

PROFESSIONAL COMMUNICATION

THIRD EDITION

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Published in India by
Oxford University Press
Ground Floor, 2/11, Ansari Road, Daryaganj, New Delhi 110002, India

© Oxford University Press 2009, 2014, 2017

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First Edition published in 2009
Third Edition published in 2017

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ISBN-13: 978-0-19-948112-5
ISBN-10: 0-19-948112-1

Typeset in Baskerville
by Ideal Publishing Solutions, Delhi
Printed in India by Magic International (P) Ltd, Greater Noida

Cover image: Petr Vaclavek / Shutterstock

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Preface to the Third Edition

Clear, efficient and accurate professional communications can have a great impact on any organization's reputation and credibility. In order to reap good results, sound theoretical as well as technical knowledge about the field needs to be coupled with effective communication. In fact, any business or transaction carried out in a firm requires either oral or written communication. While administrators, employees and sellers need to communicate effectively to promote their businesses, even buyers should communicate well so as to reap maximum benefit in their deals.

From sharing all kinds of information through meetings and emails to writing specific need-based documents such as reports and proposals professional communication plays a major role in any organizational set up.

ABOUT THE BOOK

The third edition of this textbook has been updated as per the latest syllabus of professional communication at Dr A.P.J. Abdul Kalam Technical University (AKTU). Accordingly, the book has now been divided into 12 chapters that provide a comprehensive coverage of all the topics included in the curriculum. The contents have been reorganized keeping in mind the role of different types of technical communication skills—written technical communication, business communication, interpersonal communication, negotiation strategies, and value-based text readings. Various kinds of chapter-end exercises have been included in the text with a view to help the students acquire the necessary linguistic and soft skills. These activities are designed to fulfil the requirements of the university course.

NEW TO THE SECOND EDITION

- Completely revised and updated as per the latest AKTU syllabus
- New sections on Interpersonal communication, attitude and team work
- Model test papers based on the latest syllabus

COVERAGE AND STRUCTURE

The text has been divided into V Units.

*Unit I, **Fundamentals of Communication*** includes chapters 1 and 2. The unit emphasizes and elaborates on the basics of technical communication, such as importance, process, levels, and flow of communication. It also covers the formal and informal communication networks that come into play in organizations along with barriers to communication.

*Unit II, **Written Communication*** comprises chapters 3, 4, 5 and 6. The unit focuses its discussion on the importance of prefixes and suffixes, synonyms, and homophones in enhancing vocabulary. It also covers

topics such as parts of speech, concord, modals, articles, and infinitives that can give readers insights into correct usage of the language. The unit also covers sentence construction and paragraph development, and provides guidelines on how to write good technical descriptions.

*Unit III, **Business Communication*** contains chapters 7, 8, 9 and 10 discusses basic official correspondence, various types of business letters as well as different components of letter writing with numerous samples of various layouts. It also illustrates the different aspects of report writing, technical proposals and essentials of negotiation skills.

*Unit IV, **Presentation Strategies and Soft Skills*** includes chapter 11 which emphasizes the importance of kinesics, paralinguistics, chonemics and interpersonal communication. It also discusses the traits of a good listener.

*Unit V, **Value based text Readings*** contains chapter 13 that presents five passages with discussion questions on them.

The **Appendices** at the end of the book comprise a compilation of common errors in usage, proper punctuation and capitalization, list acronyms, abbreviations, and commonly misspelt words, and help distinguish between British and American vocabulary.

We sincerely hope that this book, with its comprehensive coverage of almost all aspects and types of professional communication, will prove to be highly useful to readers. Any suggestions for improvement are welcome.

ONLINE RESOURCES

Online resources in the form of PowerPoint Slides are available to support faculty members using this text.

ACKNOWLEDGEMENTS

The publishers have applied for the following permissions—Chatto & Windus Ltd and Laura Huxley for an extract from *Literature and Science* by Aldous Huxley; Northwestern University Press for extracts from *Science and Humanities* by Moody E. Prior; and Viking Penguin Inc. for an extract from *Science and Survival* by Barry Commoner. Acknowledgements will be made in future editions of the book.

All attempts to trace the copyright holders of *Philosophy: An Introduction* by Archie J. Bahm and *The Identity of Man* by J. Bronowski have been unsuccessful. Nevertheless, we acknowledge that passages titled ‘The Mother of Sciences’ and ‘*Man and Nature*’ from their respective publications feature in our work. Appropriate acknowledgements will be made in future editions of the book.

Any suggestions and comments to improve the text are welcome. You can reach us at raman.mee@gmail.com and 38.sangeeta@gmail.com.

Meenakshi Raman
Sangeeta Sharma

Preface to the First Edition

The word *communication* has its roots in the Latin word *communicare*, which means ‘to impart’. The reference here is to sharing of information. Effective communication thus involves effective exchange of information. As an integral part of one’s academic and professional life, this requires a thorough grasp of the language used as the medium of communication.

English being a universal language, communicating fluently in it is an essential prerequisite for everyone in the academic as well as professional spheres. Even though the majority of tasks performed by an engineer, or a scientist, are of technical nature, their success, to a great extent, depends on how effectively they assimilate and disseminate technical or formal information. It is, therefore, necessary for students to master communication skills.

Communication in the professional, or business settings, as also in the academic field is mostly formal and, very often, follows set formats to get the required message across. Compared to general communication, which is mostly oral, official communication necessitates a lot of documentation where there is a lot of emphasis on the written aspect. The other major aspect to be kept in mind is audience specificity. Unlike ordinary day-to-day communication, formal communication is prepared for specific target segments of the society. For instance, the results of scientific research are mostly published through journals or papers presented at conferences. These works are of interest to a very specific group of people. Accordingly, the language used in such communication involves specific jargon, illustrations, etc. Hence, it is essential for the people preparing these correspondences to understand clearly the intricacies of listening, speaking, reading, and writing in the chosen medium. This book aims to facilitate this understanding in addition to familiarizing the reader with the fundamental components of English grammar. It has been designed to enable students and professionals to disseminate formal information effectively.

ABOUT THE BOOK

This book meets the requirements of the course on professional communication at UP Technical University. Realizing the need to hone the communication skills of engineering students and technologists, the book discusses both oral and written forms of communication in depth. A key feature of this beginner-level book is its user-friendly approach. The language is simple and easy to understand.

The technical aspects of communication have been explained through lively and relevant examples and illustrations. A number of strategies have been suggested throughout the book to enhance the efficiency and effectiveness of communication in various settings. The key strategies have been substantiated with examples from workplace situations. Important definitions as well as related interesting information have been presented in textboxes. Numerous exhibits specific to technical applications, including presentation styles, formats, and layouts for written communication have been provided throughout the book. The worked-out exercises reinforce the concepts discussed in the book, correlating theory and practice. In addition, the book also features model test papers.

The book not only serves the purpose of being a textbook for courses on communication skills but also satisfies the requirement of finishing schools to a great extent. It can also be used as a reference for training programmes offered by business houses and industries.

Meenakshi Raman
Sangeeta Sharma

AKTU Syllabus

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Unit-II Written Communication Words and Phrases: Word formation, Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; correct Usage: all Parts of Speech; Modals; Concord; Articles; Infinitives; Transformation of sentences; Requisites f Sentence Construction: Paragraph Development: Techniques and Methods- Inductive, Deductive, Spatial, Linear, Chronological etc.	3-6
Unit-III Business Communication Principles, Sales & Credit letters; Claim and Adjustment Letters; Job Application and Resumes. Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts; Types; Writing of Proposal; Significance; Negotiation skills.	7-10
Unit-IV Presentation Strategies and Listening Skills Nuances and Modes of Delivery; Body Language; Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice; Interpersonal communication: Definition; Types; Team work; Attitude; Way to improve Attitude Listening Skills : Types; Methods for improving Listening Skills.	11
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SURVEYS)

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MAKING AN OUTLINE

FOLLOW THE PRINCIPLES OF COORDI-
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REPORT

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SUPPLEMENTARY PARTS

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FIRST DRAFT

VISUAL AIDS

Revising, Editing, and Proofreading

INTRODUCTION

A nurse in a hospital reports to the doctor in the in-patient ward about the condition of each patient. A foreman, at the end of the day, reports to the manager the progress of the work carried out in his supervision. The manager of a bank sends a periodic report to the Head Office on the status of deposits, advances, overdraft limits, etc. during the period. Another manager posted in a remote rural area reports to the Head Office about the difficulties faced in sanctioning loans to farmers. A publishing firm keen on introducing a new series of paperbacks into the market has to seek a report on the current reader preference. The Managing Director of a bank would like a report on the efficacy of the measures introduced by him to promote efficiency in the branch offices.

Reports, thus are a part of our lives; be it school reports, news reports on TV, Radio, and newspapers and the various kinds of reports that one is required to make or read in the course of their work.

From time to time, the government sets up committees and commissions to report on various issues of social, political, and economic importance. There are various Parliamentary committees such as Committee on Human Resources, Committee on Agriculture, Committee on Industry, Committee on Science & Technology, Committee on Environment & Forests, etc, that are set up to discuss, analyse, and report on various matters pertaining to the respective ministries. Such committees meet from time to time, work out a detailed plan to conduct surveys and collect data from various sources, and finally submit their findings and recommendations in the form of a technical report.

But what is a report? A report is a major form of technical/business/professional communication. In writing a report, a person who possesses certain facts, ideas, or suggestions useful for courses of action transmits this information to another person who wants to use it.

The word 'report' is derived from the Latin 'reportare'—'to bring back'. Over a period of time, it has evolved to mean that the gathered information is unbiased and evidence-based.

in nature and is written for a specific purpose and audience. It discusses a given topic in depth and contains conclusions and recommendations if required.

A report is usually a piece of factual writing, based on evidence, containing organized information on a particular topic.

OBJECTIVES

The purposes for which reports are written vary widely. The following are some important objectives of reports:

- To present a record of accomplished work (Project report)
- To record an experiment (primary research report/laboratory report)
- To record research findings or technical specifications (a report on the details of a new product)
- To document schedules, timetables, and milestones (a report on a long-term plan)
- To document current status (an inspection report)
- To record and clarify complex information for future reference (a report on policies and procedures)
- To present information to a large number of people (annual report)
- To present organized information on a particular topic (a report describing the working of various divisions of an organization)
- To recommend actions that can be considered in solving certain problems. (recommendatory report)

CHARACTERISTICS OF A REPORT

The following are the characteristics of a good report.

Purpose Effective reports clearly reflect their purpose. While putting together a report, your *investigation, analysis, and recommendations should be directed by this central purpose*. The purpose of your message determines everything in it—the format, content, sequence, and words you use. Spend some time first thinking about what you want to achieve and how you want your readers to respond. In writing business reports, your purpose can be to inform, persuade, motivate, or express feelings—or a combination of these.

Precision Precision gives unity and coherence to your report and makes it a valuable document.

Factual Details Your report should be detailed and factual. The point of your report is to go into details, the kind of details your specific audience needs. Scientific accuracy of facts is very essential to a good report. Since reports invariably lead to decision-making, *inaccurate facts may lead to disastrous decisions*.

A good report is:

- precise and brief
- factual
- unambiguous and accurate
- relevant
- reader-oriented
- objective and homogeneous
- detailed and documented

Relevance The facts presented in a report should not only be accurate but also relevant. While it is essential that every fact included in a report has a bearing on the central purpose, it is equally essential to see that no relevant information is excluded. Irrelevant facts make a report confusing; exclusion of relevant facts renders it incomplete and is likely to mislead.

Irrelevant facts make a report confusing; exclusion of relevant facts renders it incomplete and is likely to mislead.

Reader-orientation A good report is always reader-oriented. While drafting a report, *it is necessary to keep in mind the person(s) who is (are) going to read it.* A report meant for the layman will be different from one meant for technical experts.

Objectivity of Recommendations If recommendations are made at the end of a report, they must be impartial and objective. They should come as a logical conclusion to investigation and analysis. They must not reflect any self-interest on the part of the writer.

Simple and Unambiguous Language A good report is written in simple, unambiguous language. It is a document of practical utility; hence it should be free from various forms of poetic embellishment such as figures of speech. It should be clear, brief, and grammatically accurate.

Clarity A good report is absolutely clear. Clarity depends on proper arrangement of facts. Report writers must proceed systematically. They should make their purpose clear, define their sources, state their findings, and finally make necessary recommendations. They should divide their report into short paragraphs with headings, and insert other suitable signposts to achieve greater clarity and reader-attention.

Brevity A report should be brief. It is difficult to define brevity in absolute terms. Nor can brevity be laid down as a rule. All that can be said is that a good report is as brief as possible. Brevity should neither be achieved at the cost of clarity, nor should it be at the cost of completeness. Sometimes the problem being investigated is of such importance that it calls for a detailed discussion of facts. Then this discussion should not be evaded. Brevity in a report is the kind of brevity one recommends for a précis. *Include everything significant and yet be brief.*

Grammatical Accuracy The grammatical accuracy of language of a good report is of fundamental importance. It is one of the basic requisites of a good report as of any other piece of composition. Remember that *faulty construction of sentences makes the meaning obscure and ambiguous.*

Special Format The technical report uses a rather involved format including cover, title page, table of contents, list of illustrations, letter of transmittal, and appendices. These have to be prepared according to a set standard, which is discussed later in the chapter.

Illustrations Most technical reports contain illustrations, which may be tables, graphs, maps, drawings, charts, or photographs.

Homogeneity Your report should deal with one topic at a time. All the sections of your report should focus on that topic.

Documentation Technical reports acquire more value when adequately documented by acknowledging sources of information in an appropriate style.

TYPES OF REPORTS

On the basis of purpose, frequency, or mode of reporting, reports can be classified as follows:

- Informative, Analytical (Purpose)
- Periodic, Special (Frequency)
- Oral, Written (Mode of presentation)

Informative reports focus on documenting new information; analytical reports assess information in order to propose a course of action.

Informative Reports

An informative report, as the name suggests, entails provision of all details and facts pertaining to a given subject or problem. For instance, it could be a report that attempts to trace the growth of Company X in the automobile industry. In a report of this kind, the presentation of all details that led to the growth of Company X should be listed in a chronological order.

Structural Organization

As the presentation of information is the basic purpose of the report, details are worked out in a systematic and coherent manner. The structural orientation and its significance in an informational report should be clearly evident to the reader.

In a report of this kind, the various sections are simple and self-explanatory. The introduction is followed by a presentation of information or facts and a conclusion thereafter, where all the details are collated in brief as a recap of earlier sections. Recommendations do not arise in this type of report.

The main purpose of an informational report is to present the information in an objective, factual, and organized manner. It presents the situation simply as it is. To write an informational report, all you need is to collect data, arrange it in an appropriate order and present it in a style appropriate to technical writing.

Analytical Reports

An analytical report is also known as an interpretative or investigative report. If a report merely presents facts pertinent to an issue or a situation, it is informative. On the other hand, if it analyses the facts, draws conclusions, and makes recommendations, it is described as an analytical report. For instance, a report which presents production figures for a particular period is informative. But if it goes into the causes of lower production in that period, it becomes analytical, interpretative, or investigative.

If a report merely presents facts pertinent to an issue or a situation, it is informative. If it analyses the facts, draws conclusions, and makes recommendations, it is described as an analytical report.

An analytical report comprises stages in which there is a proper identification of the problem, analysis, and subsequent interpretation. Recommendations or suggestions are then incorporated in the report, depending upon what is required by the report writer. Thus, in a problem-solving method, the steps observed are as follows:

- Drafting problem statement
- Suggesting alternatives and evaluation
- Evolving criteria
- Drawing conclusion(s) and making recommendations

Laboratory reports and project reports are types of analytical reports (Annexures 8.1–8.3).

Many reports that you write in the course of your career cannot always be classified neatly as informative or analytical. As a writer, the challenge will be to design a report best suited to the assignment at hand.

Project Report

You write project reports at the completion of the projects undertaken in your course curriculum; therefore it must include the important findings and conclusions. This written form of communication is helpful in maintaining the records. The analysis of data is properly organized and is comprehensively written. An important decision can be based on your project report.

Depending on the nature of the project undertaken your project report may be categorized as informative or analytical. Accordingly, you may organize and structure your report as explained in the later sections of the chapter.

Structural Organization

The structure of an analytical report may follow any of the two patterns—inductive or deductive (Table 8.1).

Table 8.1 INDUCTIVE AND DEDUCTIVE METHODS OF OPENING A REPORT

Inductive approach	Deductive approach
<p>The automobile sector in India seems to have made tremendous headway in the last ten years. Company X has produced three models of cars. However, with the entry of new players in the market the company is facing stiff competition. There is also a slump in the market with excessive production and insufficient demand. The current study analyses the growth prospects of Company X vis-à-vis its competitors.</p> <p>The study focusses attention on the following three questions:</p> <ol style="list-style-type: none"> 1. Who are the competitors? 2. Will Company X be able to face stiff competition from other companies? 3. What are the prospects of growth? <p>The report attempts to analyse . . .</p> <p>The automobile sector in India seems to have made</p>	<p>tremendous headway in the last ten years. Company X has produced three models of cars. However, with the entry of new players in the market, Company X is facing stiff competition. There is also a slump in the market with excessive production and insufficient demand. The current study analyses the growth prospects of Company X vis-à-vis its competitors. It can easily be concluded that:</p> <ol style="list-style-type: none"> 1. Company X is facing severe competition from companies Y and Z. 2. Unless and until Company X brings down its price to match that of the competitors, it will not be able to corner a substantial market share. <p>It is recommended that an additional feature such as power steering be introduced as an extra facility or a reasonable reduction in price be carried out.</p> <p>Further, it is recommended that Company X target students pursuing professional courses, with a lowered price and basic strip down model, so that it appeals to their taste and fits their budget.</p> <p>The conclusions arrived at and recommendations made are based on the following study. Five sample automobile companies were taken . . .</p>

Inductive Methodology An inductive ordering follows a simple, logical arrangement in which you proceed from the sensible singular to the universal or simply from the known to the unknown. There are two premises or syllogisms that conjoin to yield a final conclusion. For example,

- Syllogism 1 This fire warms
 Syllogism 2 And this fire warms
 Syllogism 3 And this fire warms
 Syllogism n Also this fire warms
 Conclusion Therefore every fire warms

One could formulate umpteen number of syllogisms to reach a final conclusion which is always based on the number of experiments conducted, or factors observed. Certain disciplines, in which experiments are carried out and surveys are conducted, naturally follow this pattern. Here, the progression is always in the nature of working on the known elements to arrive at an unknown conclusion.

However, inductive patterning, while normally followed for organization-based studies and experiments, suffers from a major drawback. As it is not based on any universal truth, it holds valid only up to the point where there is discovery of an issue that proves contrary to the findings in the report. It is by nature only relevant in the present and no universal claims to the same can be made.

Deductive Methodology On the other hand, a deductive ordering proceeds from the unknown to the known. Universal truths are taken as the formulation point for the problem. The various alternatives are suggested, evaluated, and conclusions drawn, keeping in mind the original problem stated. To understand the manner of approach in deductive methodology, let us take an example.

Conclusion	Every fire warms
Syllogism 1	This fire warms
Syllogism 2	And this fire warms
Syllogism 3	And this fire warms
Syllogism n	Also this fire warms

While in an inductive method the pattern of the report would normally follow the sequence of introduction, text, and terminal section, in the deductive method, the structure could be slightly different. It could begin by stating conclusions and recommendations which are then followed by an introduction and the text section. This pattern would be observed if the report is of extreme importance and the receiver does not have the time to browse through the entire report. Merely a glance at the initial pages would enable the reader to assess the contents. Such readership would only be concerned with the conclusions and recommendations/suggestions or plan of action.

Periodic or routine reports are prepared and presented at regular, prescribed intervals in the usual routine of business

Periodic and Special Reports

Periodic or routine reports are either informational or analytical in their purpose. As they are prepared and presented at regular, prescribed intervals in the usual routine of business, they are called periodic or routine reports. They may be submitted annually, semi-annually, quarterly,

monthly, fortnightly, weekly, or even daily.

Generally such reports contain mere statement of facts in detail, in summarized form, or in the layout of a prescribed form, without an opinion or recommendation. Progress reports of various kinds, inspection reports, annual reports, and sales reports all come under this category.

Special reports are related to a single occasion or situation.

At times the routine reports can be analytical or interpretative. For example, when the heads of various divisions in an organization submit annual assessment reports of their employees to the higher authorities, they assess the data and give their recommendations so as to enable their superiors to take certain decisions.

Special reports are related to a single occasion or situation. A report on the feasibility of opening a new branch, on the unrest among staff in a particular branch, or the causes behind the recent fire incidents in a factory are special reports. Special reports deal with non-recurrent problems.

Oral and Written Reports

Reports can be oral or written depending upon the mode of presentation. When you rejoin duty after attending an international seminar, you meet your officer and report about the deliberations of the seminar. This type of reporting comes under oral reporting.

An oral report is simple and easy to present. It may communicate an impression or an observation. While oral reports are useful, written reports are always preferred as they enjoy several advantages over the oral ones. Table 8.2 shows the varying advantages and disadvantages of oral and written reports.

Table 8.2 ORAL AND WRITTEN REPORTS

Oral reports	Written reports
<ul style="list-style-type: none"> • Immediate feedback is possible • Do not add to the permanent records of the organization as the information/facts can be denied • Audience needs to comprehend quickly as and when understand these are presented • May be encumbered with irrelevant facts and overlook important ones • Cannot be referred to again and again • Have less professional value 	<ul style="list-style-type: none"> • Immediate feedback is not possible • Contribute to the permanent records of the organization • Audience can ponder over these reports and at their own pace • Are more accurate and precise as the writer will be careful in putting down the facts in writing. • Can be edited, reviewed, stored, and retrieved • Have more professional value

THE IMPORTANCE OF REPORTS

A report is a basic management tool used in decision making. Hence it is extremely important for organizations of all types. Reports are vital, especially for large-scale organizations that are engaged in multifarious activities handled by different departments. Their top executives cannot keep a personal watch over all these activities.

Remember that all reports carry legal responsibility. They can be used as legal instruments. Your activities, as an employee, and your competence at work are reflected through reports.

So they have to base their decisions on the reports they get from the heads of various departments. For large organizations, reports are indispensable. Reports bear a lot of significance both to the organizations in which they arise and to the organizations they are submitted to. The following list will give you an idea of how important reports and report writing are to the organizations and the individuals.

A report is the only tangible product of a professional All the efforts of engineers, academicians, researchers and other professionals culminate in reports which convey to others the efficiency with which they carried out their assignments.

Reports enable decision making and problem solving in organizations Based on the information presented, analysis discussed, or the suggestions rendered, administrators can make important decisions and solve problems of serious concern.

Reports help the authorities in planning new ventures and in evaluating men and material If an organization wants to open a new branch in a nearby locality, it can plan for the same more effectively after going through the feasibility report prepared for this purpose. Similarly if the organization wants to assess the qualities and capabilities of a person, it can do so by going through the annual assessment form submitted by that person. It can also evaluate a newly introduced machine or product by listening to or reading the report prepared for this purpose.

Reports are an important means of information dissemination within and outside the organization Many of the routine reports such as inspection reports, inventory reports, or annual reports transmit information across and outside the organization.

Reports serve as a measure of the growth, progress, or success of an organization The progress of any organization depends on the quality and quantity of information flown through its personnel in the form of oral or written reports. For instance, an organization focussing on research can bring out reports from time to time to provide information on the progress being made.

Reports serve as a valuable repository of information Organizations of various kinds preserve reports of importance and value for a long time so that they can refer to these reports whenever needed. For example, an academic institution can refer to the previous assessment reports it had received from some committee in order to improve its performance.

Reports reveal gaps in thinking When a report is read and comprehended, the recipient comes to know whether the report writer had thought and proceeded logically and whether he/she had conducted an in-depth study of the topic. If there is some lacuna in logical reasoning or thinking on the part of the writer, reports are sure to reflect them.

Reports develop certain skills in the writer Reports not only help organizations but also help the writer to develop certain skills, such as the ability to organize, to evaluate, and to communicate with greater accuracy.

FORMATS

Your report may have any one of the following formats:

- Manuscript
- Preprinted form
- Letter
- Memo

Manuscript Format

This is the most commonly used format for reports and is generally used for reports that are formal. The length of such reports can range from a few pages to several hundred. Further, manuscript form can be used for all types of reports—informational, analytical, or routine. As the length increases, these reports include more elements such as abstract, summary, appendix, glossary, and so on.

