Low	E	D	C	A
	Medium	D	C	B	A
High	C	B	A	A	

Recommended actions for grades of risk	
Grade	Risk mitigation actions
A	Mitigation actions to reduce the likelihood and seriousness to be identified and implemented as soon as the project commences.
B	Mitigation actions to reduce the likelihood and seriousness to be identified and appropriate actions implemented during project execution.
C	Mitigation actions to reduce the likelihood and seriousness to be identified and costed for possible action if funds permit.
D	To be noted - no action is needed unless grading increases over time.
E	To be noted - no action is needed unless grading increases over time.

Change to Grade since last assessment			
NEW	New risk	↓	Grading decreased
—	No change to Grade	↑	Grading increased

**RISK REGISTER:** \_\_\_\_\_ **Last Updated:** \_\_\_\_\_

<b>ID</b>	<b>Description of Risk Identify consequences</b>	<b>Likelihood</b>	<b>Seriousness</b>	<b>Grade</b>	<b>Change</b>	<b>Mitigation Actions</b>	<b>Responsible Officer</b>	<b>Cost</b>
1.1	Inadequate funding to complete the project	M	M	B	NEW	Re-scope project, focusing on time and resourcing	Project Manager	NA
1.2	Lack of technical skills in Client Business Unit	H	H	A	.	Develop training plan	Consultant	\$2000

**RESULT:**

## **EXPERIMENT NO. 07**

### **OBJECTIVE:**

To maintain a Issue Register in a telecommunication project.

### **DEFINITION:**

The *Issues Register* records details of all the issues identified at the beginning and during the life of the project, the action taken to address each issue and the subsequent results.

### **ISSUE REGISTER:**

It usually includes:

- a unique number;
- a description;
- who raised the issue;
- date reported;
- the person or group who is responsible for resolution;
- status, usually open, or closed;
- date resolved; and
- how resolved (eg. included as action in the project work plan and budget, documented in the *Risk Register*, or closed).

This Register should be maintained throughout the project and updated regularly, as existing issues are closed as a result of successful actions and new issues added as they are identified.

### **Why would you develop a Project Issues Register?**

A *Project Issues Register* is developed to:

- provide a useful tool for managing and addressing the issues identified before and during the project;
- identify and document actions taken to address the identified issues and their subsequent resolution;
- provide the Project Sponsor, Steering Committee/senior management with a documented framework from which the status of issues can be reported;
- ensure the communication of issues to key stakeholders; and
- provide a mechanism for seeking and acting on feedback regarding project issues to encourage the involvement of the key stakeholders.

### **When would you develop a Project Issues Register?**

The *Issues Register* should be created at the start of the project.

The frequency of issues reporting will vary depending on the size of the project.

With very small projects this may consist of fortnightly consideration of any issues that could affect progress and/or a meeting with the Senior Manager/Project Sponsor.

For larger projects the *Issues Register* forms an integral part of the project, as information for the Register is drawn from the project management processes in place for the project.

### **What you need before you start:**

- An agreed Project Business Plan.
- Knowledge and understanding of the project.
- Knowledge and understanding of issues management and risk management.



**RESULT:**

## **EXPERIMENT NO. 08**

### **OBJECTIVE:**

To write a status report for a telecommunication project.

### **DEFINITION:**

The *Project Status Report* is a document that is used by Project Managers for formal regular reporting on the status of a project to the Steering Committee, Project Sponsor or Senior Manager, depending on the size of the project. It is important to remember that the role of the Steering Committee is to take responsibility for the business issues associated with the project.

### **PROJECT STATUS REPORT:**

The *Project Status Report* should include, as a minimum, the following:

- Status of the project - description, milestones for the last reporting period; milestones for the next reporting period; impact of achievement/non-achievement of milestones for the remaining period of the project.
- Budget Report - with respect to planned expenditure, actual expenditure and deficit/surplus.
- Risk management report - specifying any changes to the major risks identified since the previous report and modification to the strategies put in place to manage them, if appropriate.
- Issues Report - including areas of concern, specific problems, and any action/decision that needs to be taken by the Steering Committee.
- Recommendations.

It is important to keep the report focused and to report on/against milestones and not percentage of work complete.

### **Why would you develop a Project Status Report?**

A *Project Status Report* is developed by the Project Manager to provide regular progress reports to:

- the Steering Committee and/or Project Sponsor with information on the management issues of the project and for endorsement of any decisions/directions made in the report;
- the Inter Agency Steering Committee (IASC) if the project extends across government;
- individuals or Committees who are overseeing progress of the project; and
- ensure that no additional work or scope creep occurs.

### **When would you develop a Project Status Report?**

The frequency of status reporting will vary depending on the size of the project. With very small projects this may consist of fortnightly consideration of any issues that could affect progress and/or a meeting with the Senior Manager/Project Sponsor.

For larger projects the status report forms an integral part of the project, as information for the reports is drawn from the project management processes in place for the project.

**What you need before you start:**

- An agreed Project Business Plan.
- Knowledge and understanding of the project activities, schedule, issues, risks and budget, stakeholders, contractors and staff.
- Knowledge and understanding of issues management and risk management.
- Project budgetary information.
- Schedule of meetings.

**EXAMPLE OF PROJECT STATUS REPORT:**

PROJECT TITLE: \_\_\_\_\_ File No.: \_\_\_\_\_  
 Status Report Number: \_\_\_\_\_  
 Status report as at Date: \_\_\_\_\_  
 Project Manager: \_\_\_\_\_  
 Project Scope: \_\_\_\_\_

**1. Project Summary:**

A brief statement of project performance not covered in the remainder of the report.

**2. Milestones scheduled for achievement since last report and performance against those milestones:**

Milestone	Baseline Date	Target Date	Achievement
Description of milestone	dd/mmm/yyyy	dd/mmm/yyyy	dd/mmm/yyyy

**3. Milestones scheduled for achievement over the next reporting period and changes in those milestones with respect to the previous plan:**

Milestone	Baseline Date	Previous Target Date	Current Target Date
Description of milestone	dd/mmm/yyyy	dd/mmm/yyyy	dd/mmm/yyyy

**4. Impact of achievement / non-achievement of milestones for the remaining period of the project:**

Milestone	Impact
Description of affected/amended/changed milestone	Briefly describe any changes to the project schedule required as a result of the amended milestone(s).

**5. General Information:**

Include any general comments that may support/enhance/add to the above sections.



**6. Budget:**

Date	Description of Expenditure	Planned Expenditure	Actual Expenditure	Deficit/Surplus
dd/mmm/yyyy				

**7. Project Risk Management Statement (Identify changes in risk status to previous report):**

Risk	Likelihood	Seriousness	*Grade	Change
Brief description of the major risks (A, B and C's), changes in grading and new risks identified.	Low/ Medium/ High	Low/ Medium/ High	A/ B/ C	Increase/ Decrease/ New

\* Key:

GRADE	
A	High/ High
B	High/ Medium or Medium/ High
C	High/ Low or Medium/ Medium
D	Medium/ Low
E	Low/ Low

**8. Issues:**

Brief description of any business issues associated with the project that have arisen since the previous report and need to be addressed by the Steering Committee, Project Sponsor or Senior Manager etc.

**9. Recommendations:**

Brief statement(s) for the Steering Committee, Project Sponsor or Senior Manager to consider and/or endorse.

**RESULT:**