Pre-printed Form

Reports containing routine matter and which are periodical in nature may be written in a form prescribed by the organization. All you need to do is to fill in the blanks in a preprinted form (see the sample inspection report given in Annexure 8.4).

Memo Format

A memorandum report, commonly known as memo report, is mainly used for internal communication, that is, within the organization. It is used to handle routine business matters like passing information from one department to another, making changes, alerting employees, solving a problem, etc. It helps the administration in taking decisions or solving certain problems. A memo report is a permanent record of the internal operations of an organization and is quite similar to a letter report. But it differs in structure and is more informal than the letter report because of its circulation within the organization. Generally, a memo report is shorter than a letter report and adopts a matter-of-fact style.

A specimen memo report is given at the end of this chapter (Annexure 8.5) showing the structure. It is written on the letterhead of the organization. Inside address or salutations are not required. The main body of the memo report includes headings appropriate to the discussed matter. Although there is no complimentary close or signature, sometimes the memo report is signed or initialled at the end. Most organizations have a printed format for memos in which a memo report can be submitted.

Letter Format

Letter reports are important written documents that present technical/business information as well as problems in the format of business letters. The only difference between business letters and letter reports is

in organization of content and in writing style. All parts of a business letter are used here except the inside address, which is often omitted in form letters, especially those sent to a large number of people. The style of writing is based on facts, but it does have a personal touch in the use of pronouns and sustains the reader's interest by showing them courteous consideration. Facts are pointed out as benefits to the reader, material is broken down, and the terminology is within the reader's range of understanding.

Look at the sample letter report in Annexure 8.6 given at the end of this chapter. A distributor of grocery and drug products to supermarkets was confronted with the problem of having supermarkets kept with fully stocked shelves at all times. In this connection, he made a study of several supermarkets to determine the effect on sales of fully stocked shelves—sales of several brands in each of ten commodities and then for two weeks under fully stocked shelf conditions. The results of the survey were of interest to dealers and managers of supermarkets.

Subject headings in the main text of the letter report serve as a guide, which lets the reader know what follows, thus conserving his or her time. Tables and figures, if any, should be numbered, titled, indented, and spaced away from text.

The concluding parts of the letter report are the same as those of a business letter—complimentary close, signature, and the name of the sender.

The first paragraph in a letter report mentions the purpose of the survey and introduces the subject of the report. It catches the reader's interest because he/she is affected by the problem. The next two sections of the report present the important results of the survey and their analysis from the reader's viewpoint. Emphasis here is placed on the way the results affect the reader. The survey findings convince the reader that he/she should follow the suggested policy given at the end—that of maintaining fully stocked shelves. The report also accomplishes its major purpose. This report follows the simple organizational pattern of beginning with the introduction, presenting facts, interpreting facts, and ending with a recommendation—a pattern used generally in short, informal reports. Another commonly used organizational pattern follows these five steps:

- | | |
|-------------------------|------------------------------------|
| 1. Authorization | 4. Development of the report |
| 2. Statement of problem | 5. Conclusions and recommendations |
| 3. Summary of findings | |

The style used in letter reports is factual and definite. The same essentials applicable to all reports and business letters should be adhered to—completeness, consistency, clearness, conciseness, and correctness. Principles of business letter writing, such as using the 'you' attitude, emphasizing the positive aspect, and being specific, should also be appropriately applied. The letter report is one of the most personalized forms of reports, but the degree to which it can be personalized depends upon the relationship between the writer and the audience, and the circumstances under which it is used. Used as a means of internal communication in a firm, the letter report is likely to be more formal and less personal when moving vertically upward to top management than when it is moving downward.

PREWRITING

Before actually beginning to draft a report, you need to undertake various tasks, which may be referred to as the *preliminary steps to writing a report*. The effectiveness with which you carry out the tasks involved in these

Planning for a report is as important as the process of writing itself.

steps decides the effectiveness of your technical report. In fact, the planning stage is the most crucial one. Spend as much time as possible in collecting material, synchronizing details, and ensuring that nothing has been left out. If the planning is done in a detailed manner, there are very few chances of

errors creeping in at the final stage. In fact, planning for a report is as important as the process of writing itself. The various steps involved in report planning are as follows:

- Understanding the purpose and scope
- Analysing the audience
- Investigating the sources of information
- Organizing the material
- Making an outline

Purpose and Scope

Purpose: The objective of your study

Scope: Extent of coverage

Assume that you, as the senior engineer of an organization, have been asked by your department head to study why the recently constructed flyover did not receive the anticipated feedback from the users. You are also required to suggest some measures to modify the same. Unless you are clear with the objectives of your task that your report involves, for example, (i) identifying the causes of dissatisfaction and (ii) suggesting remedial measures, you will not be able to proceed in the right direction. It is the *purpose* of the report that enables you to decide the amount or method of data to be collected, the quality and quantity of the information to be included in the report, and also the methodology to be adopted in analysing the situation and arriving at a solution.

Further, it is essential to understand the nature of the report—whether it is informative or analytical. In an informative report, you may stress factors contributing to collation of information at the time of stating the purpose. However, in an analytical report the writer would need to prepare a problem statement, the analysis of which becomes the thrust area of the report. Depending on the type of report to be written, there is bound to be a difference in the definition of the problem and purpose.

In most of the reports required by government organizations, the objectives are clearly stated as *terms of reference*. These terms are specific instructions given to the report writer as to what objectives are to be achieved through the report. See the following sample:

You are directed

1. *to identify the causes behind the recent fire incidents*
2. *to analyse the existing fire fighting facilities*
3. *to suggest some preventive measures to stop the recurrence of such incidents*

Whenever the terms of reference are clearly specified you need to include them as they are, while stating the purpose of undertaking the task which your report involves.

'Adapt' your writing to meet the needs, interests, and background of the readers who will be reading your writing.

Audience

The audience for a technical report—or any piece of writing for that matter—is the intended or potential reader. For most technical writers, this is *the most important* consideration in planning, writing, and reviewing a document. You 'adapt' your writing to meet the needs, interests, and background of the readers who will be reading your writing. Lack of audience analysis and adaptation is one of the root causes of most of the problems you find in professional, technical documents—particularly while writing instructions, where inadequacies surface most glaringly.

One of the first things to do when you analyse an audience is to identify its type (or types—it is rarely just one type). In general, the audience can be categorized into three types as discussed below:

Experts are the people who know the theory and the product inside and out. They have designed it, and they tested it, they know everything about it. Often, they have advanced degrees and operate in academic

settings, or in research and development areas of the government and business worlds. The non-specialist reader is least likely to understand what these people are saying—but also has the least reason to try. More often, the communication challenge faced by the expert is communicating to the technician and the executive.

Executives are the people who make business, economic, administrative, legal, governmental, and political decisions on the matter that the experts and technicians work with. If it is a new product, they decide whether to produce and market it. If it is a new power technology, they decide whether the city should implement it. Executives may sometimes have as little technical knowledge about the subject as non-specialists.

Non-specialists have the least technical knowledge of all. Their interest may be as practical as technicians', but in a different way. They want to use the new product to accomplish their tasks; they want to understand the new power technology enough to know whether to vote for or against it in the upcoming election. Or, they may just be curious about a specific technical matter and want to learn about it—but for no specific, practical reason.

It is important to analyse the audience in terms of characteristics such as the following.

Background—Knowledge, Experience, and Training

One of your most important concerns is just how much knowledge, experience, or training you can expect in your readers. If you expect some of your readers to lack certain background, do you automatically supply it in your document? For example, imagine you are writing a guide to using a software product that runs under Microsoft Windows. How much can you expect your readers to know about Windows? If some are likely to know little about Windows, should you provide that information? If you say no, then you run the risk of customers getting frustrated with your product. If you say yes to adding background information on Windows, you increase your work effort and add to the page count of the document (and thus to the cost). Obviously, there is no easy answer to this question—part of the answer may involve just how small a segment of the audience needs that background information.

Needs and Interests

To plan your document, you need to know what your audience is going to expect from that document. Imagine how readers will want to use your document; what will they demand from it. For example, imagine you are writing a manual on how to use a new microwave oven—what are your readers going to expect to find in it? Imagine you are under contract to write a background report on global warming for a national real estate association—what do they want to read about, and, equally important, what do they not want to read about?

If you write to the lowest common denominator of reader, you're likely to end up with a cumbersome, tedious book-like thing that will turn off the majority of readers. But if you don't write to that lowest level, you lose that segment of your readers. What to do?

Other Demographic Characteristics

There are many characteristics about your readers that might have an influence on how you should design and write your document—for example, age groups, type of residence, area of residence, sex, political preferences, and so on.

Audience analysis can get complicated by at least two other factors: mixed audience types for one document, wide variability within an audience, and unknown audiences. Exhibit 8.1 provides some report-writing tips keeping the non-specialist reader in mind.

More than One Audience You are likely to find that your report is for more than one audience. For example, it may be seen by technical people (experts and technicians) and administrative people (executives).

Exhibit 8.1 GUIDELINES TO MAKE YOUR REPORT COMPREHENSIBLE TO THE NON-SPECIALIST READER

- Add information readers need to be able to understand your document.
- Omit information your readers do not need.
- Add examples to help readers understand.
- Change the level of your examples.
- Change the organization of your information.
- Use more or different graphics.
- Add cross-references to important information.

What can you do? You can either write all the sections so that all the audiences of your document can understand them. Or you can write each section strictly for the audience that would be interested in it, then use headings and section introductions to alert your audience about where to go and where to stay out of in the report.

Wide Variability in an Audience You may realize that, although you have an audience that fits into only one category, there is a wide variability in its background. This is a tough one—if you write to the lowest common denominator of readers, you are likely to end up with a cumbersome, tedious book-like thing that will turn off the majority of readers. But if you do not write to that lowest level, you lose that segment of your readers. What to do? Most writers go in for the majority of readers and sacrifice the minority that needs more help. Others put the supplementary information in appendices or insert cross-references to beginners' books.

Investigating the Sources of Information

To accomplish the objectives of your report, you require facts and ideas. You may find them in company records, reports, bulletins, pamphlets, and periodicals; you may use library sources to look for information; you may observe some incident and collect the facts or ideas; you may conduct personal interviews with people to get information; you may circulate questionnaires to get data for your report.

Investigating the sources of information is a kind of spadework. It is to be done right in the beginning. The extent of investigation will, of course, depend on the length and importance of the report. The important means of collecting data for your report are:

- searching library material, internal records, or databases
- personal observation
- conducting personal interviews or telephone interviews
- preparing and circulating questionnaires

Library Search

In reports on subjects of a general nature, library research may prove useful. This includes reference to standard reference books and past as well as current issues of newspapers, trade publications, research journals, and magazines.

Examples: Report on the analysis of online marketing strategies
 Report on recent trends in software industry

Nowadays, many online library catalogues may assist you in identifying the appropriate books, journals, or periodicals quickly and easily.

When reading to secure information for your report, you may find the following suggestions helpful:

- Visualize the facts. Connect words to the facts to which they refer.
- Understand the dictionary meanings and connotations of the words.
- Examine factual statements and figures for their accuracy and logic.
- Distinguish between vague and definite statements, between hasty generalizations and careful judgements, between opinion and fact.
- Scan the material for important points found in topic sentences.

To evaluate and finalize your sources, ask yourself the following questions:

- Does the source have a reputation for honesty and reliability?
- Is the source potentially biased?
- What is the purpose of the material?
- Is the author credible?
- Where did the source get its information?
- Can you verify the material independently?
- Is the material current?
- Is the material complete?
- Do the claims of the source stand up to scrutiny?

Internal Records

Most of the relevant information is already contained in the old files of the institution. Sometimes there are precedents, and old findings and recommendations may be of considerable help. So it is very important to go through the old files of the organization. Declining sales or rising cost of production are recurring phenomena. And their causes are also usually similar. In these cases, old files may provide some valuable information.

Examples: Report on the history and growth of an Institute
Report on the admission pattern adopted by a University

Database Search

You can collect data for your report by surfing various databases, the addresses of which can be obtained through Internet search. But if you are not effective and efficient in your searching, you may end up with information overload or wastage of time. The following guidelines will enable you to carry out a quick and purposeful database search:

Choose Appropriate Databases You may want a good technical/business/academic database. However, journals on your topic may be in a database that also includes journals on other subjects.

Use Multiple Search Engines Do not limit yourself to a single search engine, especially if you are looking for less popular topics. Try your research on several engines by using *metacrawlers*, special engines that search several search engines at once.

Use Keywords and Phrases For instance, if you want to write a report on 'Importance of artificial intelligence in decision making', you would select the keywords or phrases such as artificial intelligence, decision making, management, and corporations. Use synonyms or word equivalents whenever possible, and use quotation marks around phrases to look for the entire phrase instead of separate words.

Use Appropriate Order Search engines look for the words exactly as you key them in. If the words occur, but not in the same order, you may miss relevant hints.

Avoid Stopwords Stopwords are those words the computer disregards and will not search for. Common ones are: a, an, the, of, by, with, for, and to.

Use Variations of Your Terms Use abbreviations (MD, CEO), synonyms (primary, major), related terms (group, team, collaboration), different spellings (fiber, fibre), singular and plural forms (analysis, analyses), and nouns and adjectives (environment, environmental).

Use Appropriate Search Operators Narrow or broaden your search by including AND, OR, AND NOT, WITHIN, NEAR, or ADJ. They can help you create complex, precise search strategies. (Examples: poverty AND crime AND gender; radiation NOT nuclear; endangered ADJ species; phylogeny NEAR ontogeny; orchids AND growing OR planning.)

Refine Your Search If Necessary If you end up with more than 60 or 100 links to sort through, refine your search. If your first page of results does not have something of interest, you have entered inadequate or too few words. Also, pay attention to whether you are searching in the title, subject, or document of the database. Each will fetch you different results.

Personal Observation

Observation is seeing with a purpose. Personal observation is used as a method of data collection for securing first-hand information for your reports. It is based on your sensory perception and memory and often combined with other methods of data collection.

Observation is seeing with a purpose.

While observing personally, you not only observe but also form a mental impression of what you had perceived. In other words, your observation appeals to your senses. For example, when you conduct an experiment in a laboratory, you use this method to collect data for your lab report.

Examples: All laboratory reports
Report on fire incidents

The two kinds of observation are (i) controlled observation and (ii) uncontrolled observation. The former is generally used in scientific research where scientists carry on an experiment and record findings. Scientists, for example, may conduct a particular experiment under specific conditions of temperature and pressure. They set the stage and then observe. On the other hand, in uncontrolled observation, the observer views things as they are. For instance, you would resort to uncontrolled observation when you collect data for writing a report on the working conditions prevalent in a particular factory.

Given below are some tips for successful personal observation:

- Be focussed on what to observe.
- Be objective and unbiased in your observation.
- Do not rely entirely on your memory.
- Carry paper and a pen to make notes.
- Note down all observations on the spot.
- Make a clear distinction between what you have seen and what you have felt.
- Check the accuracy of facts.

An interview is an interaction or conversation with a purpose.

Interviews

An interview is an interaction or conversation with a purpose. It is an effective method for collecting primary information directly from an expert. It allows for a direct exchange of information, and the interviewee's voice, facial expression, gestures, and general behaviour all contribute to this exchange of information. The answers you receive are influenced by the types of questions you ask, by the way you ask them, and by your subject's cultural and language background.

Interviews conducted with the purpose of collecting data for a report are called data collection interviews. They can be either face-to-face/in-person or telephonic.

In general, data collection interviews are conducted for the following specific purposes:

- to gather facts or subjective data such as attitudes, preferences, opinions, tastes, or emotional reactions
- to determine facts known to a single individual or group of people
- to substantiate the data collected through other sources

A successful interview requires careful planning and organization to ensure that you get the information you really need.

Preparing Questions By going prepared with a set of questions, you will feel confident and you will not waste the time of respondent or yourself. You will also create a better impression on the respondent if you are well prepared. There are four basic types of interview questions:

Open-ended questions These invite the interviewee to offer an opinion, not just a yes, no, or other one word answer. They help you learn the reasons behind a decision rather than just the facts, and diminish your control of the interview.

Example: What do you think are the major reasons for the employees' unrest?

Direct open-ended questions These give the interviewee some freedom but give you more control.

Example: What is your role in bringing back normalcy among the employees?

Close-ended questions These require yes/no, short answers, produce specific information, save time, require less effort from the interviewee, and eliminate bias and prejudice in answers. They limit the respondent initiative and are not very useful for extracting information.

Example: Do you feel the unrest among the employees will continue for a week?

Restatement questions These mirror a respondent's previous answer and invite the respondent to expand on that answer.

Example: You said that the union leader would be meeting the employees this evening. Is that information correct?

While preparing a personal interview sheet containing the list of questions to be posed during the interview, follow the guidelines in Exhibit 8.2.

The face-to-face data collection interview has both advantages and limitations such as the follows.

Advantages

- Provides qualitative data as you can seek further clarification, if necessary, on any answers
- Enables you to observe the reactions of the respondent
- Can be effective and efficient if you go ready with a set of questions

Limitations

- It is expensive and time-consuming if you have to meet people located at various places.
- You cannot contact a large number of people and hence the data may not be representative.
- As the answers are detailed and not in tabular form, you may find the analysis difficult.

Telephone Interview Sometimes interviews are conducted over the telephone. Such interviews are useful for opinion polls, when a limited number of questions are to be asked. The telephone interview permits wide coverage of either particular or general groups, and uses a representative or random sample. The following lists summarize the merits and limitations of telephone interviews:

Exhibit 8.2 GUIDELINES FOR PLANNING AND CONDUCTING A FACE-TO-FACE INTERVIEW AND PREPARING QUESTIONS

Planning

- Get an appointment.
- Be clear about your purpose.
- Carry pen, note pad, and recording accessories.
- Get prior permission for recording.
- Be ready with a strategy to bring the respondents to focus, if they deviate.
- Prepare a list of questions. (open end)
- Visualize opening and last question.
- Dress appropriately.
- Reach on time.

Conducting the interviews

- Briefly explain the purpose.
- Exhibit active listening.
- Be accurate in recording.
- Don't enter into an argument.
- Assume a subordinate position.
- Avoid too many interruptions.
- Be tactful.
- Be flexible.
- Don't get unnerved.
- Finish in time.
- Assure confidentiality.
- Avoid embarrassing questions.
- Thank the respondent.
- Keep the lines of communication open.

Preparing Questions

- Prepare about twenty questions if your interview time is 30 minutes.
- Think about sequence.
- Use a mix of question types.
- Prepare questions with adequate focus on the topic.
- Ask intelligent, smart questions.
- Edit your questions.

Merits

- The telephone interview is the quickest of the survey techniques.
- The refusal rate is usually low among people who are reached by phone.
- The cost per completed interview is low for the sample covered.
- For studies of middle- and high-income groups the telephone interview may be satisfactory because most of the interviewees will have phones.
- Interviews may be scattered over a wide area within a city without adding to the cost.
- As compared to a mail questionnaire, the telephone survey is preferable because it usually costs less per return. Returns are higher on first solicitation, and they can be more effectively controlled from the point of neighbourhood distribution.

Limitations

- Detailed data cannot be gathered by this method because the respondents could soon annoyed or impatient. If the schedule is too lengthy, the respondents may either hang up or give unreliable answers.
- As it is not possible to observe the body language of the respondent, you may not be able to modify your strategies during the interview.
- It is difficult to secure privacy on party lines.
- Misinformation is hard to detect and check in short inquiries.
- If the lines are disturbed you may not be able to hear properly and record your answers accurately.

Questionnaires

One of the best methods of collecting primary information is to ask people with relevant experience and opinions (known as survey). When prepared and conducted properly, surveys can tell you what a cross-section of people think about a given topic. A survey is reliable if it produces identical results when repeated. A survey is valid if it measures what it is intended to measure. Surveys are generally conducted for the following purposes:

- to collect data from a large number of people scattered over a wide geographical area
- to secure information on behaviour characteristics
- to gather opinions on attitudes
- to obtain facts

One of the most crucial elements of a survey is the questionnaire. To develop questionnaires, begin by making a list of points you need to determine. Then break these points into specific questions, choosing an appropriate type of question for each point. The following guidelines will help you produce results that are both valid and reliable.

- Ask only those questions relevant to your study.
- Provide clear instructions on how to fill out the questionnaire.
- Keep the questionnaire short and easy to answer.
- Formulate questions that provide easily tabulated or analysed answers.
- Avoid leading questions.
- Ask only one thing at a time (avoid double-barrelled questions).
- Pre-test the questionnaire.

The discussion that follows takes you through certain important aspects of questionnaire preparation. It tells you about the types of questions you may include, how to prepare them, how to sequence them, and also the types of sampling available.

Question Types

The following are the type of questions that could be asked in a questionnaire.

Open-ended questions elicit descriptive answers. To enable the respondent to write his answer, provide adequate space.

Example: What is your opinion on establishing a gymnasium in our campus?

Close-ended questions require a definite answer such as yes/no, adequate/inadequate, satisfactory/unsatisfactory, sufficient/insufficient, etc. as framed in the question.

Example: What do you feel about the availability of space for establishing a gymnasium in our campus?
adequate/inadequate

Multiple Choice type questions require the respondents to choose an option from the given choices.

Example: Which of the following time slots do you feel would be appropriate for the new gymnasium?
(choose any two)

- (a) 5.30 a.m to 6.30 a.m.
- (b) 6.00 a.m. to 7.00 a.m
- (c) 5.00 p.m. to 6.00 p.m.
- (d) 6.30 p.m. to 7.30 p.m.

Ranking type questions require the respondents to rank the items given from 1 to 5.

Example: Rank the following timings in the order of your preferences, from 1 (most preferred) to 5 (least preferred):

- (a) 5.30 to 6.30 a.m.
- (b) 6.00 to 7.00 a.m.
- (c) 7.00 to 8.00 a.m.
- (d) 5.00 to 6.00 p.m.
- (e) 6.30 to 7.30 p.m.

Short Answer type questions require answers of few words or phrases. The answers are shorter than those for the open-ended questions.

Example: How often would you like to use the gymnasium per week?

Preparing Questions

Whatever may be the type of questions you frame, remember to follow the following guidelines:

Provide Clear Instructions Explain how to fill out the questionnaire: whether to check the box, write something, rank, etc.

Keep the Questionnaire Short and Easy to Answer Ask only such questions that are specific to your report topic; limit short answer questions.

Formulate Questions that Provide Easily Tabulated and Analysed Answers Respondents will find it easy to mention numbers and facts than to summarize their opinions.

Avoid Leading Questions If you ask ‘Do you feel that hydrochloric acid is good for clogged drains?’, it is a leading question as you give the readers a clue. They may answer ‘yes’ even without applying their mind. Instead, if you ask ‘Which acid, in your opinion, is good for clogged drains?’ and give options, they are forced to choose one of the options.

Ask about only One Aspect at a Time Do you feel this experiment can be done under low pressure and high temperature conditions?—this is a double-barrelled question. You have to separate the issues of pressure and temperature and ask two questions.

Pretest the Questionnaire You can get better results if you select a group of ten people and ask them to fill out the questionnaire before you send it to your actual respondents.

If you are mailing rather than administering it in person, include a return postage-paid envelope along with a persuasive cover letter that explains why you are conducting the survey. It should convince your readers that responding is important

You will get a maximum of 10–20 per cent response in the best circumstances.

Sequencing

To enable a continuous flow of thought, questions should be sequenced appropriately. You can follow either a logical or a psychological order. A logical sequence gives full consideration to the subject matter of questions, which must be covered thoroughly, and the chain of thought moves continuously from one question to the next. The psychological order, on the other hand, gives full consideration to the psychology of the respondent. The first few questions may be easy and then the reader may proceed to more difficult ones. To sustain the readers’ interest, some transitions are used between questions. Personal questions are buried in the middle of the questionnaire. Similarly, questions that may reflect the respondent’s intelligence and those that are likely to be of little interest to him also find a place in the middle.

Sampling

When you want to contact a large number of people, you cannot mail the questionnaires to everybody.

It is enough if you choose a part of the group for sampling on the assumption that a representative number of responses indicates the whole. There are two major aspects to be considered in planning:

- Type
- Size

Types of Sampling Depending on the method of selection, sampling may be categorized as *random*, *stratified*, or *proportionate*. For instance, if you go in for an employee survey, you can get the payroll list containing names of all employees and can select individual names at equally spaced intervals, such as every fifth or tenth name. That would be random sampling. For the same survey, if you divide the employees into categories and select names from each group, that will fall under stratified sampling. The last method, namely proportionate sampling, is used only when a specific class will affect the responses or conclusions. Here, you control the selection in such a way that characteristics of the whole group are represented proportionately.

Size The purpose of the survey determines the size of the sample—whether it is large or small. But an adequate sample is one that is large enough for generalization about certain characteristics.

The normal percentage of returns on most mail questionnaires is from 10 to 15 per cent. With a carefully selected mailing list and a questionnaire of general interest, returns often will reach 75 per cent or more. When they reach approximately 80 per cent, the findings are reliable without further testing because answers from those not responding would have little effect on the total responses.

Covering Letter

Generally all mail questionnaires are accompanied by a covering letter (Exhibit 8.3) which should be short and tactful. Its contents are:

- Purpose of the study
- Brief description of the questionnaire
- General instructions pertaining to the questions
- Request to fill in and return the form
- Assurance of confidentiality and follow-up

Sources for Mailing List

- Telephone directories
- List of voters
- List of customers
- Schools and Colleges
- Professional directories
- Censuses
- Automobile registration.

Advantages and Disadvantages of Questionnaires Like other means of data collection, a questionnaire also has its own advantages and disadvantages.

Advantages

- Less expensive than the other methods.
- Specific segments of population can be reached.
- More reliable than interviews because people generally take care in filling out written information.
- Questions can be answered at the convenience of the respondent.
- All respondents will receive the same questionnaire and hence the bias of the interviewer is eliminated.
- The respondent need not be identified.
- The respondent has a chance to deliberate and look up information.
- Analysis is easier.

Disadvantages

- There may be difficulty in securing replies.
- The data obtained may not be representative if you do not get reply from a large number of people.
- Often questions may be inadequately answered or unanswered.
- It is difficult to get complex or confidential information through a questionnaire.

Exhibits 8.3 and 8.4 show a sample covering letter and a sample questionnaire, respectively.

Web-based Surveys (Internet Surveys)

You must have come across several surveys/opinion polls conducted everyday by popular newspaper websites. Internet is a medium through which you can contact thousands and thousands of people simultaneously and conduct surveys. These surveys have several advantages as listed below:

- Most modern means of surveying
- Cheaper to conduct

Exhibit 8.3 SAMPLE COVERING LETTER

October 10, 2003

Ravi Kumar
Best Institute of Technology
Agra

Dear friend

Sub: Data for survey on smoking

I am conducting a survey on smoking habits prevalent among the students of Best Institute of Technology. This survey is a part of my project work under the guidance of Prof. Jackson.

I would like to collect data that can be worked out into a report. As a student member of the project team I have offered to assist in collecting information from my friends. In this connection, I have prepared a questionnaire, containing twenty-one questions, pertaining to the smoking habits of students.

You will be helping our project team, if you answer the questions that appear on the enclosed questionnaire. I have also enclosed a stamped, addressed envelope for your convenience in answering, and a courtesy copy of the questionnaire that you may keep.

Your answers are important to me in analysing the subject of the project we have taken up. Answering the questions will take but a few minutes of your time and will be of real value to me in completing this survey.

I assure you that the information you provide through your answers will be kept confidential and will be used for research purposes only.

Please send the filled out questionnaire before October 30, 2003.

I appreciate the time and effort you are sparing for me and I thank you for the same.

Yours sincerely,

(Ravi Kumar)

Encl: One questionnaire

Exhibit 8.4 SAMPLE QUESTIONNAIRE ON ATTITUDES TOWARDS SMOKING**QUESTIONNAIRE**

Age:

Sex: M/F

1. Do you smoke?

☐ Yes☐ No

2. If your answer to Q1 is Yes,

You started smoking when you were _____ years.

3. How many cigarettes do you smoke per day?

☐ Only occasionally (Not everyday)☐ Less than 5 per day☐ Between 5 and 10 per day☐ More than 10 per day☐ Not applicable.

4. Do you know that the major cause of lung cancer is smoking?

☐ Strongly agree☐ Agree☐ Not agree☐ Strongly disagree☐ Not sure

5. Even though I smoke, and I am aware that smoking and lung cancer are related, I personally feel that 'it is not going to happen to me'.

☐ Yes☐ No☐ Not Applicable

6. Does anyone in your family smoke?

☐ Father☐ Mother☐ Brother☐ Sister☐ Others☐ No one

7. Do you think that people pay attention to the Statutory Warning on cigarette packs that 'Cigarette smoking is injurious to health'?

☐ Yes☐ No

8. If you smoke, which of the following apply to you?

☐ I have already quit smoking successfully.☐ I tried to quit but was unsuccessful.☐ I will quit sometime later.☐ I will continue to smoke as I enjoy it.☐ I will continue to smoke, as I don't worry about the ill effects of smoking.

9. Do you feel smoking has serious effects on non-smokers?

☐ Yes☐ No

10. If you are not a smoker, it is because

☐ Your parents will never like it.☐ You never felt any need to experiment with smoking.*(Contd.)*

(Contd.)

☐ You strongly believe that smoking is dangerous to one's own health.

☐ Other, specify _____.

11. Do you think nicotine in cigarettes is addictive?

☐ Yes

☐ No

12. Do you strongly feel that girls should not smoke?

☐ Yes

☐ No

13. 'Passive Smoking' is related to respiratory problems among non-smokers. (Passive smokers are people who do not smoke themselves but inhale the smoke in the environment because of other smoker/s.)

☐ Strongly agree

☐ Agree

☐ Disagree

☐ Strongly disagree

14. According to you, 'My friend started smoking _____

☐ To experiment.

☐ Because friends smoke

☐ To relieve himself/herself from anxieties

☐ To look 'smart'.

☐ Describe in your own words. _____

15. Do you strongly feel that smoking affects men more?

☐ Yes

☐ No

16. I have heard of many people who smoked heavily but lived to a ripe old age, so smoking is not all that bad. Do you agree to this notion?

☐ Yes

☐ No

17. Do you strongly feel that smoking affects women more?

☐ Yes

☐ No

18. Do you strongly feel that men give up smoking easily when compared to women?

☐ Yes

☐ No

19. Do you strongly feel that women give up smoking easily when compared to men?

☐ Yes

☐ No

20. Do you feel that most lung cancer is caused by air pollution, automobile fumes, etc. ... not smoking?

☐ Yes

☐ No

21. With reference to smoking and public health, which of the following measures do you support:

☐ Smoking should be banned in public places.

☐ Cigarette advertisements in mass media should be banned.

☐ Sponsoring of sport events by cigarette manufacturers should be banned.

☐ Awareness campaigns on health hazards of smoking in colleges should be carried out.

☐ Others, specify ...

- Reach a large number of people instantly, economically
- Can improve survey response rates
- Can be made more attractive by using graphics and animation

Organizing the Material

Depending upon the topic, purpose, and audience, you can organize the material/data collected for your report in

- the order of occurrence;
- the order of importance; or
- a combination of orders.

Order of Occurrence

Order of occurrence is otherwise known as chronological order. Here, the data is presented in a sequence that depends on time that is more or less of uniform value—none of the parts are uniquely important.

- Examples: (i) History of a transaction
(ii) Procedure for manufacturing or installing equipment

In some cases, though time is still an element, it is not pertinent. Here sequence is more directional than temporal. The order is more that of movement than of occurrence, and movement may be in any direction.

- Examples: (i) A quarterly report on the volume of sales of a company having branches in Eastern, Western, Northern, Southern parts of India.
(ii) Report describing the plan of a building.

Order of Importance

When the matter/data collected for your report is not of uniform value, you may have to organize the information in descending or ascending order of importance.

Generally, the descending order of importance is valid for informational reports as the reader is interested in looking for the most important information first.

- Examples: (i) Feasibility reports.
Here, immediate needs are more important than future needs.
(ii) Feedback report on a conference recently attended.

The ascending order of importance is used mainly to create a dramatic suspense and reach the climax at the end of the report. This is inappropriate for most technical reports, as there is no need to create suspense. It is more effective in magazine articles and speeches as they slowly gain momentum. Of course, certain analytical reports based on a certain theory or principle may be organized in this order as the reader may wish to understand first the basic precepts or ideas on which the study is built.

- Examples: (i) Research reports
(ii) Developing a new system

Combination of Orders

This order is particularly useful in reports involving a double assignment. A combination of order of occurrence and order of descending importance is fairly common.

- Example: (i) Report on the appraisal of a situation and the recommended changes.
(ii) Report on a problem and the suggested solution.

In short, examine the data as a whole, consider them for completeness, their relationship to the purpose of investigation, their total significance to the problem at hand and then organize in an appropriate order.

Making an Outline

It is extremely important to develop an outline of the report prior to commencing work on the report. The formatting of the report should be carried out only after completion of the outline.

An outline is a mechanical framework into which you can fit in bits and pieces of information you have collected for your report. It serves as a signpost to show you the right direction in which you need to proceed for writing your report.

Remember your school days when your teacher had asked you to write an essay. How did you begin? You thought about some points, organized them in your mind, and then jotted them down in some order. You revised them and modified the order. Then, keeping those points as guidance you started writing on each. Then you could produce a well-organized essay. Report writing also follows similar steps. Thoughts do not come to us in the way in which we want them to come. They come randomly and it is for us to organize them appropriately and systematically before we begin writing.

Preparing an outline requires a considerable amount of time. But the time you spend on a systematic outline is always beneficial to you as this helps you save time. On the other hand if you start writing your report without an outline your writing will lack organization and structure and end up in confusion. The outline indicates the main topics and sub-topics for your report in words or phrases. To prepare an effective outline, you may follow the tips given below:

- Use words or phrases.
- Use nouns whenever possible.
- Use parallel grammatical construction.
- Follow the principle of coordination and subordination.
- Use decimal numbering system.

Go through the following sample outline and the discussion thereafter to make your outline more effective.

Education System in India

1. Introduction
2. Status before Independence
3. Present Status
 - 3.1. School Education
 - 3.1.1. Primary
 - 3.1.2. Secondary
 - 3.1.3. Higher Secondary
 - 3.2. College Education
 - 3.3. University Education
4. Status of Women's Education
5. Merits and Demerits
6. Financial Support
7. Employment Prospects
8. Conclusions

Use Words or Phrases

The outline which you prepare with careful planning finally turns out to be the *Table of Contents*. Various parts of the outline are used as headings to the sections of the report. Hence you should take care in choosing the words for constructing the headings of an outline. You can go in for short construction (topic headings), frequently consisting of one or two words which merely identify the topic of discussion; or you can go in for longer constructions (talking headings), frequently including prepositions that not only identify the subject

Table 8.3 TOPIC HEADING AND TALKING HEADING

Topic heading	Talking heading
4. Marketing Strategies	4. Creating strategies for marketing
4.1. Feedback	4.1. Collecting feedback from all areas
4.2. Promotional Efforts	4.2. Designing strategies for promotional efforts
4.3. Distribution Network	4.3. Setting up of new distribution network

matter covered but also summarize the material they cover. Given in Table 8.3 are examples of topic heading and talking heading as they may appear in a segment of an outline.

Use Parallel Grammatical Constructions

Ideas that are parallel in thought must also be parallel in grammatical construction. Therefore, corresponding parts of an outline, being of equal significance, must be stated in the same grammatical form. In other words, equal-level headings should be parallel in structure so as to show similarity. Through parallel headings you can show such equal-level divisions consistently.

For example, if you use a noun phrase to express an idea under one sub-division, you must state the other parts of the same sub-division in noun phrases only. Similarly, if the heading for one division is a participle phrase, other points appearing under the same subdivision must be expressed in participle construction. Compare the following parallel and non-parallel constructions given in Table 8.4 to understand the effectiveness of parallel constructions in an outline.

Table 8.4 PARALLEL AND NON-PARALLEL CONSTRUCTIONS

Non-parallel construction	Parallel construction
1. Advantages of computers 1.1. Internet Browsing 1.2. Promotes sales 1.3. Analysing Data 1.4. Managing Finance	1. Advantages of computers 1.1. Internet Browsing 1.2. Sales Promotion 1.3. Data Analysis 1.4. Financial Management
1. Introduction 2. Computers mark the beginning of a new era 3. What are the applications? 4. Are they advantageous?	1. Introduction 2. Computers: the beginning of a new era 3. Applications 4. Advantages

Avoid Needless Repetitions

Do not repeat words because repetition results in monotonous writing, which will make your outline dull and drab.

Look at the original and revised versions of a segment of an outline taken from a report on Education System in India given in Table 8.5.

By simply eliminating the repetition of the word 'education' in all the subdivisions, we have avoided sounding monotonous.

Follow the Principles of Coordination and Subordination

Your outline indicates the level of each heading in the report, that is, how important each heading is. The closer a heading is to the margin, the greater is its importance in the report. Likewise, as the headings move away from the margin, they become less important.

Table 8.5 AVOIDING MONOTONY IN AN OUTLINE

Original	Revised
3. Present Status	3. Present Status
3.1 School Education	3.1 School Education
3.1.1 Primary Education	3.1.1 Primary
3.1.2 Secondary Education	3.1.2 Secondary
3.1.3 Higher Secondary Education	3.1.3 Higher Secondary

According to the principles of coordination (Table 8.6), you should see to it that all the main headings are of the same level in terms of their relation to the subject of your report and also the seriousness of discussion. So it is important that when you organize your data, select appropriate main headings which are of equal importance to your report.

As per the principles of subordination, the sub-headings should be appropriate to the main heading under which they are listed.

Consider the same excerpt given in Table 8.6, in Table 8.7. You can see what is meant by the principles of subordination:

Table 8.6 COORDINATION OF HEADINGS

Illogical coordination	Logical coordination
2. Computers: Beginning of a New Era	2. Computers: Beginning of a New Era
3. Applications	3. Applications
4. Education	3.1 Education
5. Industries	3.2 Industries
6. Advantages	4. Advantages and Limitations
7. Disadvantages	

Table 8.7 SUBORDINATION OF HEADINGS

Illogical subordination	Logical subordination
3. Applications	3. Applications
3.1 Education	3.1 Education
3.2 Industries	3.2 Industries
3.3 Advantages	4. Advantages and Limitations
3.4 Limitations	

Follow a Suitable Numbering System

You may use either the conventional numbering system or the decimal numbering system to mark the levels of headings in outline.

The conventional system uses Roman numerals to show the main headings and the letters of the alphabet and Arabic numerals to show the sub-headings, as shown below:

Conventional System

- I. First-level heading
 - A. Second level, first part
 - B. Second level, second part
 1. Third level, first part

2. Third Level, second part
 - a. Fourth level
 - (1) Fifth level
 - (a) Sixth level
- II First-level heading
- A. Second level, first part
 - B. Second level, second part
-

The decimal system uses whole numbers to show the major sections. Whole numbers followed by decimal digits show subsections. That is, the digits to the right of the decimal show each successive step in the outline. The following is an example of this system:

Decimal System

- 1.0 First-level heading
 - 1.1 Second level, first part
 - 1.2 Second level, second part
 - 1.2.1 Third level, first part
 - 1.2.2 Third level, second part
 - 1.2.2.1 Fourth level, first part
 - 1.2.2.2 Fourth level, second part
 - 2.0 First-level heading
 - 2.1 Second level, first part
 - 2.2 Second level, second part
-

Though you can use any of these numbering systems for your report, the decimal numbering system is more popular and more convenient to use. Of course, depending upon the existing practice in your organization, you can use any of these two systems. Whatever system you use, do remember that generally headings beyond the third level do not find a place in the contents page. Of course, while making an outline that is prepared for your own purpose, you can go up to any level of headings.

STRUCTURE OF REPORTS

Just as several organs constitute our body, various elements combine together to structure a report. Knowing these elements will help you in writing your reports better.

Though nineteen elements are listed after this discussion, you need not use all of them in your report. While some of them may be included in all reports, some may find a place only when your report gets published. However, you can select the elements of structure keeping in mind the following parameters:

- Usefulness
- Terms of reference
- Existing practice

Usefulness refers to the need for including any particular element. For example, when you write an informational report, you do not require a section on recommendations. Similarly when you prepare a report in the pre-printed form, you need not even include any of the elements. All you need is to just fill in the columns in the form.

Terms of reference tells you the objectives of your report. If the terms of reference require you to suggest some measures for improving the situation, you need to include a section on recommendations. Otherwise, you can stop with the section on conclusions.

Though you have several elements to constitute your report, you are supposed to consider the *existing practice* in your organization in terms of producing reports. That is to say, if your organization does not require an abstract or summary for a report, you can omit them.

Elements of Structure of a Report

Cover	}	Prefatory Parts
Title Page		
Certificate		
Acknowledgements		
Contents		
List of Illustrations		
Abstract		
Introduction	}	Main Text
Discussion		
Conclusions		
Recommendations		
Appendix/Appendices	}	Supplementary Parts
References/Bibliography		
Glossary		
Frontispiece	}	Optional Elements
Letter of Transmittal		
Copyright notice		
Preface		
Summary		
Index		


Prefatory Parts

Cover and Frontispiece

The cover of your report not only gives it an elegant appearance but also protects it from damage. It also serves as a quick reference to the readers to know the topic and the author of the report. The classification of the report (secret/top secret) and report number may also be mentioned on the cover page on the top left corner and right corner respectively. To arouse the curiosity of the reader, you may superimpose on this cover page some illustrations such as photographs, drawings, diagrams, etc., provided these illustrations reflect the contents of your report. For example, a report on 'Designing Web Pages' can have a web page superimposed on the cover. Any such illustration is known as *frontispiece* and generally it finds a place in reports that are published. If your report is less than 10 pages or if it is bound with a transparent sheet at the top and bottom, you need not include a cover page.

Many organizations have standard covers for reports imprinted with the organization's name and logo. Report files are either printed on these covers or attached with labels. If your organization does not have a standard cover, you can prepare one as stated earlier. Exhibit 8.5 shows a sample cover page.

Exhibit 8.5 SAMPLE COVER PAGE

<h1 style="margin: 0;">Confidential Report No. 115</h1> <h2 style="margin: 0;">Growth of Medical Facilities In India (1951–1999)</h2> <p style="margin: 0;">Prepared by XYZ Secretary Medical Council of India</p> <div style="text-align: center;">  </div> <p style="margin: 0;">August 2008</p>
--

Title Page

Title page (Exhibit 8.6) is the first right hand page of your report. This page is more or less similar to the cover page except that it contains the following additional information:

- name and designation of the intended audience
- name and designation of the approving authority, if any. (In some organizations the report does not directly reach the recipient. It may require the approval of an intermediary before reaching the recipient.)

Exhibit 8.6 SAMPLE TITLE PAGE

<h2 style="margin: 0;">Growth of Medical Facilities In India (1951–2008)</h2>
<p>Prepared For</p> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>
<p>by</p> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>
<p>Approved by ABC</p>
<p>Medical Council of India August 2008</p>

Exhibit 8.7 SAMPLE CERTIFICATE**Certificate**

This is to certify that the project entitled embodies the original work done by under my supervision.

Place:

Date:

Signature

The details on the cover and title page need to be organized symmetrically. If needed, the organization's emblem can be included just above its name given at the bottom.

Certificate

Certain reports such as project reports, research reports, etc. require a certificate vouching the original contribution of the report writer. Generally, the certificate (Exhibit 8.7) contains the statement testifying the original work, place, date, and signature of the project supervisor or guide.

Letter of Transmittal

The letter of transmittal (or memo of transmittal) conveys your report to your audience. This serves the same purpose as that of a preface in a published document. As the letter of transmittal is the written version of what you would say if you were handing the report directly to the person who authorized it, its style is less formal than the rest of the report. For example, the letter would use personal pronouns (you, I, we) and a conversational tone.

The transmittal letter (Annexure 8.3) usually appears just before the table of contents. If your report will be widely distributed, you may decide to include the letter of transmittal only in selected copies so that you can make certain comments to a specific audience. If your report discusses layoffs or other issues that affect people in the organization, you might want to discuss your recommendations privately in a letter of transmittal to top management. If your audience is likely to be sceptical of or even hostile to something in your report, the transmittal letter is a good opportunity to acknowledge their concerns and explain how the report addresses the issues they are concerned about.

The contents of a letter of transmittal are:

- Objectives/Terms of reference
- Scope
- Methodology adopted
- Highlights of your analysis
- Important results
- Significance of your study
- Suggestions
- Any other details which may enable the audience to understand your report better
- Acknowledgements

Such a letter typically begins with a statement such as 'Here is the report you asked me to prepare on ...'. The rest includes information about the scope of the report, the methods used to complete the study, and the limitations that became apparent. In the middle section of the letter, you may also highlight important points or sections of the report, make comments on side issues, give suggestions for follow-up studies, and offer any details that will help readers understand and use the report. You may also wish to acknowledge help extended by others. The concluding paragraph is a note of thanks for having been given the report assignment, an expression of willingness to discuss the report, and an offer to assist with future projects.

If the report does not have a synopsis, the letter of transmittal may summarize the major findings, conclusions, and recommendations. This material would be placed after the opening of the letter.

Acknowledgements

This is a list of persons who you would like to thank for their advice, support, or assistance of any kind. It is not only customary but also necessary to acknowledge even the small help rendered by people. While writing the 'Acknowledgements', do remember the following guidelines:

- Categorize your audience: courtesy, real help, emotional support, secretarial assistance.
- Vary your expressions: do not begin each sentence with 'I think'; such a monotonous beginning will reduce the impact of your acknowledgements.

Here are a few openings:

Thanks are due to

Our sincere appreciation to

We owe a lot to

Mere thanks in few words would be highly

Inadequate to express my sincere thanks to

I am extremely grateful to

My heartfelt thanks are due to

I acknowledge with thanks the support rendered by

- Avoid clichés such as:

First and foremost

Last but not the least

Firstly secondly thirdly

I take this opportunity to thank

- Avoid listing the names.
- Divide the content (if long) into well-structured paragraphs.

Table of Contents

'Table of Contents', generally titled simply 'Contents', helps your reader locate a specific topic easily and quickly. If your report is short (ten pages or less), you need not include this element in your report. This table is the final form of your report outline, or simply known as frozen outline with page numbers. It indicates in outline form the coverage, sequence, and relative importance of information presented in your report. The 'Contents' page is especially helpful to readers who wish to read only a few selected topics of your report.

'Contents' lists all the three parts, namely Prefatory, Main, and the Supplementary Parts, of your report along with their page numbers.

It also lists the illustrations you have used in your report. But, if the illustrations are more than five, you can include a separate 'Contents' page for your illustrations (List of Illustrations), which will be placed after the 'Contents'. Though your outline can have subheadings of any degree, your 'Contents' page limits you to using headings up to three levels only. See the following example of Table of Contents in Exhibit 8.8:

Depending upon the length and complexity of your report, your 'Contents' page may show only the top two or three levels of headings or only first-level headings.

In order to show the beginning page numbers for each topic, 'Contents' is prepared conveniently after all the other elements of the report have been prepared. All the topics and sub-topics should be listed as they appear in the text of your report. Prefatory parts are numbered in small Roman numerals while the main text and supplementary parts are numbered in Arabic numerals (see Exhibit 8.8).

Exhibit 8.8 SAMPLE TABLE OF CONTENTS

TABLE OF CONTENTS	
Acknowledgements	ii
Abstract	iv
1. Introduction	1
2. Growth of Medical Facilities—An overview	4
3. Hospitals & Dispensaries	11
4. Beds	16
5. Health centres	21
5.1. Community	
5.2. Primary	
5.3. Sub	
6. Conclusions	30
7. Recommendations	32
Appendix	34
References	41

List of Illustrations

This serves as the 'contents' page for all the illustrations which appear in your report. Except tables, all other illustrations (graphs, maps, drawings, charts, etc.) are grouped under the heading Figures. The List of Illustrations gives the titles and page numbers of all visual aids. When tables and figures are numbered separately, they should also be listed separately. If you find it difficult to accommodate both the lists on a single page, you can list them on two separate pages. These lists would enable the reader to quickly locate any specific illustration.

Abstract

An abstract gives the essence of your report. In business reports it is known as synopsis. The length of an abstract is generally 2 to 5 per cent of the report. The length and readership of your report decide whether an abstract is to be included. If your report is less than ten pages it does not require either abstract or summary. (While an abstract is more appropriate in specialist-to-specialist communication, a summary is meant for all readers, it is longer than an abstract.) If the report is 10–50 pages long it should have an abstract. If it is voluminous, or more than 50 pages, it needs both abstract and summary. An abstract is especially relevant in specialist-to-specialist communication where the reader would be expected to have some background knowledge of the subject. It does not allow abbreviation, acronym, or illustration. It tells the reader the following:

- Objective
- Main findings or accomplishment
- Significance

Exhibit 8.9 shows a sample abstract written for an informative report on the Growth of Medical Facilities in India during 1951–1999.

Summary

While abstract is more appropriate in specialist-to-specialist communication, summary is meant for all readers. It is longer than an abstract (5–10 per cent of the length of the report). Business reports name 'Summary' as 'Executive Summary'. It presents the entire report in a nutshell. Summaries may contain

Exhibit 8.9 SAMPLE ABSTRACT

Medical facilities in India, no doubt have grown considerably over the years. With the primary objective of providing a clear view of this growth over the years 1951–1997, this report analyses in detail the various facilities related to hospitals, dispensaries, and centres in our nation. Essentially the study would provide a comprehensive view of the medical facilities, which in turn would enable the authorities to decide upon improving the same in future.

headings, adequately developed text, and even visual aids. A well-written summary opens a window into the body of the report and allows your reader to form an impression of how well you have dealt with the topic of your report. Generally, the summary of a report presents gleanings from various parts of the report in the same sequence as they appear in the report. After reading the summary, your audience should know the essentials of the report and be able to make a decision. Later, when they find time, they may read certain parts of the report to obtain additional detail.

Table 8.8 presents the difference between an abstract and a summary.

Table 8.8 DIFFERENCES BETWEEN ABSTRACT AND SUMMARY

Abstract	Summary
<ul style="list-style-type: none"> • Essence of the report • 2–5 per cent of the report • More relevant in specialist-to-specialist communication • Information is qualitative • Do not include illustrations 	<ul style="list-style-type: none"> • Entire report in a nutshell • 5–10 per cent of the report • Meant for all readers • Information is both qualitative and quantitative • May include certain illustrations

Preface

Preface is the preliminary message from the writer to the reader. It is quite similar to the letter of transmittal, except that it does not formally transmit the report. It seeks to help the reader appreciate and understand the report. The contents of a preface are:

Factors that Led You to the Report (what was the prevailing situation or earlier studies carried out and hence the need for this study and report)

Organization of Your Report (what do the various sections contain)

Highlights (important observations and findings)

Significance (how your report would enable readers in further study or research; how best your study would help them)

Acknowledgements (Frequently, when you include Preface, you can dispense with the ‘Acknowledgments’ page. You can express in the Preface itself your indebtedness to those who helped you in your study.)

Generally, the preface appears only when your report gets published.

Copyright Notice

Copyright is a form of protection that covers published and unpublished literary, scientific, and artistic works, whatever the form of expression, provided such work is executed in a tangible or material form. Simply put, it means that if you can see it, hear it, and/or touch it, it may be protected.

Copyright laws grant the creator the exclusive right to reproduce, prepare derivative works, distribute, perform, and display the work publicly. For example, a copyright statement that reads ‘© Copyright 1998, OUP, India’ means that the Oxford University Press of India has legal monopoly over the work, which was produced in 1998.

There is one thing that must be clarified, though. The actual *intangible idea* may not be copyrighted. What is copyrighted is the tangible result of the idea, which would be the layout written in the copyrighted work.

Even if you paraphrase the author’s original words, you must credit your source’s hard work by naming your source as a reference. This is a requirement under copyright legislation.

Main Text

Introduction

The function of an Introduction is to put the whole report in perspective and to provide a smooth, sound opening for it. It presents the subject or problem to the readers and gets their attention. A good Introduction

A good Introduction must furnish the readers with sufficient material concerning the investigation and problem, to lead them to an easy comprehension of the rest of the report.

must furnish the readers with sufficient material concerning the investigation and problem, to lead them to an easy comprehension of the rest of the report. It should also give the readers a general view of the report before they plunge into the details. In other words Introduction is a section where you present a broad, general view of your report rather than a specific and analytical one.

An introduction includes the following information:

Background of the Report Conditions/events giving rise to the project or survey need to be discussed here. Details of previous investigations, and studies can also be included if there is significant time gap.

Purpose and Scope The background will logically lead to the purpose of the report. If the investigator has received the Terms of Reference, they can be presented verbatim. Otherwise the objectives have to be clearly specified.

The purpose statement describes what you plan to accomplish with your report and thus the boundaries of your work. Stating which issues you will cover and which issues you will not cover is especially important with complex, lengthy investigations.

Authorization Mention the authority who has assigned you to do this project/conduct this survey. In other words, mention the recipient’s name and designation.

Basic Principles or Theories Involved Outline the important theories and principles you have used for analysing the data.

Methods of Gathering Data Mention what methods you have used or sources you have consulted for collecting the data.

General Plan in Developing the Solution (Brief Outline of the Methodology) Outline the methodology adopted in your analysis.

General Structure of the Report (Organization of Various Sections) The Introduction may contain subheadings such as objectives and procedures, which serve as significant guideposts for the readers.

Ending the Introduction with an explanation of the general plan of the report will provide a logical transition to the next section of the report. You can also end it with the discussion of the procedures used

to gather data; and then the next section would present the results. A brief outline of the results or main conclusions may also provide a logical transition to the first part of the Discussion section of your report.

The Discussion should lead the reader through the same reasoning process the author used to reach the conclusions and show him that they are sound.

Discussion

Discussion—the most voluminous part of your report—contains the information that supports your conclusion and recommendations, as well as your analysis, logic, and interpretation of the information. Here, information and data are presented, analysed, and interpreted. The writer must decide between pertinent data to include in the text and less important information to omit or relegate to the appendix. Meanings,

ideas, and facts are made clear to the reader. Comparisons are made; facts are evaluated; significant relationships are drawn. The solution of a problem may be given with an explanation of its advantages and disadvantages. Tables, charts, and other media for presenting figures and data are used. Other illustrative material may be included (the use of illustrations is discussed later in this chapter under the heading Visual Aids). Emphasis is on the results and their interpretation. The discussion should lead the reader through the same reasoning process that the author used to reach the conclusions and show him that they are sound.

Opposing contentions should be considered to show how the data prove otherwise. The writer should not assume that the reader agrees with a concept, unless it is generally accepted. Simple, straightforward statements of facts are most easily understood. Different aspects of the problem are treated in this section. Major subject headings are used to guide the reader. Points may be arranged to suit the subject and reader.

Tell your audience what you are going to tell them. Tell it to them. And then tell them what you have told them!

Conclusion

Hilaire Belloc's recipe for a lecture might well be followed in report writing. First of all tell your audience what you are going to tell them. Tell it to them. And then tell them what you have told them!

Conclusion is that section of the report where you bring together all the essential points developed in the discussion.

The function of this section is to gracefully bring the discussion to a close and to signal to the reader that he has reached the end of the report. It also refers to the logical inferences drawn, the judgments formed on the basis of analysis of data presented in the report, or to the findings of the investigation. The conclusion section has the following characteristics:

- Uses decreasing order of importance.
- Can be narrative (in paragraphs) or tabular (in points)
- Uses narrative type when there are few conclusions
- Uses tabular form when there are more conclusions
- Narrative and tabular both forms are acceptable but the latter is better for quick comprehension.
- Contains only opinions and never suggests future actions to be taken by the reader.
- Does not introduce any new idea not previously introduced in the report.

Conclusions are the result of reasoned analysis and judgement of the data in the report and serve as a basis for recommendations growing out of the study. They may be summary or analytical in nature. In summary, the conclusion section is a recapitulation of the significant points developed in the discussion section. Concluding statements are supported by the facts in the discussion section.

An example of the tabular type of conclusion is the following, taken from a consumer-preference survey made by Swift & Company for the moulded pulp egg carton vs. the regular self-locking egg carton:

1. The moulded pulp carton is decidedly preferred, both by those having used it (77 per cent of them) and those who have not used it (68 per cent of them).
2. Protection is the principal reason of preference for the moulded pulp carton.
3. 'Hard to open' and 'can't see eggs' are the principal reasons for disliking the moulded pulp carton, given by those who have used it.
4. 15 per cent of those preferring the moulded pulp carton had opening troubles—69 per cent of those preferring the regular type found the pulp carton difficult to open.
5. 45 per cent of those preferring the moulded pulp carton liked to look at eggs before buying, compared to 74 per cent of those preferring the regular type. 'Want to see size' and 'colour' were given as reasons why.

Here is a sample of the narrative form of conclusion.

Until the final comparative analysis of sales, there was relatively little to choose between the two cities. Both were certainly well adapted to a location for conducting the presenting surveys of a small national-scale advertising agency, although at this point Kansas City has probably shown itself to be slightly more representative of the nation than Cincinnati. The analysis of retail sales, however, completely changed the picture.

In an information report, the conclusion is generally narrative in form. If the report is analytical by nature, conclusions are reached through analysis and interpretation of the data. They result from thinking over the facts and are usually discussed in paragraphs, in which case you can have subtitles also. Look at the following sample conclusion:

Original Assumption of Suitability

As has been stated previously, no city's population can ever be expected to represent an average sample of the inhabitants of the entire country. Income, standard of living, and sales almost invariably will be greater than average. Consequently, the only measure of suitability is the extent to which these factors remain in proportion to one another, and hence, the degree of reliability which they have, after making necessary corrections and adjustments in data.

On this basis, Cincinnati would seem quite adequately and satisfactorily suited for use as an advertising 'pretesting' ground. Kansas City, in view of its retail sales pattern, is certainly far less suitable, although it could probably be used if necessary.

It should be remembered that these conclusions are based on a current analysis, not a trend analysis, and pertain only to the present time. A period of a few years may completely reverse the situation, or it may be found that the present sales pattern in Kansas City is only a temporary distortion.

Choice of the More Suitable City

After the foregoing discussion, it seems hardly necessary to state that Cincinnati, Ohio is by far the more suitable of the two cities. Its population constitutes a better average sample than Kansas City's and the result of surveys made there should prove more reliable, in the long run, than those made in Kansas City.

Sometimes facts are presented, analysed, and a conclusion reached in the discussion section; then the writer moves on to another set of facts, their analysis, and another conclusion. In this case conclusions are reached along with analysis of the material. Then in the conclusion section they are all brought together in summary form.

Recommendations

Recommendations pertain to the action that is to be taken as a result of the report. They are supported by the conclusions, and they are aimed towards accomplishing the purpose of the report. If the purpose of a report, for instance, is to alleviate employee grievances over wage incentive plans, the recommendations will suggest ways that this can be done. Conclusions and results of investigating the problem will support the recommendations.

Like conclusions, recommendations may take the form of a formal, long report. Recommendations are generally presented last; such has been the case in the discussion in this chapter. They do not, however,

always appear at the end of the report. They may be given first, especially in recommendation reports. They are also sometimes treated briefly in the letter of transmittal, preface, and separate summary section. If the reader is likely to react unfavourably to the recommendation, then it should be given last; the report can prepare him for it. If he is already familiar with the data or is chiefly interested in the action to be taken, then the recommendation should be presented first to avoid reading through a lot of material.

Conclusions embody the inferences and findings of the report, whereas the function of recommendations is to suggest the future course of action.

In some reports conclusions and recommendations are combined on the idea that they are closely associated. Unless the report is very short, or you are specifically required to do so, you need not combine the two.

Recommendations in a report help the reader to take some important decisions or solve some serious problems. In fact the objectives or terms of reference of your report indicate whether recommendations are needed. It is not wise to offer recommendations if you have not been asked to do so. The reader for whom you prepare the report may think that you have assumed the authority which rightly belongs to him/her. And this assumption may affect your relationship with him/her. More than anywhere else, there is a need here for a special attention to the kind of readers and your relationship with them. Consider carefully your relationship with them.

Recommendations, depending upon your relationship with the reader, can assume any of the following three types:

Tentative (temporary solutions which may have to be reconsidered in future)

Conciliatory (suggestions which you feel may be accepted by the recipient)

Aggressive (recommendations which are mandatory and are to be implemented immediately)

Supplementary Parts

Appendices

This section of your report is used for information which has some relevance to the report but cannot be easily fitted into the text. It is a convenient way of presenting detailed information particularly of a descriptive nature, which, if inserted in the main body, would interrupt the smooth flow of the narrative. Hence, before including any material in the appendix, you should:

- see whether the material is related to the subject of your report
- check whether it would interrupt the theme if included in the main body

An Appendix should contain (i) material not strictly related to the main argument of the report but which nevertheless is of interest and (ii) material which readers can safely omit but can consult if they want to examine the details, and also to carry out further study.

Generally, an Appendix contains materials such as sample documents, detailed calculations, experimental results, statistical data tables and graphs, specimen questionnaires or samples of forms used in investigations, summaries of results achieved by other organizations, etc.

An Appendix also helps you to present recent work or data added at the last moment. It is better to put these in an Appendix rather than completely rewrite the report which has been conceived and written as a whole.

If there are many appendices, name them as Appendix A, Appendix B, and so on. Also give an appropriate title to each of them. But avoid lengthy and numerous appendices as they reveal the writer's poor organization.

Bibliography (References/Sources/Works Cited)

A bibliography is an alphabetical list of the sources—books, magazines, newspapers, CD-ROMs, Internet, interviews—that you have consulted while preparing your report. This list is used for the following reasons:

- to acknowledge and give credit to your sources of words, ideas, diagrams, illustrations, quotations borrowed, or any materials summarized or paraphrased,
- to give your readers information to identify and consult your sources, and
- to give your readers an opportunity to check your sources for accuracy.

The Harvard method of citation has become popular because it is clear and easy to follow. The shortened reference (author's name and year of publication) is given in the text in brackets, followed by more detailed references at the end.

You may name this section *References* or *Sources* if it includes works consulted but not mentioned in your report.

You may call this section *Works Cited* if you list only the works that are mentioned in the report.

There is a definite pattern and style according to which sources or references are cited. Over the years various styles have evolved, such as the Chicago Style, Harvard Style etc.

The details you require to prepare a bibliography are:

- author
- title
- place of publication
- publisher
- date of publication
- page number(s) (for articles from magazines, journals, periodicals, newspapers, encyclopedias, or anthologies).

Besides providing a bibliography, some writers prefer to cite references in the report text. Acknowledging your sources in the text demonstrates that you have thoroughly researched the subject of your report and helps build credibility among readers. Many writers mention a creditable source's name several times to persuade their audience. But if you do not want to make your report read like an academic treatise with numerous citations, simply mention the source in the text. However, for your ready reference, we have provided an example to show you how to cite the references in the text, and also a list of references/works cited in a page (Exhibit 8.10), as it appears in a report.

Exhibit 8.10 REFERENCES

REFERENCES

- Berst, Jesse. 'Berst Alert.' ZD Net 30 Jan. 1998. <http://www.zdnet.com/anchordesk/story_1716.html>
- Corporate Credit Union Network. A Review of the Credit Union Financial System. Kansas City: U.S. Central. 1998.
- Kroll Jack. 'T.Rex Redux.' Newsweek, 26 May 1997: 74–75
- 'Rocket.' The World Book Encyclopedia. 1979 ed. Chicago: World Book.
- Thomas John, The Art of Writing, 1997. New Delhi: Novel Publishers.
- Tibbets, Charlene and A.M. Tibbets, Strategies: A Rhetoric and Reader. Glenview: Scott and Company. 1988.

Citing Works Within the Text To document your sources, cite the author's name, year of publication, and the page number of the source in parentheses at the end of the sentence, before the final period:

‘Thus acquiring skills in composition enhances one’s proficiency in language’.
(Thomas 1997, 101–102).

OR

If the author’s name is used in your sentence you may just refer to page numbers:

As Thomas (1997, 101–102) observes, *‘Thus acquiring skills in composition enhances one’s proficiency in language’.*

OR

If you are referring to the whole work rather than a specific section, you may omit any reference in parentheses:

According to Thomas, acquiring skills in composition enhances one’s language proficiency.

Your bibliography can also be an Annotated Bibliography which is an alphabetical list of books or articles for which you have added explanatory or critical notes. The annotation is usually written in a paragraph, about 150 words, in which you briefly describe the book or article cited and then add an evaluation and a critical comment of your own.

Following are two examples of what an APA annotated bibliography may look like.

- Keefe, F. J., (1996) Pain in arthritis and musculoskeletal disorders. *Journal of Orthopedic & Sports Physical Therapy*, 2: 279–290.

I got all the facts about exercising with arthritis and the different types of exercise from this source. The author is very readable and includes a detailed bibliography.

- Sewell, W. (1989). *Weaving a program: Literate programming in WEB*. New York: Van Nostrand Reinhold.

Sewell explains the code language within these pages including certain lines of code as examples. One useful idea that Sewell uses is to explain characters and how they work in the programming of a Web page. He also goes through and describes how to make lists and a title section. This will be very useful because all Web pages have a title section. This author also introduces Pascal which I am not sure if I will include in my manual but after I read more about it I can decide whether this will be helpful to future users.

Exhibit 8.11 provides guidelines for preparing the list of references or works cited.

Exhibit 8.11 GUIDELINES FOR PREPARING THE LIST OF REFERENCES OR WORKS CITED

- Cite such works in the text and list them in alphabetical order.
- If number is small, give them as footnotes either by putting a printer’s mark ** or writing a number at suitable places of the text.
- Remember that footnotes are intended to be helpful and not ornamental.
- Include (1) author’s name, initials (2) title of the work (3) edition (4) place of publication (5) publisher (6) year (7) page number of citation first and last (8) price. Separate them by periods. For footnotes, use commas to separate.
- Books, journals or periodicals—note volume number and also the edition number.
- Accuracy is essential. For example instead of Vol XVI if by mistake you mention Vol XIV, the reader will find it extremely difficult to find the source.
- Cite even unpublished work, if necessary—e.g., Richards James. *The New Tower of Babel*, Paper read to the Presentation of Tech. Information Group at University, College, London, 31 Jan., 1995.

Footnotes

Footnotes and endnotes are used to give credit to sources of any material borrowed, summarized, or paraphrased. They are intended to refer readers to the exact pages of the works listed in the *Works Cited*, *References*, or *Bibliography* section.

The main difference between footnotes and endnotes is that footnotes are placed numerically at the foot of the very same page where direct references are made, while endnotes are placed numerically, at the end of the essay, on a separate page entitled *Endnotes* or *Notes*.

If you are using a typewriter, a superscript number is typed half a space above the line after the last word of the citation, e.g., ‘The information superhighway is giving way to a commercial superhighway.’¹ If you are using a word processor, you can access the superscript function. To type a footnote citation, the same superscript number is put at the beginning of the footnote at the bottom of the same page where the citation occurs.

When mentioning a work for the first time, a full and complete footnote or endnote entry must be made.

Please note that only *one* sentence is used in a Footnote or Endnote citation, i.e., only *one* period or full stop is used at the end of any Footnote or Endnote citation. In a bibliography, each citation consists of a minimum of *three* statements or sentences, hence each entry requires a minimum of *three* periods, e.g., a period after the *author* statement, a period after the *title* statement, and a period after the *publication* statement (publication/publisher/publication date).

Footnote or Endnote Example

² G. Wayne Miller, *King of Hearts: The True Story of the Maverick Who Pioneered Open Heart Surgery* (New York: Times, 2000), 245.

Bibliography Example

Miller, G. Wayne. *King of Hearts: The True Story of the Maverick Who Pioneered Open Heart Surgery*. New York: Times, 2000.

Remember that the insertion of too many footnotes interrupts the smooth flow of your report. Moreover footnotes are very distracting; hence use them sparingly. Also, be brief while using them.

Glossary

This is a list of technical words used in the report and their explanations. If small in number, the terms are explained in footnotes themselves. The decision whether to include a glossary or not depends upon the background of your targeted readers. If they are from other fields, it would be better to include it.

Index

The index is intended to serve as a quick guide to locate the material in your report. Your readers can locate a topic, sub-topic or any other important aspect of the report quickly and easily. This element is generally used in bulky reports where the contents do not serve the purpose of locating a particular issue. The index is arranged in alphabetical order (please see the index of this book) and it is extremely helpful in cross-referencing.

WRITING THE REPORT

First Draft

The last stage is that of writing the report. It will need a constant shuttling between the outline and the notes. First a rough draft of the report is prepared. Then it is revised, pruned, and polished. If the writer has some more time at his disposal, he will find it advantageous to come back to his rough draft after, say, a couple of days. This short interval will make his revision work really meaningful. The writer should also be careful that the language of the report is simple, unambiguous, and free from grammatical errors. It is now time to type it out in a proper form and submit it.

Visual Aids

Visual aids are part of the discussion section of your report. You might have observed that most of the technical reports, whether they are laboratory reports, project reports, or feasibility reports, include illustrations such as tables, graphs, maps, diagrams, charts or photographs. In fact, text and illustrations are complementary in technical reports. You can use graphics to represent the following elements in your technical writing:

Concepts If you want to show how your company is organized, that is, the relationships between the different departments and officials, you could set up organization chart-boxes and circles connected with lines that show how everything is hierarchically arranged and related. This would be an example of a graphic for a concept: this type depicts non-physical, conceptual things and their relationships.

Objects If you are describing a fuel-injection system, you will probably need a drawing or diagram of the device. If you are explaining how to graft a fruit tree, you will need some illustrations of how that task is done. Photographs, drawings, diagrams, and schematics are the types of graphics that show objects.

Numbers If you are discussing the rising cost of housing in a particular city, you could use a table with the columns being for five-year periods since 1995. The rows could be for different types of housing. You could show the same data in the form of bar charts, pie charts, or line graphs.

Words Finally, graphics are used to depict words. You have probably noticed how textbooks put key definitions and examples in a box with words.

Visual Aids as Supporting Data

Illustrations are very effective when you have a mass of statistics and complex ideas to be represented in your report. You can explain the statistical data through tables, graphs, charts, maps, diagrams, or photographs in your report. As already mentioned, text and illustrations are complementary in technical reports. Hence, whenever you realize that illustrations can best explain your data, you use them. It is not advisable to use visual aids in your report just for the sake of using them.

Advantages You already know that visual communication has more impact than verbal communication. Using illustrations has many advantages such as the following:

- Arouses interest and focusses on essentials
- Leads the reader to quicker comprehension
- Supports and reinforces your words
- Saves much time and effort in explaining and interpreting complex ideas
- Explains the data in much lesser space but with greater accuracy
- Simplifies numerical data
- Emphasizes and clarifies certain facts and relationships
- Makes your descriptions vivid and eye-catching
- Renders a professional flavour to your report

Effective Use Some guidelines to use illustrations effectively in your reports are as follows:

- Provide neat, accurate and self-contained illustrations.
- Choose illustrations appropriate to the data.
- Label them completely.
- Make sure that they are self-contained.
- Integrate each illustration with the text.
- Place them as close to the first reference as possible.

- See to their size so that even on reproduction, they are clear.
- Establish a balance between the verbal and the visual.

Types of Visual Aids

Figure 8.1 shows various types of illustrations.

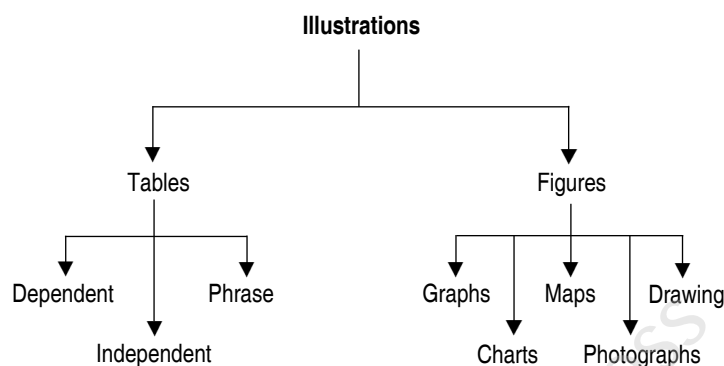


Figure 8.1 TYPES OF ILLUSTRATIONS

From Figure 8.1, you may find that though there are various kinds of visual aids, we may broadly classify them into two main categories, namely, tables and figures. All illustrations other than tables are usually categorized as figures.

Which type of illustration can be used most effectively to accomplish the desired objective? What type will present the facts more clearly?

In the process of selecting and designing illustrations, the question of which type to use always arises. Which type of illustration can be used most effectively to accomplish the desired objective? What type will present the facts more clearly? Before these questions can be answered, and before the actual work of selecting and designing an illustration can begin, the following preliminary steps must be taken. First the material must be arranged in some sort of systematic order: a series, a distribution, or some other logical

arrangement. Next, you must be thoroughly familiar with the material and be aware of the implications of its use. The final step involves a decision as to the type of illustration to be used. Several factors enter into a decision of this kind, such as the nature of the data, the anticipated use, and the intended audience. These factors are usually interrelated.

The type of data will often aid in the selection of the appropriate type of media. For example, if the data were quantitative in nature, the selection might be from one group of charts; if the data were more qualitative in nature, the selection might be made from another group.

The following pages provide samples of various types of illustrations and also briefly explain the purpose for which each of these types is used.

Tables A table is a systematic arrangement of numbers, words, or phrases in rows and columns, used to depict original numerical data and also derived statistics. It permits rapid access to and relatively easy comparison of information. If the data is arranged chronologically (for example, sales figures over a ten-year period), the table can show trends—patterns of rising or falling activity. Of course, tables are not necessarily the most vivid or dramatic means of showing such trends or relationships between data—that is why we have charts and graphs.

The biggest use of tables is for numerical data. Imagine that you are comparing different models of laser printers in terms of physical characteristics such as height, depth, length, weight, and so on—you can use a table in this case.

Traditionally, the title of a table is placed on top of the table or in the first row of the table. If the contents of the table are obvious and there is no need to cross-reference the table from anywhere else in the report, you can omit the title. To avoid complication, you can consider tables as figures (the same as illustrations and other graphics), and number them within the same sequence. Exhibit 8.12 presents some guidelines for style and formatting of tables.

Exhibit 8.12 STYLE AND FORMATTING GUIDELINES FOR TABLES

- Refer to the table in the text just preceding the table. Explain the general significance of the data in the table; do not expect readers to figure it out entirely for themselves.
- Do not overwhelm readers with monster 11-column, 30-row tables! Simplify the table data down to just that amount of data that illustrates your point—without, of course, distorting that data.
- Do not put the word or abbreviation for the unit of measurement in every cell of a column. For example, in a column of measurements all in millimeters, don't put 'mm' after every number. Put the abbreviation in parentheses in the column or row heading.
- Right- or decimal-align numbers in the columns. If the 123 and 4 were in a column, the 4 would be right below the 3, not below 1.
- When there is some special point you need to make about one or more of the items in the table, use a footnote instead of clogging up the table with the information.
- Most of the advanced word-processing software packages, such as Word and WordPerfect, now have table-generating tools. You don't have to draw the lines and other formatting details.

As indicated in Figure 8.1, there are three types of tables:

- Dependent
- Independent
- Phrase

Details of Inpatients Admitted on 14.11.99	
General ward	35
Special ward	15
Maternity ward	10

Dependent tables are those whose contents cannot be understood without going through the text. This type is used when you have less data (Figure 8.2).

Independent tables are the most commonly used ones. Though your text should explain each table, readers need not go through the text to understand the contents of these tables (Figure 8.3).

Figure 8.2 DEPENDENT TABLE

Table II—Fatal Road Accidents 1991–95 (% wise)

Year	Pedestrians	Cyclists	Others	Total	%
1991	2380	830	1310	4520	19.7
1992	2315	850	1615	4780	20.8
1993	2255	805	1750	4810	20.9
1994	2460	750	2060	5270	22.9
1995	2050	735	800	3585	15.7
Total	11460	3970	7535	22965	100
Percentage	50%	17%	33%	100%	

Figure 8.3 INDEPENDENT TABLE

Goods	Durability	Nature/metal	Availability
Wires	Long lasting	Copper	Freely
Utensils	Long lasting	Steel	Scarce

Figure 8.4 PHRASE TABLE

report writer, has both advantages and disadvantages. A lot of figures can be depicted. A number of combinations are possible in this tabular form; for example, numeric and non-numeric data can be depicted together. However, it also has certain disadvantages: while it is part of the visual depiction, yet, visually, the details are not evident at a glance. Occasionally, the writer might, in the process of putting in too much data, make it too detailed and complicated. Finally, the visual appeal in these charts is missing.

Graphs Graphs are actually just another way of presenting the same data that is presented in tables—although a more dramatic and interesting one. At the same time, however, you get less detail or less precision in a chart or diagram than you do in the table. Imagine the difference between a *table* of sales figures for a ten-year period and a *line graph* for that same data. You get a better sense of the overall trend in the graph but not the precise rupee amount.

As with illustrations, you have the options for creating charts and graphs by photocopying from other sources, generating your own with special software, and manually creating your own. Many of the text-processing software packages have fancy features for generating charts and graphs—you just feed in your data, specify the format you want and you will get the graph or chart.

When you create charts and diagrams, keep the following requirements in mind:

Axis Labels In bar charts and line graphs, do not forget to indicate what the x and y axes represent. One axis might indicate millions of dollars; the other, five-year segments from 1960 to the present.

Keys Bar charts, line graphs, and pie charts often use special colour, shading, or line style (solid or dashed). Be sure to indicate what these mean; translate them in a key (a box) in some unused place in the chart or graph.

Figure Titles For most charts and graphs, you will want to include a title, in many cases, a numbered title. Readers need some way of knowing what they are looking at. And do not forget to cite the source of any information you borrowed in order to create the graphic. The standard rule for when to number figures or tables is this: if you cross-reference the figure or table elsewhere in the text.

Cross-references Whenever you use a chart or graph, do not forget to put a cross-reference to it from the related text. With that cross-reference, provide some explanation of what is going on in the graphic, how to interpret it, what its basic trends are, and so on.

Documentation When you borrow information to create a graphic, be sure to use the standard format to indicate the source. See the section on *documenting borrowed information* under prefatory parts (either textual or graphic). It does not matter whether you photocopy the graphic and tape it into your report, retype the graphic (for example, a table), trace or draw the graphic freehand, or take some subset of the data (for example, using data from a table to create a bar chart)—it is *all* borrowed information, which some brave and noble soul worked hard to develop and who deserves credit for that effort.

There are several types of graphs which you may find useful for your reports. The various types of graphs are: rectilinear or line graph, bar graph, pie graph, scatter graph, semi-log graph, pictorial graph and surface graph.

Phrase Tables are used when your data is in words or phrases instead of numerical figures (Figure 8.4).

Advantages and Disadvantages of Tables The tabular form of presentation, while simple for the

Line Graphs Line graphs are used to show the continuous change along with time. For example the *increase, decrease, or no change* in temperature along with time can be depicted through a line chart. If you conduct two or three experiments the three different readings can be depicted using three index lines. See the two samples of line graphs shown in Figures 8.5 and 8.6.

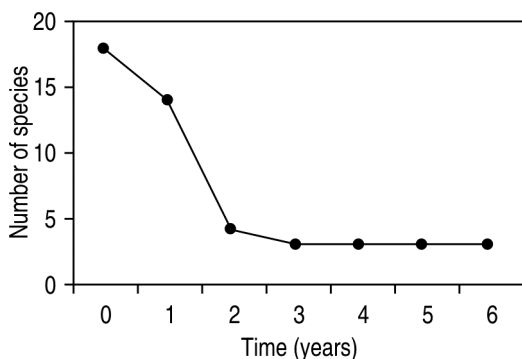


Figure 8.5 LINE GRAPH (1)

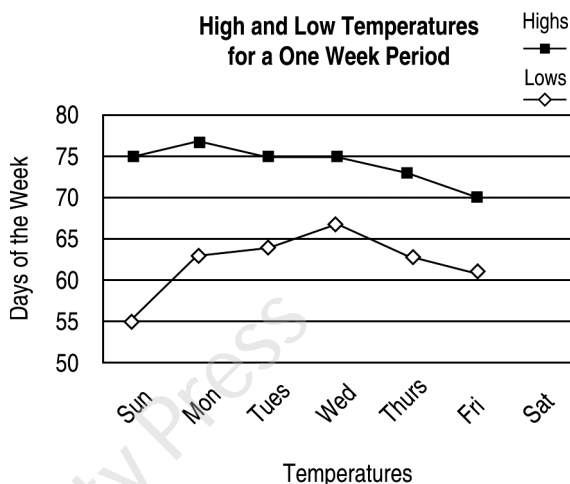


Figure 8.6 LINE GRAPH (2)

This graph is usually used to depict trends over a period. The constant is normally plotted on the *x*-axis or the horizontal axis and the variable on the *y*-axis. Both the scales begin at zero and proceed in equal increments. However, occasionally on the *y*-axis there might be a small break immediately after the zero point. This is normally done when there is a large difference between zero and the first quantity to indicate that some data has no bearing on the current study and has therefore been left out. However, care should be exercised to indicate the points of omission.

A lot of trends over a specific period can be depicted by the line graph. A little caution should, however, be exercised if the lines cross each other at points as this might create confusion in the mind of the reader. Preferably, if there are criss-crossing lines, only three variables should be plotted as more than these might lead to erroneous conclusions.

Advantages and Disadvantages of Line graphs Several variables can be plotted indicating trends over time allowing easy comparisons. However, problems could arise if too many variables are plotted preventing fine distinctions from being evidenced or noticed.

Bar Graphs Bar graphs are effective in emphasizing the comparison of various items in your data. They can be used to depict the quantity of different items during the same period or same item during different periods.

These are the simplest to construct and make for easy comprehension by the reader. They could be of various types: vertical with singular or multiple bars stacked (Figure 8.7) or comparative and horizontal. If these graphs depict more than one variable, two colours or designs are used so as to highlight the difference between two variables. These graphs are comparative and if more than two variables in terms of the same time frame are used, a stacked vertical or horizontal bar chart is used. The greatest advantage of these bar diagrams is that they can also be used with a three-dimensional effect.

Advantages and Disadvantages of Bar Graphs Presentations in this form are advantageous as they have a compelling impact and two or more variables can be stacked without leading to difficulties in grasping

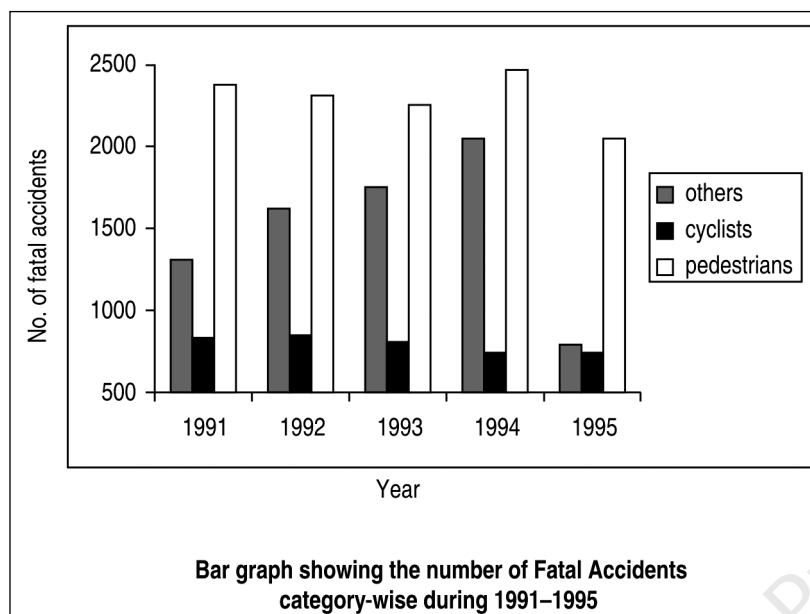


Figure 8.7 BAR GRAPH

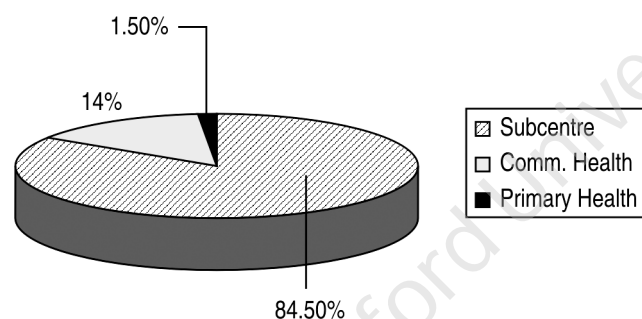


Figure 8.8 PIE GRAPH

occasions when the difference is very minor and it might get blurred; for example, a segment depicting 0.5% may become too small to notice. Hence, it is not advisable to use pie graphs if the number of variables in your data is more than five as it is difficult for the human eye to detect the relative percentage of too many cluttered items.

Semi-logarithmic Graph Semi-log graphs are used to represent such data in which the range of one variable as compared to the other is enormous. In other words, these graphs permit representing very diverse magnitudes on the same graph. Unlike the normal graph sheet, this type of graph uses the arithmetic scale on the horizontal axis and the logarithmic scale on the vertical axis. Please see the sample graph sheet used for semi-log graph as well as the sample of the plotted graph (Figures 8.9 and 8.10).

Scatter Graph If you want to show the correlation between two items in your data, you can use a scatter graph. In scatter graphs, *dots* (.) or *crosses* (x) are used to represent the data. There should be clusters in most of the scatter graphs. The absence of clustering refers to the absence of correlation between the two items represented in the horizontal and vertical axes. You can see the clustering at various places in the example given in Figure 8.11.

the details. The colour and schematic designs added to the bars lend visual appeal to these charts. However, there could be a lack of precision in presentation of details as the variables may become too cluttered and the lettering too small.

Pie Graph Alternatively known as percentage graph or circle graph, pie graphs or pie charts can be used to show how parts are related to the whole in a particular data. This is one of the most popular forms to depict the share of the various categories and their correlations

to the whole as a percentage. If there is a need to emphasize a particular segment, it is detached from the pie and referred to as the *floating wedge*. The other segments are demarcated by lines or differing colours in a circular form (Figure 8.8).

The pie chart captures the attention of the reader at a much faster pace than probably any other presentation would. Within one chart itself segments can be highlighted. In addition to the colour pattern used, the categorization of the segments can be within, outside, or alongside the chart. However, there could be

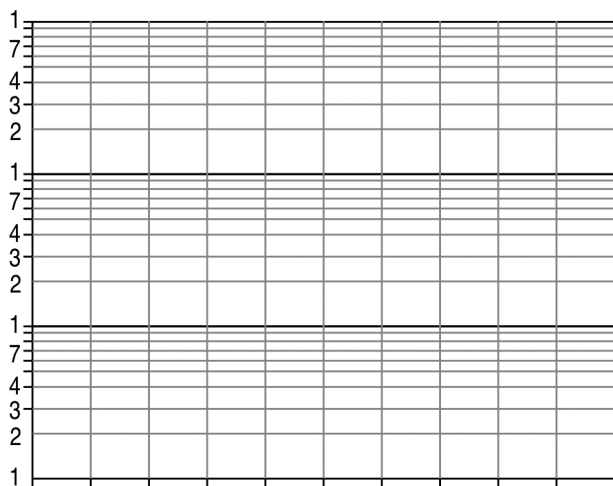


Figure 8.9 GRAPH SHEET

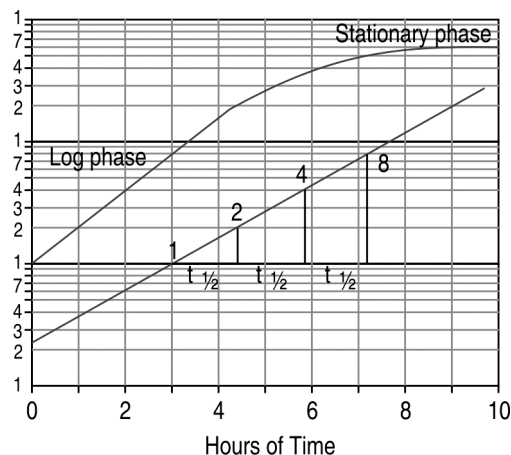


Figure 8.10 PLOTTED GRAPH

Source: //www.scienceprojects.com/SemiLogUse.htm

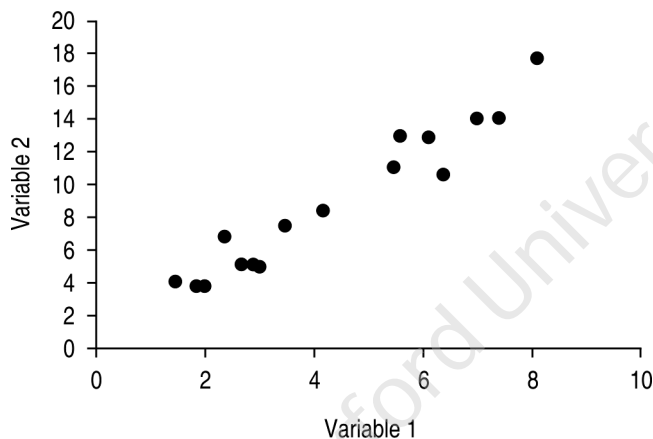


Figure 8.11 SCATTER GRAPH

single cluster of figures. Much time and effort goes into the designing of this chart so as to make it truly representative of the problem that it seeks to address. But it is not very useful for business reports as they are more concrete and not based on pictorial depiction of the problem. As pictograms are eye-catching, these are suitable for magazines (Figure 8.12).

Area Graphs Area graphs can be used to show how something changes over time. Usually, the x-axis has numbers for the time period, and the y-axis has numbers for what is being measured. Area graphs can be used when you are plotting data that has peaks (ups) and valleys (downs), or that was collected in a short time period.

An example of an area graph, given in Figure 8.13, shows the percentages of high school graduates who completed advanced English courses over a period of time.

Area graphs also help you to compare the trends over a period of time. For example, when you plot an area graph to show the water consumption in a particular educational campus, you can see the total consumption of water in that campus as well as the consumption in individual areas as shown in the sample

Pictograms/Pictorial Graph These are more in the nature of bar charts, with figures or small pictures plotted instead of lines. The pictures are chosen in accordance with the topic or the subject matter. This chart is self-explanatory; for example, if a chart were to be prepared indicating the population boom in the last five years, human figures could be used to exemplify the point being made by the report writer. In this example, a cluster of the figures or pictures would indicate an excessive number at that period. This chart, however, not used extensively for business reports.

The advantage of a chart of this kind is that large numbers can be presented by a

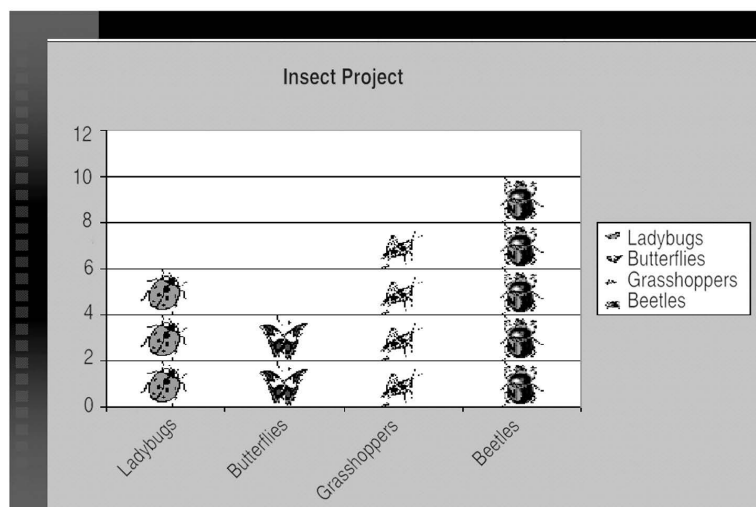


Figure 8.12 PICTOGRAM

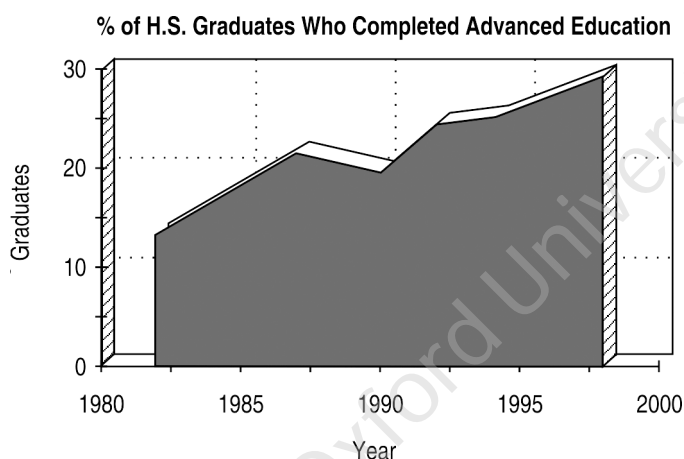


Figure 8.13 AREA GRAPH (1)

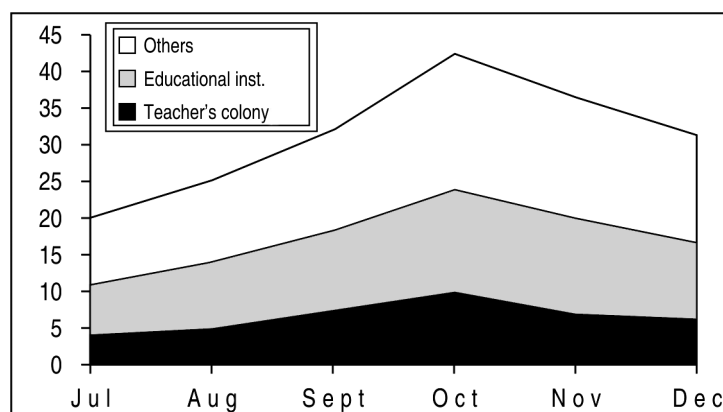


Figure 8.14 AREA GRAPH (2)

(Figure 8.14).

While index lines are predominant in line graphs, the area between lines is highlighted in an area graph. In addition, shades are also used. A darker shade is used at the bottom and as and when you plot higher and higher, the shades become lighter. The peak shows the total water consumption in that campus.

Charts There are two types of charts: Organization Charts and Flow Charts.

Organization Charts Generally organization charts are used to illustrate the various positions or functions of the organization. Most of the communication channels in an organization are described with the use of these kinds of charts. But you can also use such charts to depict the organization of various other ideas such as the different sets of instructions which you may give to your subordinates or different decisions which you have taken. From the sample given in Figure 8.15, you may understand how to organize your ideas in the form of an organization chart:

Flow Charts Flow charts present a sequence of activities from start to finish. They are normally used when we wish to illustrate processes, procedures, and relationships.

The various elements in the chart can also be depicted either with figures or with geometrical designs (Figure 8.16).

Flow Charts are useful to depict the sequential steps in any process or procedure.

Drawings and Diagrams Drawings and diagrams are used to depict objects, processes, circuits, etc. They can be used to show the normal view, sectional view, or the cut-away view of an object.

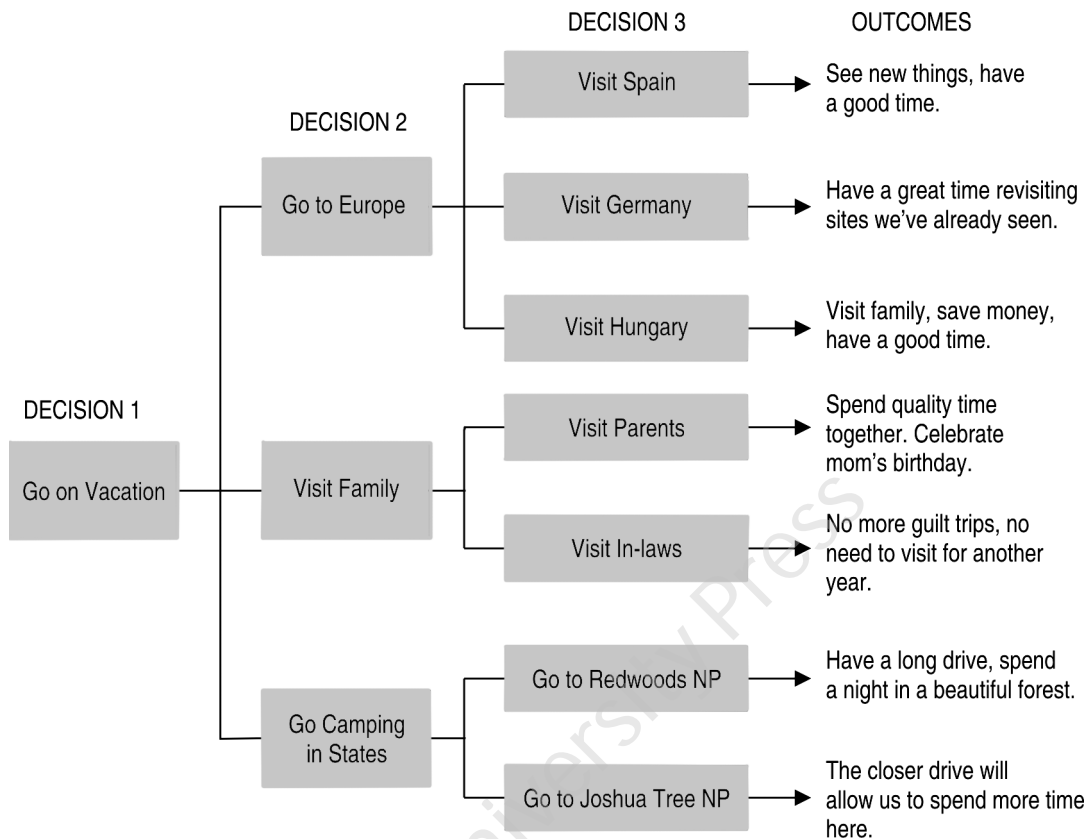


Figure 8.15 ORGANIZATION CHART

In the realm of drawings and photographs, the types run from minimal detail to maximal. A simple line drawing of how to graft a fruit tree reduces the detail to simple lines representing the hands, the tools, the graft stock, and graft. Diagrams are a more abstract, schematic view of things, for example, a wiring diagram of a clock radio; it hardly resembles the actual physical thing at all. These graphics, supplying gradations of detail as they do, have their varying uses.

In instructions, simple drawings (often called line drawings because they use just lines, without other detail such as shading) are the most common. They simplify the situation and the objects so that the reader can focus on the key details.

In descriptions, you would want to use drawings, but in this case drawings with more details, such as shading and depth perspectives.

Lots of *clip arts* are becoming available with software programs and on the Internet. For fairly common objects such as computer and telephones, you can insert these into your document and add labels to them.

Hand-drawing may not be as out of question as you might think. Take a blank sheet of paper and start sketching lightly with a soft-leaded pencil. Keep working until you have the drawing the way you like. Then use a black marker to ink in the lines that you want, and erase the stray pencil markings. Now, treat this drawing the way you would any photocopied image.

A sample drawing and a sample diagram are given in Figures 8.17 and 8.18 respectively.

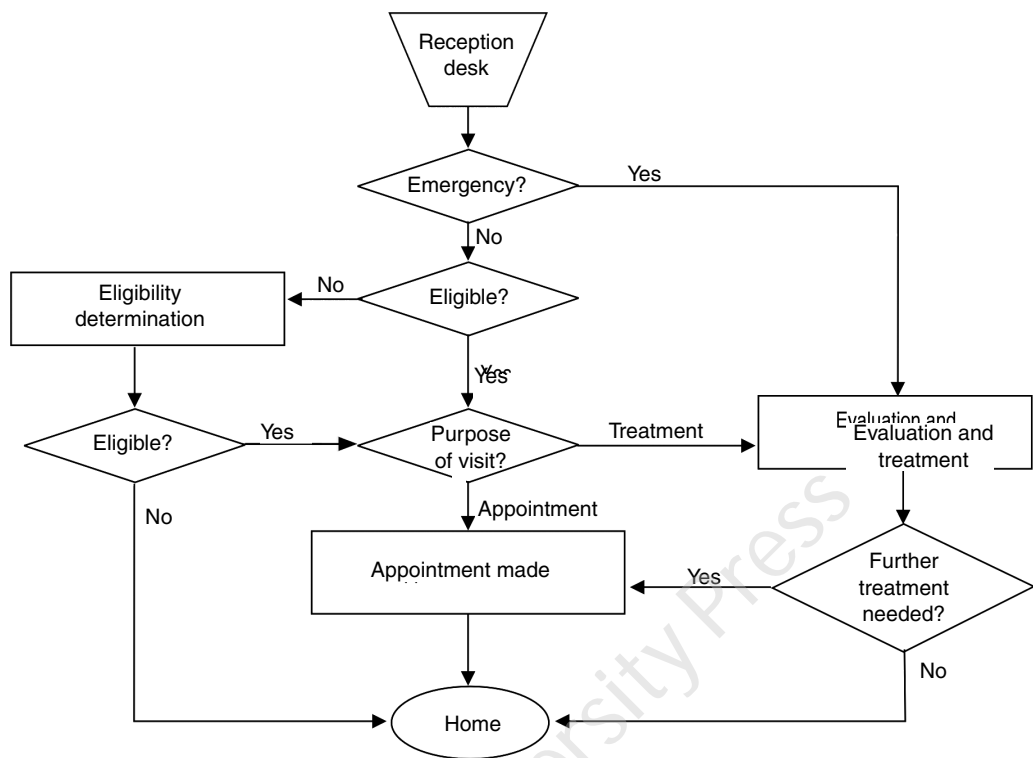


Figure 8.16 FLOW CHART

AW/95 Belt Drive Drawing

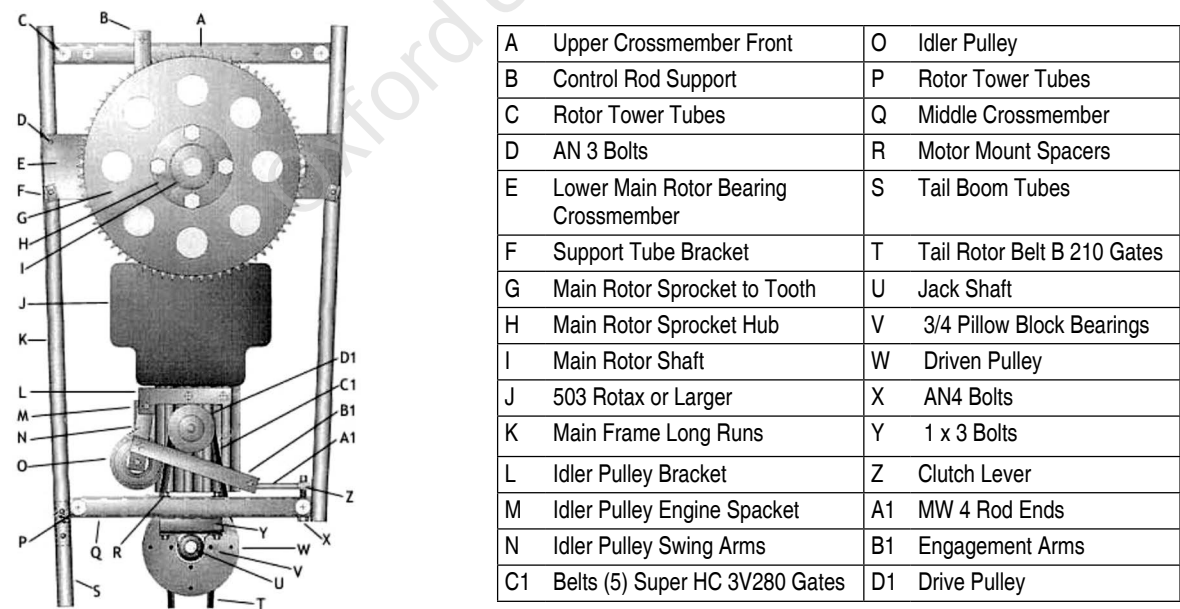
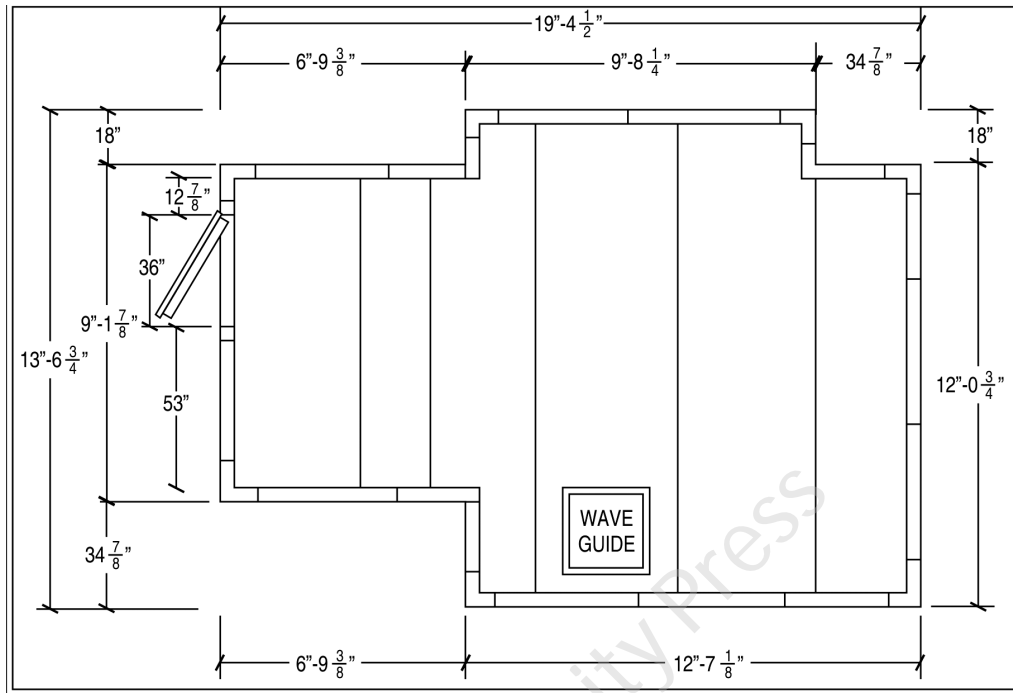


Figure 8.17 SAMPLE DRAWING



Plain View, Nom 14' × 20' × 9'6", Indoor Modular Structure with 14 GA Galvanized Flat Floors

Figure 8.18 SAMPLE DIAGRAM

Photographs In feasibility, recommendation, and evaluation reports, photographs are often used. For example, if you are recommending a photocopier, or if you want to compare various cars, automated teller machines, etc., you might want to include their photographs.

Photographs give the reader a realistic view of the object. But care should be taken when you decide to include them in your report. They should be of such superior quality that they are clear even on reproduction. If you want to omit certain irrelevant details in the photographs you select, you can do so in the negatives and then include.

Figure 8.19 shows photographs of two photocopiers which give you an idea of how they give a realistic view to the readers.

Maps *Maps graphically represent spatial relationships on plane surfaces.* They may take different forms, such as a map of political territory (state, town, or country), the layout of a store or a manufacturing plant, or the market area of a business. They are appropriate when we wish to discuss or present statistical data through geographical indicators or to express relationships between locations. Figure 8.20 shows a map depicting the entire route of a vehicle, along with the number of stops, and the duration of each stop.

The choice of scale for a map depends on its purpose and the amount of detail to be included. It should be an accurate representation of the data and should not create marked distortion of the space it represents. Cross-hatching or shading is used to portray absolute amounts, rates, ratios, and percentages of data, such as health statistics, population data, employment, traffic flow, and land-use. Colour, symbols, and pictograms may be used to make the map more appealing and attractive.



Figure 8.19 PHOTOGRAPHS

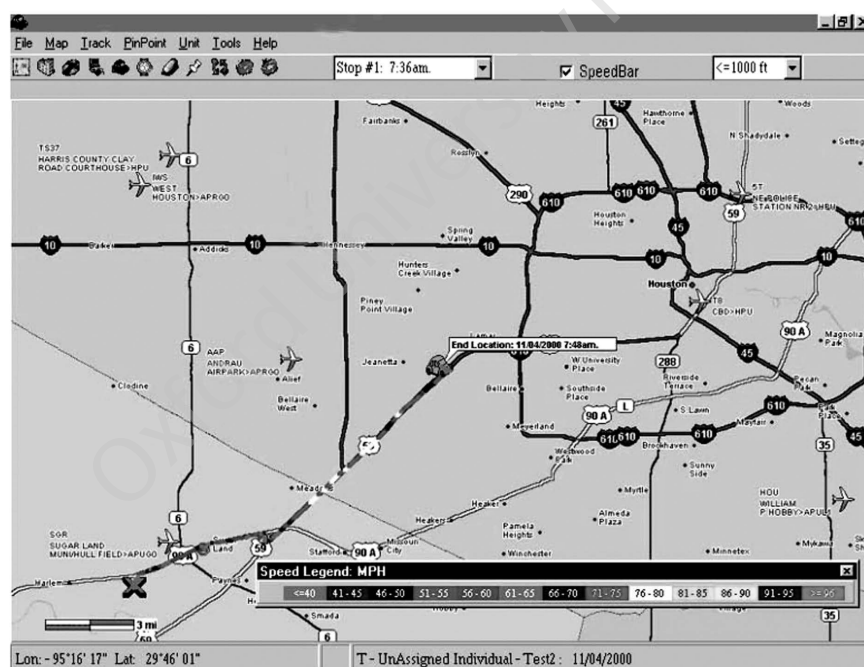


Figure 8.20 MAP

In short, maps are used to show space relationship, to establish a frame of reference, and to facilitate the understanding of certain spatial relationships that are difficult to describe in words.

REVISING, EDITING, AND PROOFREADING

After completing the first draft of your report, you need to review it carefully. The type of your report, its utility, the time available, and also the effectiveness of the first draft determine the amount of revision needed.

The first draft is reviewed for the following:

- Accuracy of facts
- Clarity of expression
- Overall organization
- Adequacy and appropriateness of the contents to meet the set objectives
- Suitability and conformity of illustrations
- Effectiveness in expression
- Grammatical accuracy
- Correctness of layout

Basically, editing is the same as revising because its purpose is to correct and improve the report; to prepare and check the final copy. Although someone other than the author generally does editing, nowadays a number of writers edit their own material. Most of them even do the drafting and revising together, using the recent technological facilities available in computer packages.

The report, revised from all aspects mentioned above with additions, deletions, or corrections, is again read to check and improve it before submission. If your report is to be published, editing also involves carefully preparing the final copy for the printer. You need to check your manuscript first for its correctness, completeness, and clarity of its contents. Then you check it for overall and sectional organization, and finally for the correctness in the mechanics of style and form. In most instances, after revising meticulously, all you need is to correct a few mechanical errors that remain. Some useful tips for revising are given in Exhibit 8.13.

Exhibit 8.13 TIPS FOR EFFECTIVE REVISION

- Reserve sufficient time for revision.
- Read the document critically.
- Review the document for accuracy, completeness, and clarity.
- Revise in several sweeps.
- Proofread the paper copy of the document.
- Check the final copy with the first draft.

Proofreading is done at each stage of preparing your first draft to ensure correctness. The proofreaders should read the copy as a whole, and then check it for form, layout, and mechanical accuracy. It is not necessary to read for content at this stage. The proofreaders should read each word and phrase carefully and thoroughly check the punctuation marks. You need to check the final copy against the first draft to ensure that all the corrections are incorporated. There are standard symbols available for proofreading. To designate corrections or retyping, these symbols are used in the copy and in the margin.

It is always advisable to have two people for proofreading; one for reading aloud and the other for checking. Almost everybody uses the word-processing software these days and hence tends to proofread the soft copy rather than the printout. But it is necessary to proofread the print version especially for longer documents as the human eye may overlook the errors while reading from the computer monitor.

EXERCISES

1. A company is considering a proposal to establish a new factory in your town. The Managing Director has asked you to write a report on suitability of the place for the establishment of this factory. For this

report, an outline is provided below. Study it carefully and *rewrite it* in accordance with the principles of co-ordination, subordination, phrasing, numbering, ordering, etc.

Establishment of a New Factory Outline

1. Introduction
2. Fire fighting and Communication facilities
 - (i) Telephone
 - (ii) Fax
 - (iii) Films
 - (iv) Games
3. Education and Entertainment facilities
4. How is the market
 - A. Potential
 - B. General
5. Labour from Local and other plants
 - 5.0 Raw materials
 - 5.1 Cost
6. Transport facilities
 - 6.1 Rail, road, air
 - 6.2 Raw materials
 - (a) Building
 - (b) Infrastructural
7. Recommendations
8. Conclusions

2. Develop the material given below into a formal outline with appropriate numbers and correct indentation. The outline is not arranged logically. Rework the outline into its logical form.

Animals I Have Had As Pets

- I. Members of the cat family
 - (a) Baby lion
 1. Three days old
 2. Mother died at local zoo
 - (b) House kittens
 1. Five of these
- II. Members of the dog family
 - (a) Two young dogs, mixed breed
 - (b) A poodle
 - (c) German Shepherd
 - (d) Other dogs
- III. Canaries
 - (a) Two males
 - (b) Three females
 - (c) Parakeet
- IV. Guppies
- V. Members of the reptile family
 - (a) Young grass snake
 - (b) Green lizard
 - (c) Two snails
- VI. Goldfish

3. 'The District Collector, Jhunjhunu, is concerned about the rapid increase in the number of road accidents in Pilani. The Chairman, Municipal Corporation, Pilani, has been asked to submit a report investigating the causes and suggesting measures to improve the situation.'

Prepare an outline for the above report.

4. You, as the Collector of Bhuj District, have been asked by the Secretary, Home Department, Gujarat, to submit a report on the relief work that was undertaken after the devastating earthquake hit the area in 2001. The Ministry sanctioned ₹50 crore for the relief operations in the district, which was to be spent on free distribution of grains, water, medicine, etc. Now prepare an outline keeping in mind the principles of effective outline.

5. Fantasy Garments Corporation wants to open a new garment outlet in a metropolitan city for all age groups, ranging from formals to casuals. You, as the Sales Manager of the company, have to prepare a report on the set-up of the new showroom. For this report, prepare an outline which should have nine main headings which contain sub-headings up to second level.

6. Rajasthan has been facing severe drought conditions for the third year in succession. In order to mitigate the sufferings of the drought-affected areas, the state government is fully geared up to start drought relief operations with the objective of generating employment, maintaining cattle conservation, providing drinking water supply, etc. As Secretary to the State Minister for Relief Operations, you have been asked to write a report on the drought relief operations, to be sent to the Council of Ministers. Now prepare only the outline for this report.

7. Modern Consultancy Services, Dalhousie Lane, New Delhi – 110 001, proposes to run a six-week training programme in Professional Communication for their Engineers. As the Director of Training, you have been asked to examine the suitability of running this programme at the Indian Institute of Management, Ahmedabad, during the ensuing summer vacation and to submit a report to the Personnel Manager of the company. Write an outline for this report.

8. Given below are the topics and sub-topics to be included in the outline for a report on Better Reasons

for Not Buying a Car Than to Buy One. Somebody who does not know the principles of preparing an outline messes them up. Your job is to help this person out. Identify the topics and sub-topics and arrange them according to the principles of logical ordering, coordination, subordination, parallel phrasing, and decimal numbering, so as to form an appropriate outline.

Reasons for buying a car, poor financial investment, taxes being very high, initial investment, it also has high interest rates, hazards, continuing investment, convenience, status, conclusions, inconvenience, inadequate highway systems, reasons for not buying a car, accidents are quite possible, fuel, equipment, maintenance, government agencies also take fees, introduction, high cost of fuel, weather is labile and unpredictable, increasingly crowded roads, parking is a growing problem, urban areas are unpredictable.

9. Bharat Textile Mill, Kanpur, manufactures several kinds of cotton and synthetic clothes. For the last five years, there has been a gradual decline in profits owing to various causes, including fall in sales. The Managing Director has asked the marketing manager to investigate the causes, make suitable recommendations, and submit a report. Assuming yourself to be the Marketing Manager, prepare an outline for this report.

10. In modern times, working women are facing problems like eve teasing, sexual harassment, gender discrimination at the time of promotion, salary fixation, etc. You, as the Head of the Women Welfare Association, have been asked to write a report on Gender Discrimination at Work Places. Prepare a mail questionnaire to be sent to women professionals working in various organizations in order to elicit the relevant information.

11. 'Smoking among the youth in India is on the rise. Studies have consistently shown that smoking leads to various ailments. Consequently, it is a major public health concern'.

You as a public health professional have been asked to suggest measures to reduce this problem after carefully studying the extent of smoking, reasons behind it, awareness about the short- and long-term effects and attitudes of the youth towards this practice. Therefore, in order to conduct this study, you have decided to carry out the survey using a mail

questionnaire. Formulate 15 appropriate questions to elicit relevant information from college students about the above mentioned key areas.

12. The Indian Railways is considering major changes to improve the facilities currently available on its Express Trains. A committee has been set up to conduct a customer survey about various facilities travellers need, their satisfaction level, and suggestions to make train travel enjoyable and comfortable.

You are required to prepare a questionnaire with questions that would elicit relevant information in the areas of study.

13. The management of Reg International, Mumbai, is greatly concerned about growing absenteeism among the employees in its various divisions. You as the Personnel Manager, HRD, have been asked to investigate the causes of absenteeism and submit a report to the Managing Director. For collecting the relevant data, prepare a mail questionnaire to be distributed among the employees of the company. Write a covering letter also. Your questionnaire should have at least twenty questions.

14. The Director of College Education, Patna, Bihar, has been concerned about the poor academic standards and mismanagement of the affairs of various colleges in Patna. You, as Deputy Director of Education, have been asked to enquire into the matter and submit a report to the Director. Now prepare a mail questionnaire to be sent to lecturers of the respective colleges in order to collect data for the report.

15. The Managing Director, Parag Textiles, Surat, wishes to study the complaints of its employees regarding the new Bonus and Incentive Scheme announced by the Board of Directors last month. As the Public Relations Officer, you have been asked to submit a report to make the policy more beneficial and effective for its employees. Assuming that you have already prepared a questionnaire, write a covering letter to be sent with the questionnaire.

16. The Director of Education is deeply concerned about the loss of reading habits among the youth today. As the Education Officer, you have been asked to collect the data from the University students and submit a report. Now prepare a Questionnaire to elicit the relevant information.

17. The Ministry of Health, Government of India proposes to conduct a survey to study the occupational hazards that Information Technology (IT) professionals face. For this purpose prepare a mail questionnaire to be sent to the IT professionals working in various multinational companies all over Mumbai.

18. National Steel Industries Ltd, Mumbai, plans to improve the existing parking facility for the various types of vehicles used by its employees. As the Public Relations Officer, you have been assigned the task of collecting the relevant information for a report to be submitted in this connection.

Prepare a mail questionnaire to be circulated among the employees who intend to avail the parking facility.

19. Brilliant Management Consultants, Delhi, is running a four-week training programme in Professional Communication for its junior executives. Since it is going to end by next Sunday, you as the Training Manager are planning to obtain the feedback and suggestions for the programme, with a view to improve the qualities of this training in future. Now prepare a questionnaire for eliciting the required information.

20. Modern Institute of Technology, Tikanpur, is a new educational institute which has well-equipped labs and a huge computer centre, with all the modern computing and Internet facilities. These facilities are made available to students for 24 hours.

The Dean, Students' Welfare Unit, of this Institute has been receiving complaints about students suffering from various kinds of aches and pains: headaches, lower back pain, especially of coccyx (tail-bone), neck pain, along with watering of eyes and weakness, i.e., debility. Preliminary reports suggest the reasons to be prolonged sitting in front of the computers, missing of meals and eating junk food at odd hours. A disturbing news has caused greater concern at the academic level: students are using the Internet facilities for non-academic purposes like 'chatting', viewing movies, listening to music, etc. All this has led to significant behavioural changes in many students not conducive to their growth, progress, and development.

Assuming yourself to be the Chief Warden of this residential Institute, write a memo report to be submitted to the Dean, Student Welfare Division. Your report should include findings and recommendations.

21. The Dean, Community Welfare Division, wishes to know whether the BITS supermarket should stay open at night. For collecting the relevant data 300 customers were interviewed at random. The results of the survey are given below in the tabulated form:

Table showing % response to the question: 'Do you want the store to stay open at night?'

Age group	Yes	No	Don't know
10-15	43.5	38.0	18.5
16-21	64.2	29.0	6.5
22-30	54.5	44.0	1.5
31-45	37.5	47.5	15.0
46-60	18.4	70.0	11.6

Now, as Research Officer, write a Letter Report to be submitted to the Dean, CWD, to enable him to take necessary decision in this regard. Invent the necessary details.

22. The Human Resource Department of Kalka Paper Industry, Mumbai, runs a two-day orientation for the new employees every other month. At this orientation they are apprised of company history, objectives, etc., with a purpose to familiarize the participants with the industry and give them a sense of belongingness. Recently, the participants have expressed their dissatisfaction with such orientation seminars. The HRD Manager has asked you as the Personal Assistant to analyse the importance of the orientation and the presentation techniques used and also provide recommendations to make it more interesting and useful for the participants. Now write a memo report to be sent to the HRD manager.

23. The Supreme Court has banned the plying of diesel-run buses within a metropolitan city. According to the ruling, only CNG (Compressed Natural Gas) buses are allowed on the road. This has resulted in a lot of inconvenience for the public. The State Government has received a number of grievances about the inadequacy of the Metro Transport Corporation (MTC) in meeting the needs of the commuters. You, as the chairman of MTC, have been asked to study the existing situation and report the details in the form of a letter to the Transportation Ministry of the state. Write a report assuming the following details:

Total number of buses: 10,000
 Number of CNG buses: 4,500
 Number of school buses: 1,000

24. Raj Pareek Singh (RPS) University, Kareempur, wishes to introduce the internal evaluation system and has written to the Registrar, BITS, Pilani. Write a letter report to be sent to the Chairman, Examination Committee, RPS University, containing relevant information. Your letter report should be in full block form.

25. The Research Division of National Marketing Council (NMC) conducts research designed to keep its members informed on the general marketing pattern. You are a Research Officer of the NMC. You have been asked by your Marketing Manager to gather information on purchasing patterns of consumers across the nation during January–March 2002. The commodities include food, tobacco and liquor, housing, clothing, medical care, recreation, education, reading, transportation, etc.

Assuming that you have completed this task, write your findings in the form of a memo report to the Marketing Manager of NMC. Invent any other necessary details.

26. The Haryana State Government had sanctioned ₹5 crore on 15 April, 2003, for various self-employment schemes especially for the educated unemployed in District Rohtak. This money has been spent on setting up the following:

- A small electronic components manufacturing industry
- Five poultry farming units
- A vocational training programme
- A primary health care unit

As Assistant Collector of Rohtak, Haryana, write a report in the form of a memorandum, to be sent to the District Collector, containing information on work done till date. Invent the necessary details.

27. The Department of Agricultural Research and Education, Government of India is currently collecting data on the amount of milk, fruit and vegetables, eggs, etc. produced in the year 2000–2001 to formulate a viable National Agriculture Policy which would take care of animal husbandry and dairying also. The data collected are given below:

Milk	78 million tones
Potato	241.5 lakh tones
Fruit & Vegetables	104 million tones

Fish	55.81 lakh tones
Eggs	31,320 million tones
Onion	47.5 lakh tones

As the Senior Scientist of this department, write a report in the form of a letter analysing the above data and giving the necessary details. Use full block form and open punctuation. Address your letter to the State Minister of Agriculture. Invent the necessary details.

28. The Managing Director of Allied Publishers Company Ltd, New Delhi 110 001, wishes to have a report on the readership of various magazines published by it. As the Public Relations Officer of this company, you have compiled the data for writing this report.

Table showing the readership in percentages

Age Group	Women Today	Financial Reporter	Sports Week	Focus
18–25	14	21	35	29
26–35	16	13	41	48
36–45	17	32	53	25
45 onwards	12	32	32	25

Write this report inventing the necessary details.

29. The Rajasthan State Council for Science and Technology (RCST) has been playing a significant role in promoting the use of science and technology for the process of development in the state, especially in the rural areas. The table given below shows the percentage distribution of expenditure incurred by this Council for the year 1997–2000.

Table showing percentage distribution of expenditure.

S. No.	Items	Years		
		1997–98	1998–99	1999–2000
1	Major Projects	36.7	40.6	44.5
2	Development Programmes	36.3	50.4	48.4
3	Secretariat and Travel	23.3	8.3	6.3
4	Building and Equipment	3.7	0.7	0.8
	Total	100.0	100.0	100.0

As Secretary of this Council, analyse this data and write an analytical report to be submitted to the Chairman,

RCST, Jaipur. Wherever necessary use illustrations to support your analysis. Invent the necessary details.

30. The Indian Government is concerned about the exodus of Indian doctors, engineers, and academicians to foreign countries like the US, Britain, Germany, and Gulf countries and wishes to retain these professionals to utilize their services for the motherland and fellow countrymen. In this connection, the Chief Secretary, Ministry of Human Resource Development, New Delhi, has asked for a report investigating the causes of this trend and suggesting measures to arrest the exodus.

As a research analyst in the above Ministry you have been asked to write the report to be sent to the Chief Secretary. The data you have obtained are given in the following table:

Table showing Trend of Exodus from India Since 1999.

Profession	Countries Immigrated to after Obtaining Degrees			
	America	Britain	Germany	Gulf Countries
Doctors	50	27	18	5
Engineers	06	24	07	7
Academicians	13	27	12	48

Note: The figures are in percentage.

31. With a view to rescheduling its programmes, Doordarshan has conducted a survey to find out the number of viewers of each programme. The results of the survey conducted among the members of one

thousand families each in Mumbai, Delhi, Kolkata, and Chennai are given in the table below in percentage:

Table showing Viewers' Choice

Viewers' Age-Group	Programmes				
	News	Sports	Music	Films	Cartoons
5-12	2.0	5.0	7.0	13.0	58.0
13-20	12.0	45.0	48.0	17.0	25.0
21-40	36.0	35.0	32.0	25.0	10.0
41 and above	50.0	15.0	13.0	45.0	7.0
Total	100	100	100	100	100

Now, assuming yourself to be the Head of the Audience Research Cell, write a report discussing the viewers' choice for various programmes. Support your discussion with appropriate illustrations.

32. Two years ago, Nisbit.com started an online transaction portal for users to do online shopping. After two years, the Chief Executive Officer (CEO) of Nisbit.com feels concerned about the slow growth of the company. It is observed that the number of consumers switching to online shopping have not met the expected level. To find out the reasons for the poor response from the customers, the company has decided to conduct a nationwide survey. The following table gives the finding of the survey.

As the survey manager of the group, write a formal report to be submitted to the CEO of Nisbit.com.

33. Motivating employees for optimal performance and retaining the trained personnel in an organization is not only very important in today's competitive business

Reasons	Age-Group					
	19-29		30-50		51 and above	
	M	F	M	F	M	F
Unfamiliar technology	15.1%	23.2%	36.6%	45.3%	81.2%	89.3%
Security concerns	40.5%	48.4%	55%	59.7%	4.4%	2.1%
Resistance to change	14.6%	17.4%	24.6%	29.5%	45.6%	51.7%
Lack of access to Internet	38.4%	41.1%	37.6%	44.4%	7.9%	9.6%
Inefficient delivery (unreliable)	34.4%	36.2%	31.4%	35.5%	4.8%	3.5%
Preference for traditional shopping	25.1%	58.6%	19.5%	62.3%	4.6%	38.2%
Other reasons	17.5%	24.3%	16.4%	23.6%	3.5%	4.1%

world but also one of the most difficult tasks that the personnel manager faces in the organization.

A large-scale survey by opinion polls was conducted among Senior Level Managers, Mid-Level Managers and Floor Supervisors. 300 from each group participated in the survey in which the respondent indicated one most preferred motivator for himself at work. The following table gives the frequency count for responses from each group.

	Senior-level managers	Mid-level manager	Floor supervisors
Money Rewards	80	60	90
Knowledge Training	85	30	15
Social Rewards	40	65	60
Free Lunches	20	55	65
Club Privilege	50	60	10
Flexible Hours	25	30	60
	300	300	300

As the Personnel Manager, write a recommendatory report to the Vice President, Human Resource Development, of a large corporation. Invent necessary details.

34. At its last meeting, the Executive Committee of Maruti Udyog Ltd indicated an existing need for training the three levels of company managers. Hence, the Chairman has asked the Managing Director to analyse the various areas in which training is required for them. As the Managing Director, you have collected the data tabulated below:

Table Showing Training Needs by Different Levels of Management

Entry-Level Area	Middle Managers		Senior Managers		Executives	
	No.	%	No.	%	No.	%
Managing People	34	31.5	95	34.7	22	32.8
English Writing & Oral Presentation Skills	36	33.3	79	28.8	14	20.9
Finance & Accounting	26	24.1	63	23.3	29	43.3
Computer Proficiency	22	20.4	23	8.4	02	03

Analyse and interpret the given data so as to enable the Chairman to plan for a Training Programme for the three levels of Managers.

35. The Education Division of the International Association of Manufacturers (IAM), New York, has recently conducted a survey with a view to study and compare the major sources of information in the manufacturing organizations of three countries, namely the United Kingdom, Canada, and the United States. The data tabulated in Table I has been collected from 30 organizations, 10 from each country. Approximately 800 workers responded to the questionnaire in each country. Assuming yourself to be the Research Associate in the Education Division of IAM, analyse the given data, interpret it exhaustively and write a report to be submitted to the Chairman, IAM.

You may use your imagination to supply any additional details you need and use illustrations wherever necessary.

Table I: MAJOR SOURCES OF INFORMATION: UK, CANADA, US

S. No	Types of Source	Preferred as a source (Per cent)			Currently as a source (Per cent)		
		UK	Canada	US	UK	Canada	US
1	Orientation Program	42.3	47.7	40.9	10.0	8.7	11.5
2	Small Group Meetings	71.7	58.3	61.3	32.4	29.4	30.5
3	Top Executives	54.9	46.1	51.4	14.9	12.4	11.4
4	Organizational Publication	45.6	34.4	42.7	21.9	19.1	26.6
5	Mass Media	7.9	8.0	10.3	15.5	9.2	9.8
6	The Grapevine	8.2	8.2	9.6	43.8	36.2	39.2

36. The Managing Director of Birla Information Technology Ltd, Mumbai, is concerned about the effects of the prolonged use of computers on software professionals of the company. You, as the Personnel Manager, have been asked to study the impact on their mental and physical health and suggest measures to minimize the problem. The data you obtained for this purpose from 300 software professionals of the company through a questionnaire are tabulated below.

37. The Chairman, Energy Development and Conservation Council, New Delhi, has been concerned about the recurring mismatch between the demand for electricity and its supply all over the country. As the Secretary of this Council, you have been asked to study the sector-wise power consumption pattern and write a

report to be submitted to the Chairman. The following table gives the data for three consecutive years.

Table showing sector-wise power distribution (in billion units):

Sector	Year		
	1995–96	1996–97	1997–98
Agriculture	70.70	79.30	85.74
Commercial	14.14	15.97	16.99
Domestic	43.34	47.92	52.54

Interpret the above data using appropriate illustrations to support your analysis.

Analyze the data given above and write an interpretive report.

Table showing various effects of the prolonged computer use on software professions:

No. of respondents	Average time spent using the computer per day	Mental Effects			Physical Effects		
		Loss of concentration	Depression	Irritability	Eye strain	Headache	Backache
80	4–8 Hours	10	5	8	20	15	15
90	8–10 Hours	18	08	15	20	15	15
130	> 10 Hours	22	10	25	35	20	40

Note: Some may have more than one complaint.

Annexure 8.I

Sample Laboratory Report

Cross-Circulation Drying

Objectives

1. To study the drying characteristics of porous & non-porous solid under forced draft condition with cross flow of air.
2. To determine the critical moisture content.
3. To calculate the total drying time.

Theory

Drying of solid generally means removal of small amounts of liquid from solid material to reduce liquid content to acceptably low value. There are several distinct periods in the drying curve as moisture content of the solid is reduced from high initial value to its final value.

- Period O. An initial period during which drying rate may increase or decrease rapidly from an initial value.
Period I. An early stage of drying during which drying rate remains at constant value.
Period II. During this period, the drying rate decreases more or less linearly with continued decrease of water content.
Period III. The drying rate in this zone decreases further, but generally in a non-linear fashion with moisture content.

The total time of drying t_T is determined from following equation:

$$t_T = \frac{M_s}{A R_c} [(x_E - x_C)] + X_c \ln \frac{x_C}{x_2}$$

m_s = mass of bone dry solid

A = area of drying

R_c = rate at first critical point

X = free moisture content $X = X_T - X^*$

X = total free moisture content

X^* = equl free moist. content

X_c = free moisture content at first critical point

X_1 = initial free-moisture content

X_2 = final free moisture content

Requirements

Dryer assembly, blower, beaker, water, brick particles (porous), glass beads (non-porous), heater, physical balance, digital anemometer, thermometers.

Procedure

1. Empty pan of dryer was weighed.
2. The pan was taken out of dryer and after filling it with brick particles, it was placed back in the drying chamber. The weight of pan was noted.
3. The water cups for wet bulb temperature (WBT) thermometer were taken out from dryer.
4. Heater and blower were switched on. The value on inlet line was adjusted to give air velocity of 4 ms. It was measured with digital anemometer.

(Contd.)

(Contd.)

5. Air was blown for 30 min. for the system to reach steady state. The dry bulb temperature and weight of pan at this state was noted.
6. The brick particles were soaked in water for about 10 min. in beaker. Then wet particles were spread over pan uniformly.
7. One cup with water in cup holder and one WBT thermometer each were put at the inlet and outlet ports of the dryer.
8. The pan was placed back in the drying chamber.
9. Dry bulb & wet bulb temp. at inlet & outlet and the weight of the pan were recorded. These are reading at time $t=0$.
10. Readings initially at intervals of about 2 min. and later at intervals of 5 min. were taken.
11. The process was continued until there was a significant change in the weight of the pan.

Observations

Weight of bricks = 250 gms.

Tin dry = 60 C

Tout dry = 62 C

$V = 4 \text{ m/s}$

For Brick Particles:

Time	Weight of Pan, and Wet Solid, W	Inlet Temperature		Outlet Temperature	
		Dry Bulb (C)	Wet Bulb (C)	Dry Bulb (C)	Wet Bulb (C)
0	328 gm	61	46	61	44.6
2	318	63	53	61	47
4	314	63	54	61	48
6	310	64	54	60	54
8	307	65	54.5	61	54
13	298	66	55	62	56
18	291	66.5	55	62	56
23	283	66.5	52.5	62	57
28	278	66	51.5	62	57
33	272	65	50	62	57

Sample Calculations:

$$(i) tT = ms / \text{Arc} [(X_1 - X_c) + X_c \ln X_c / X_2]$$

$$= 250 / (0.0245 \times 0.008) [(0.0306 - 0.24) + \ln 0.24 / 0.008]$$

$$= 30.4 \text{ min.}$$

$$X^* = 0.006$$

$$X_T = 0.312$$

$$X_c = 0.306$$

$$X_{T2} = 0.068 - 0.006$$

$$X_2 = 0.0008$$

Result

For Brick Particles:

Sl. No.	Weight of Wet Solid, W3 (gms.)	XT	T (min.)	Slope
1	328	0.312	0	0.02
2	318	0.272	2	0.008
3	314	0.256	4	0.008
4	310	0.24	6	0.006

(Contd.)

(Contd.)

Sl. No.	Weight of Wet Solid, W3 (gms.)	XT	T (min.)	Slope
5	307	0.228	8	0.0072
6	298	0.192	13	0.0056
7	291	0.164	18	0.0064
8	283	0.132	23	0.004
9	278	0.112	28	0.0088
10	272	0.068	33	

For Glass Beads:

Wt of empty pan = 204 gms.

Wt of glass beads = 102 gms.

V = 4 m/s

Tin dry = 64.5 C

Tout dry = 60 C.

Time (min.)	Weight of Wet Solid, W3 (gms.)	Inlet Temperature		Outlet Temperature	
		Dry Bulb (C)	Wet Bulb (C)	Dry Bulb (C)	Wet Bulb (C)
0	118	62	40	60	37
2	114	65	49	61	41
4	112	66	51	62	42
6	111	66	53	62	44
8	109	66	54	63	47
3	106	66	54	63	53
18	104	67	55	63	52

Result**For Glass Beads:**

Sl. No.	Weight of Wet Solid, W3 (gms.)	XT	Time (min.)	R
1	118	0.1568	0	0.0196
2	114	0.1176	2	0.0098
3	112	0.098	4	0.0049
4	111	0.0882	6	0.0098
5	109	0.0686	8	0.00588
6	106	0.0392	13	0.00392
7	104	0.0196	18	

$$X^* = 0.015$$

$$XT = 0.1568$$

$$X1 = 0.1568 - 0.015$$

$$X1 = 0.1418$$

$$X2 = 0.0196 - 0.015$$

$$X2 = 0.0046$$

Sample Calculation:

$$\begin{aligned}
 \text{(i) } t_T &= \text{ms/Arc} [(X1 - Xc) + Xc \ln (Xc/X2)] \\
 &= 0.102 / (0.0245 \times 0.0049) [(0.1418 - 0.0882) + 0.0882 \ln (0.0882/0.0046)] \\
 &= 4.19 \text{ min.}
 \end{aligned}$$

(Contd.)

(Contd.)

Result**Humidity Chart for Brick Particles**

Time (min.)	Humidity (Inlet) (Kg)	Humidity (Outlet) (Kg)
0	0.062	0.062
2	0.061	0.096
4	0.094	0.098
6	0.095	0.097
8	0.096	0.097
13	0.095	0.095
18	0.095	0.096
23	0.091	0.097
28	0.09	0.097
33	0.087	0.097

For Glass Beads:

Time (min.)	Humidity (Inlet) (Kg)	Humidity (Outlet) (Kg)
0	0.038	0.032
2	0.076	0.045
4	0.085	0.046
6	0.094	0.055
8	0.094	0.065
13	0.094	0.096
18	0.093	0.095

Discussions and Conclusions

The practical value of equilibrium moisture content of glass beads should be zero. In our experiment we got the value as 0.015, which can be assumed approximately equal to zero.

The total time of drying of brick particles from calculation is 30.5 min. which is comparable to observed time of 33 min., but for glass beads the calculated time was found to be 4.19 min. while the observed time was 18 min. The reason may be the amount of glass beads taken, which was less than necessary. Nevertheless, the whole surface area of pan was considered, though these beads did not cover the whole surface area.

The humidity was found to be constant with time for brick particles but not for glass beads.

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
CHEMICAL ENGINEERING GROUP LABORATORY
DATA SHEET

Expt. No. 3
Section 3

Group 2

Title: Cross-circulation Drying
Date: 16-9-2001

Name: G Amudhu

ID.No. 1999A1PS444

1. $V = 4 \text{ m/s}$
 Wt of empty pan = 202 gms. Tin dry = 60 C
 Bricks = 250 gms. Tout dry = 62 C

(Contd.)

(Contd.)

t	Weight	Tin, dry	Tin, wet	Tout, dry	Tout, wet
0 min.	328 gm.	61 C	46 C	61 C	46 C
2	318	63	53	61	47
4	314	63	54	61	48
6	310	64	54	60	54
8	307	65	54.5	61	54
13	298	66	55	62	55
18	291	56.5	55	62	56
23	283	66.5	52.5	62	57
28	278	66	51.5	62	57
33	272	65	50	62	57

2. $V = 4 \text{ m/s}$

Wt of empty pan = 204 gms. Tin dry = 64.5 C

Glass beads = 102 gms. Tout dry = 60 C

Annexure 8.2

A REPORT

ON

Low Cost Concrete using locally available
materials (Marble Slurry)

BY

Name of the student**ID.No**

PIYUSH GUPTA

2005A2PS344

PRANKUR GUPTA

2005A2PS379

*Under the supervision of:***Dr. Anshuman****Assistant Professor****Civil Engineering Group****BITS-Pilani**

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

(1st semester, 2007-08)

ACKNOWLEDGEMENTS

We sincerely express our profound gratitude and indebtedness to our guide Dr. Anshuman, Assistant Professor, Civil engineering Group, BITS Pilani, Rajasthan for his precious guidance and co-operation in completing the project work.

We are extremely grateful to Professor Rajiv Gupta, Dean, Engineering Services Division, Birla Institute of Technology and Science, Pilani for providing us with the required amount of materials and the help.

We express our sincere gratitude to Dr. S.B. Singh, Group leader, Civil engineering Group, BITS Pilani, Rajasthan for providing all the necessary lab facilities which helped us in completing the project work.

We express our special thanks to Dr. A. Vasan, Assistant Professor, Civil Engineering department, BITS PILANI, who encouraged us to take this project and for being our well-wisher and sparing his valuable time even during odd hours without any hesitation.

We express our sincere thanks to Mr. Sandeep, Mr. Suresh, Mr. Shivpal, Mr. Ratan Sharma and all the division members of civil engineering group for their invaluable support.

We also express our deepest thanks to all the faculty members of BITS Pilani and our friends for their support and belief in us during the project work.

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I. INTRODUCTION

Concrete is a construction material that consists of cement (commonly Portland cement), aggregate (generally gravel and sand), water and admixtures. Concrete is used more than any other manmade material on earth. As of 2005, about six billion cubic meters of concrete are made every year, which equals one cubic meter for every person on the planet.

With construction going on our country in full swing, one of the main challenges confronting the concrete industry is to meet the challenges posed by this enormous infrastructure need. The major portion of the cost of concrete goes for purchasing cement. Moreover, if we keep the cost factor aside, with the shrinkage of natural resources to produce ordinary Portland cement, more and more use of suitable industrial waste materials that can replace cement clinker is one of the ways to meet this challenge.

One of the main challenges now confronting the concrete industry in India is to meet the challenges posed by enormous infrastructure needs, such as power plants, roads and ports, due to rapid industrialization. With the dwindling of natural resources to produce Ordinary Portland Cement (OPC), more and more use of suitable industrial waste materials with cementitious characteristics that can replace cement clinker is being proposed as one of the ways to meet the challenge. Marble slurry is one such waste produced during finishing of marble and is currently disposed of in landfills. It is essential that the utilization of Marble slurry in useful applications increase dramatically, to reduce the use of land for waste disposal. The positive effects of using marble slurry in concrete are related to the following,

- Better quality of concrete;
 - Better rheology,
 - Higher strength,
 - Enhanced durability.
- Eco-friendly;
 - Minimizing greenhouse gas emissions associated with the manufacturing of OPC,
 - Environment friendly disposal of millions of tones of marble slurry.
- Preservation of resources;
 - Saving in energy requirements in the production of OPC,
 - Preservation of limestone and coal reserve.

2. LITERATURE REVIEW

2.1 General

Based on the excellent results of in-house trial tests, positive inputs received from the Atomic Energy Regulatory Board (AERB), experience of other global organizations in the use of fly ash concrete for NPP construction and limited use of micro silica in concrete for the construction Reactor Building inner containment structures by NPCIL in its earlier power plants has provided the adequate confidence to NPCIL for inducting fly ash as a part cement-replacing ingredient of concrete for construction of NPP structures.

As the use of fly ash in concrete is a relatively new trend in Indian construction industry in general and NPP construction in particular, therefore not much data was available on it till very recently. After the successful use of fly ash in concrete in the ongoing power projects of NPCIL, enough data is now available to evaluate its performance vis-à-vis its use in construction of NPP structures.

Fly ash has now been used extensively for production of both traditionally placed and self-compacting concrete at RAPP-5&6 and KAIGA-3&4, for production of self-compacting concrete in limited quantity at TAPP-3&4 and for making concrete blocks at KKNP. Besides this, AERB has also executed its R & D activities through ACC and Jadavpur University regarding performance of fly ash concrete.

2.2 Details of R & D Work

AERB sponsored the following two projects on high performance concrete (HPC), scope of which include the work on fly ash concrete,

- 1) ACC Project
- 2) Jadavpur University project

Based on the results obtained from these projects, further work was carried out on the life assessment of concrete mixes with mineral admixtures especially with fly ash concrete. Some of the outcomes of the R&D work carried out by AERB are presented in subsequent sections covering the following areas,

- Performance of fly ash vis-à-vis other pozzollans
- Fly ash based concrete mixes, and
- Life assessment of fly ash concrete mixes.

2.3 Utilization for Construction of NPPs

2.3.1 Background

Use of fly ash concrete started in NPCIL in December 2002 at RAPP 5 & 6 with its maiden use for bedding concrete under foundations. Subsequently, fly ash concrete has been used at RAPP 5 & 6, KAIGA, TAPP 3&4 and KKNPP its structural concrete and also making masonry blocks. Approximately 42000 cu.m. of fly ash concrete has been used in all the on going NPPs till now.

The use of fly ash in concrete has contributed significantly in terms of enhancement of its properties in both fresh and hardened states.

Following improvements in the concrete properties have been observed with the addition of fly ash.

Use of fly ash concrete has benefited in the following ways.

- Increased durability on account of significant reduction in permeability, even against penetration of chloride ions.
- Lower generation of heat of hydration due to low cement content, resulting in feasibility of construction of large concrete pours with minimum number of construction joints.
- Low permeability and improved resistance to sulfates and chlorides enabling concrete suitable for severe exposure conditions. Also improving the water proofing characteristics of the structural elements, such as basements and roofs.
- High segregation resistance due to excellent cohesive properties, enabling concrete pouring in larger lifts/heights.
- Improved pump-ability enabling pumping of concrete to distant locations from a common feeding station.
- Excellent flowability characteristics enabling flow of concrete in to the remotest zones and most congested reinforcement areas, thus eliminating possibility of presence of cavities or honey combs inside the structure.
- Excellent surface finish resulting into reduced requirements of finishing work and surface preparation for taking up painting work.
- Prolonged initial setting time and longer workability retention thus gives more open time for concrete and improving the ease of concrete pumping.

Economical on account of reduction in cement content and also reduction in quantity of water, further resulting into reducing of admixture.

2.3.2 Project Wise Details of Fly Ash Concrete Utilization

2.3.2.1 RAPP 5&6

At RAPP 5&6 about 26000 Cu.m. of structural concrete at 10,000 cu.m. of plain cement concrete has been used in various Nuclear building (except reactor building containment structure) and conventional buildings. Various grade of fly ash concrete used in projects are M10, M25, M50 and M 35.

2.3.2.2 TAPP 5&6

At TAPP 3&4, fly ash concrete used up till now is about 400 cu.m., as structural concrete in CCW pump house, screed concrete in SFSB and concrete for sealing of SW system lines. Various grades of concrete used for the above works are M40, M25 and M15 respectively.

2.3.2.3 KAIGA 3&4

At KAIGA 3&4 a total of about 4000 cu.m. of concrete has been used for the construction of main plant structures / buildings other than reactor building and IDCT structures. Concrete grades of M30 & M45 have been used for the above said buildings.

2.3.2.4 KKNP

At KKNP, a total of about 2000 cu.m of concrete has been used for making of solid concrete blocks of grade M10 has been used.

2.3.3 Observations & Precautions**2.3.3.1 Observations**

It has been observed at all the NPP project sites that fly ash concrete has consistently met the requirements of specifications in fresh and hardened states. The permeability of concrete as determined from rapid chloride penetration test has been observed to be reduced significantly as compared to normal concrete without addition of fly ash. The surface finish of formed surfaces has also been found to be improved considerably.

2.3.3.2 Precautions

The site has observed that following precautions are necessary during the production and post placement stages of fly ash concrete.

During Production Stage

The mixing time of concrete has to be increased marginally as compared to normal concrete.

During Post Placement Stage

- Protection of green concrete from sun and winds immediately after finish.
- Prolonged wet curing

3. MIX DESIGN

Mix design is the process of selecting suitable ingredients of concrete and determining their relative proportions with the object of producing concrete of certain minimum strength and durability as economically as possible.

Strength of concrete is limited by the strength of the paste, since the mineral aggregate are far stronger.

Four variable factors in mix design are:

1. Water-cement ratio.
2. Cement content or cement-aggregate ratio.
3. Gradation of the aggregate.
4. Consistency.

4. CHARACTERISTICS OF CONCRETE

This Section deals with the properties concrete should have after hardening and in fresh state. During hydration and hardening, concrete needs to develop certain physical and chemical properties. Among other qualities, mechanical strength, low moisture permeability, and chemical and volumetric stability are necessary.

4.1 Workability

Workability is the ability of a fresh (plastic) concrete mix to fill the form/mold properly with the desired work (vibration) and without reducing the concrete's quality. Workability depends on water content, aggregate (shape and size distribution), cementitious content and age (level of hydration), and can be modified by adding chemical admixtures. Excessive water will lead to increased bleeding (surface water) and/or segregation of aggregates (when the cement and aggregates start to separate), with the resulting concrete having reduced quality.

4.2 Curing

Because the cement requires time to fully hydrate before it acquires strength and hardness, concrete must be cured once it has been placed and achieved initial setting. Curing is the process of keeping concrete under a specific environmental condition until hydration is relatively complete. Good curing is typically considered to provide a moist environment and control temperature. The effects of curing are primarily a function of geometry (the relation between exposed surface area and volume), the permeability of the concrete, curing time, and curing history. Improper curing can lead to several serviceability problems including cracking, increased scaling, and reduced abrasion resistance.

4.3 Strength

Concrete has relatively high compressive strength, but significantly lower tensile strength (about 10 per cent of the compressive strength). As a result, concrete almost always fails from tensile stresses even when loaded in compression. The practical implication of this is that concrete elements subjected to tensile stresses must be reinforced with materials that are strong in tension. Concrete is most often constructed with the addition of steel or fibre reinforcement.

4.4 Elasticity

The modulus of elasticity of concrete is a function of the modulus of elasticity of the aggregates and the cement matrix and their relative proportions. The modulus of elasticity of concrete is relatively linear at low stress levels but becomes increasingly non-linear as matrix cracking develops. The elastic modulus of the hardened paste may be in the order of 10-30 GPa and aggregates about 45 to 85 GPa. The concrete composite is then in the range of 30 to 50 GPa.

5. TESTS ON CONCRETE AND THEIR PROCEDURE

Due to availability of testing instruments in the laboratory and time constraints the major tests done are:-

1. Compressive strength
2. Density
3. Slump
4. pH measurement

5.1 Compressive strength

Shape of specimen:	Cube
Size of specimen:	150x150x150 mm
Age at Test:	3,7, 28,56, 356 days
Specification:	IS: 516-1959: Method of tests for strength of concrete

5.2 Density

Shape of specimen:	Cube
Size of specimen:	150x150x150 mm
Age at Test:	3,7, 28,56, 356 days
Specification:	IS: 1199-1959: Method of sampling & analysis of concrete

5.3 Slump

Specification:	IS: 1199-1959: Method of sampling & analysis of concrete.
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5.3.1 Apparatus

The apparatus shall be in accordance with EN 12350-2 except as detailed below:

- Base plate, made from a flat plate with a plane area of at least 900 mm x 900 mm on which concrete can be placed. The plate shall have a flat, smooth and non-absorbent surface with a minimum thickness of 2 mm. The surface shall not be readily attacked by cement paste or be liable to rusting. The construction of the plate shall be such as to prevent distortion. The deviation from flatness shall not exceed 3 mm at any point when a straight edge is placed between the centers of opposing sides.
- The centre of the plate shall be scribed with a cross, the lines of which run parallel to the edges of the plate and with circles of 200 mm diameter and 500 mm diameter having their centers coincident with the centre point of the plate. See figure.
- Rule, graduated from 0 mm to 1000 mm at intervals of 1 mm.
- A stopwatch measuring to 0.1 s.

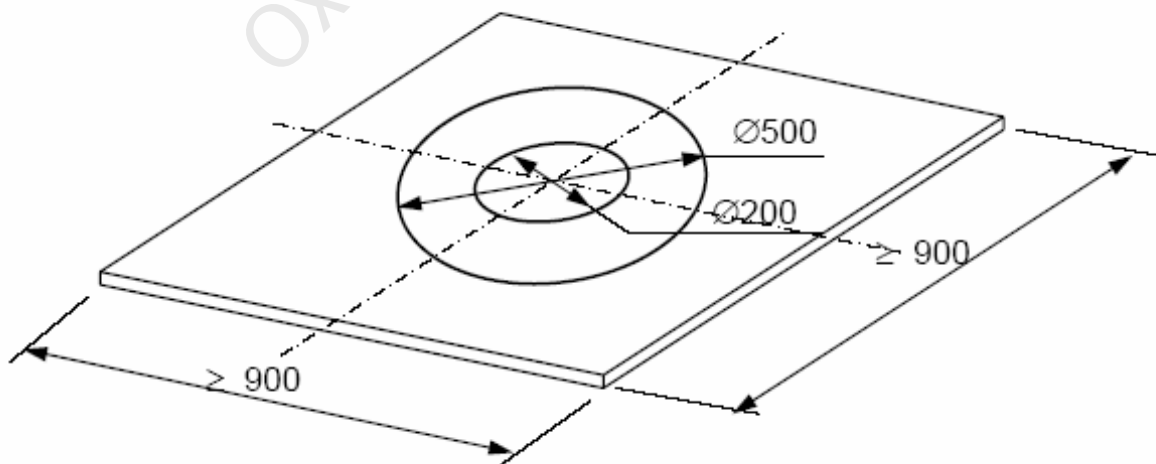


Figure: BASE PLATE FOR SLUMP FLOW

5.3.2 Procedure

- The sample shall be obtained in accordance with EN 12350-1.
- Prepare the cone and base plate as described in EN 12350-2.
- Fit the collar to the cone if being used. Place the cone coincident with the 200 mm circle on the base plate and hold in position by standing on the foot pieces (or use the weighted collar), ensuring that no concrete leaks from under the cone.
- Fill the cone without any agitation or rodding, and strike off surplus concrete from the top of the cone. Allow the filled cone to stand for not more than 30s; during this time remove any spilled concrete from the base plate and ensure that the base plate is damp all over but without any surplus water.
- Lift the cone vertically in one movement without interfering with the flow of concrete.
- Without disturbing the base plate or concrete, measure the largest diameter of the flow spread and record as **dm** to the nearest 10 mm. Then measure the diameter of the flow spread at right angles to **dm** to the nearest 10 mm and record as **dr** to the nearest 10 mm.
- Check the concrete spread for segregation. The cement paste/mortar may segregate from the coarse aggregate to give a ring of paste/mortar extending several millimeters beyond the coarse aggregate. Segregated coarse aggregate may also be observed in the central area. Report that segregation has occurred and that the test was therefore unsatisfactory.

5.4 ph measurement

Specification: IS: 3025- Methods of Sampling and Test (Physical & Chemical) for Water & Waste water (part II).

5.4.1 Reference

- i. Progress Report for Laboratory Testing of Concrete Properties at Elevated Temperatures, Civilian Radioactive Waste Management System Management & Operating Contractor, February 9, 1999, U.S. Department of Energy
- ii. IS:3025 Method of sampling & test for water and waste water part: II

5.4.2 Procedure

- i. A 100 gms (minimum) sample of hardened concrete shall be taken from the remnants of a concrete cylinder previously tested in unconfined compression.
- ii. These remnants (concrete fragments from near the middle of the cylinder) shall then be crushed to a size finer than a No. 10 sieve (2 mm).
- iii. This crushed and pulverized material shall then be mixed with an equal part by weight of de-ionized water. Eight ounce glass jars shall be used for the mixing and subsequent ph measurements. The mixing shall be accomplished by a plastic stirring rod which shall be inserted through a hole in the plastic lid of the glass jar the plastic stirring rod shall be attached to an electric drill for the 30 minutes of continuous stirring. The mixture shall then be allowed to stand for 10 minutes.
- iv. The ph of the supernatant liquid above the settled solids shall then be measured using IS 3025: Method of sampling and test for water and waste-water (Part II).
- v. The ph measurements shall be determined using a commercially available ph meter.

6. TEST RESULTS

Casting of the cubes was done in the first two weeks of November and the difference in days of casting was tried to keep as minimum in order to avoid effects of climate and temperature changes.

6.1 Marble slurry specifications

Marble slurry was ordered from a mining site in Banswara in order to get the proper results and use them for construction purposes other than laboratory results. The important measures taken in order to use marble slurry are:

1. The slurry was oven dried for 2 days to remove the water absorbed by it.
2. It was then sieved from IS Sieve of diameter 150 micrometer.
3. Material which is passed through 150 micrometer sieve was used.

6.2 Test results

The test results are tabulated as given below:

6.1 RESULTS OF CONCRETE WITH 10% CEMENT REPLACEMENT LEVEL OF MARBLE SLURRY

Trial Mix No.	Mix designation	Density (kg/m ³)					Compressive strength (N/mm ²) at age in days				
		3	7	28	56	365	3	7	28	56	365
TM – 001	S 10	2510	2520	2510	2520		12.55	17.88	21.44	23.11	
TM – 002	S 10	2530	2520	2520	2520		12.22	17.88	21.88	22.22	
TM – 003	S 10	2540	2490	2510	2510		13.11	18.54	22.22	24.11	

6.2 RESULTS OF CONCRETE WITH ONLY CEMENT AS BINDER

Trial Mix No.	Mix designation	Density(kg/m ³)					Compressive strength (N/mm ²) at age in days				
		3	7	28	56	365	3	7	28	56	365
TM – 001	C 10	2450	2460	2466	2466		10.88	15.55	24.88	27.11	
TM – 002	C 10	2440	2440	2456	2466		11.44	16.77	24.66	27.44	
TM – 003	C 10	2450	2450	2438	2460		11.22	16.88	25.22	26.23	

7. ANALYSIS OF RESULTS

The results for the 56 day strength are coming out to be satisfactory. For checking durability analysis of strength of concrete after one year is required.

Going by the current results of 28 days strength concrete with 25% cement replacement by marble slurry is coming out to be the optimum proportion of replacement. With 25% replacement the reduction in cost of concrete comes out to be 17.691 % .

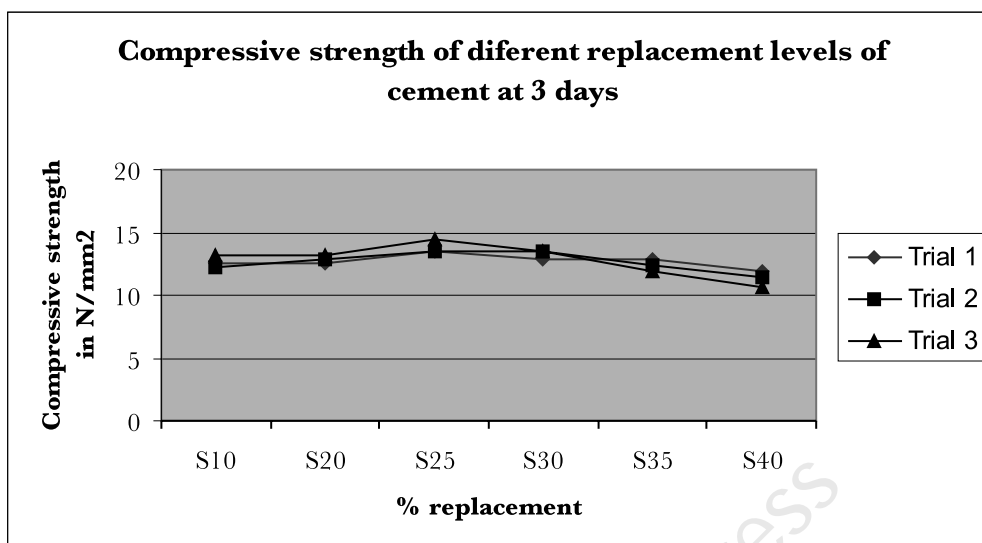
The amount of material used is

Total number of cubes casted: $15 \times 2 \times 6 = 180$

Total amount of Fine Aggregate used: $13.85 \times 30 = 415.5$ kg

Total amount of Coarse Aggregate used: $30.15 \times 30 = 904.5$ kg

Total amount of Cement Aggregate used: $9.75 \times 15 + 9.75 \times 2.5 \times (.9 + .8 + .75 + .7 + .65 + .60) = 253.25$ kg



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Annexure 8.3

Sample Analytical Report

Cover Page

A REPORT
ON
ROLE OF SCIENCE AND TECHNOLOGY IN THE DEVELOPMENT
OF RURAL AREAS
BY
ANOOP KADYAN
SECRETARY
THE RAJASTHAN STATE COUNCIL FOR SCIENCE AND TECHNOLOGY
JAIPUR (RAJASTHAN)
15 NOVEMBER 1996

Title Page Version 1

A REPORT
ON
ROLE OF SCIENCE AND TECHNOLOGY IN THE DEVELOPMENT OF RURAL AREAS
PREPARED FOR
THE CHAIRMAN
RCST, JAIPUR
BY
ANOOP KADYAN
SECRETARY
THE RAJASTHAN STATE COUNCIL FOR SCIENCE AND TECHNOLOGY
JAIPUR (RAJASTHAN)
15 NOVEMBER 1996

Title Page Version 2

THE RAJASTHAN STATE COUNCIL FOR SCIENCE AND TECHNOLOGY
JAIPUR (RAJASTHAN)
ROLE OF SCIENCE AND TECHNOLOGY IN THE DEVELOPMENT
OF RURAL AREAS
A REPORT
PREPARED

(Contd.)

(Contd.)

BY
ANOOP KADYAN
SECRETARY

FOR
 THE CHAIRMAN
 RCST, JAIPUR

Approved by
 Maneesh K
 Vice Chairman
 RCST, Jaipur

15 NOVEMBER 1996

Letter of Transmittal

The Rajasthan State Council for Science and Technology Jaipur (Rajasthan)

November 15, 1996

Ranjan Sankha
 The Chairman
 RCST
 Jaipur 314 004

Dear Sir

I have great pleasure in submitting the report on Role of Science and Technology in the Development of Rural Areas.

I would like to express my thanks to my colleagues for their constant support and encouragement. They have been very generous in extending their cooperation and help and this has enabled me to carry out this study properly.

Unprecedented growth of science and technology has brought about many radical changes in society. Science and technology have become so enmeshed with every activity of our society today that they can be regarded as a major input variable in today's society. The impact of science and technology is reflected in transportation, communication, health conditions, energy, automation, quality of life, environment, and so on. Since the major population of India resides in rural areas, to promote the use of Science and Technology in this area will be greatly beneficial. It is needless to say that you can make right decisions and policies if you develop a perspective of science, technology, and society dynamics in rural areas. The chairman of RCST has initiated me as the Secretary to write an interpretative report on The Role of Science and Technology in the Development of Rural Areas. The study is based on the information received from the department on the percentage distribution of expenditure for five years, i.e., from 1990-91 to 1994-95.

Rajasthan's rich culture and heritage attract a large number of tourists to this state. The lack of infrastructure and development is a negative mark of the state; therefore, the need for development in the state was felt in early 90s. For proper development, RCST allocated a large amount of funds through the use of science and technology.

The present study gives an overview of the distribution of expenditure over the last five years, i.e., 1990 to 1995, in the areas of undertaking major projects in the development of potable water: devices, fuel-efficient devices, initiating programmes for development of bio-mass gasifier, fly-ash based building projects, funds allocated on Secretarial and Travel Building and equipment.

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Science and technology certainly play a pivotal role in the development of society as these are closely knit with all activities. The present study will certainly help you to take further decisions on the allocation of more funds.

I hope the study will prove useful for making proper recommendations.

With regards

Yours faithfully

Anoop Kadyan
Secretary, RCST

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<i>Certificate</i>	(iii)
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4. Programmes	
5. Secretariat and Travel	
6. Building and Equipment	
7. Overall Pattern	
8. Conclusions	

1. Introduction

There is a growing need for promotion of science and technology all over India, especially in the rural areas. A rich and resourceful state like Rajasthan has always been known for its culture and tradition. Every year Rajasthan sees a large number of tourists coming from all over the world to experience the flavour of India and its culture. While tourism is becoming one of Rajasthan's biggest revenue earners, the infrastructure and the development in the state is not world-class. It is not such that it can provide an even greater boost to tourism. The need for development in this area was felt in the early 1990s and this was planned through the promotion of use of science and technology in the state. Hence, annually, large amounts of funds were allocated for this purpose.

The present report attempts to give an overview of the distribution of expenditure over the last five years, i.e., from 1990 to 1995, in the areas of undertaking major projects in development of water and fuel-efficient devices, starting programmes for development of bio-mass gasifier, fly-ash-based building projects, building & equipment, and secretariat and travel. The data for this report was collected from the records of the Council's Financial Division. It is hoped that the analysis and conclusions drawn would help bring about more fund diversion for promoting science and technology in the state. Since the report analyses the expenditure only for five years, it cannot give any recommendation. Moreover, in the everchanging world of technology, it is difficult to foresee the developments required even two or three years hence.

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Besides the Introduction, the report contains seven sections. Section 2 gives an overview of the expenditure pattern, the next four analyse the trends in different fields of development, while the last two sum up the discussion and show results of study.

2. Overview of Expenditure Pattern

During the last five years there have been variations in the percentage of distribution of expenditure in different fields, as shown in Table I.

Table I Percentage Distribution of Expenditure During 1990–1995

Particulars/Years	1990-91	1991-92	1992-93	1993-94	1994-95
1. Major Projects (development of portable water devices, fuel efficient devices)	44.87	36.7	32.43	40.55	44.43
2. Programmes (development of biomass gasifier, fly-ash-based building projects).	28.56	36.41	56.62	50.35	48.39
3. Secretariat & travel	19.62	23.13	14.74	8.63	6.50
4. Building & equipment	6.95	3.76	0.21	0.47	0.68
Total	100.00	100.00	100.00	100.00	100.00

The variations as indicated by the data presented above are correlatable to the instability in the state and central government, and also (external) foreign reasons, such as the US Stock Exchange crash and the Gulf War during this period of five years. In the discussion that follows, the expenditure pattern has been analysed.

3. Major Projects (Development of Water & Fuel-efficient Devices)

There has been a decline in the expenditure in this field in the first three years, i.e., up to 1993, which again increased in 1993-94 & 1994-95 (see Figure 1 below). Initially when water-and fuel-efficient devices were

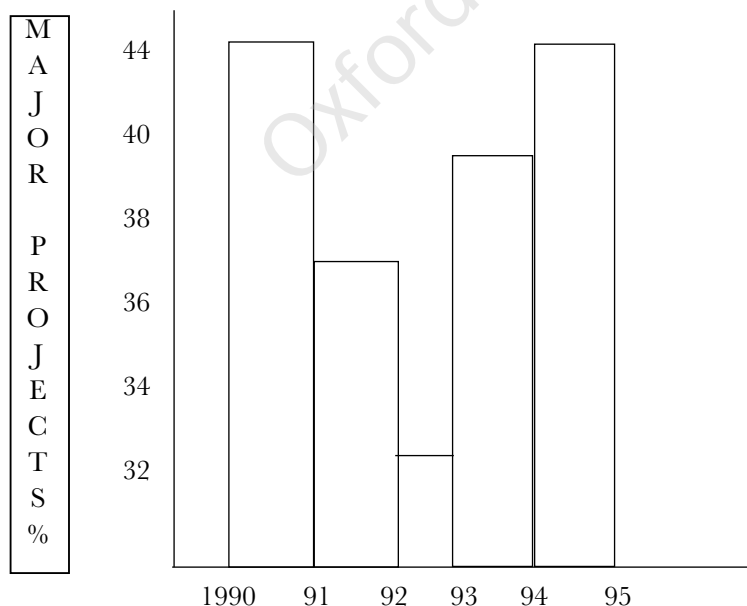


Figure 1 EXPENDITURE ON MAJOR PROJECTS

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proposed, the idea was not welcomed, and hence less emphasis was given to it. But with the occurrence of Gulf War in 1992-93, and the resultant shortage of fuel and inflation of fuel prices, the need for developing non-conventional energy devices was realized. Hence expenditure increased in this field.

4. Programmes (development of biomass gasifier, fly-ash-based building projects)

As Figure 2 indicates, there has been a rise in expenditure till 1993, after which the expenditure in this field started declining. Upon talking to the officials in the Department of Science & Technology, it was found out that this was because these developmental programmes required a heavy one-time initial investment. Once the infrastructure was set-up, the expenditure was incurred only for its maintenance and operation. Hence, for the projects in this field, almost the whole infrastructure was set up by 1993. However, after 1993, the expenditure declined in this field due to only operational and maintenance cost incurred in this field.

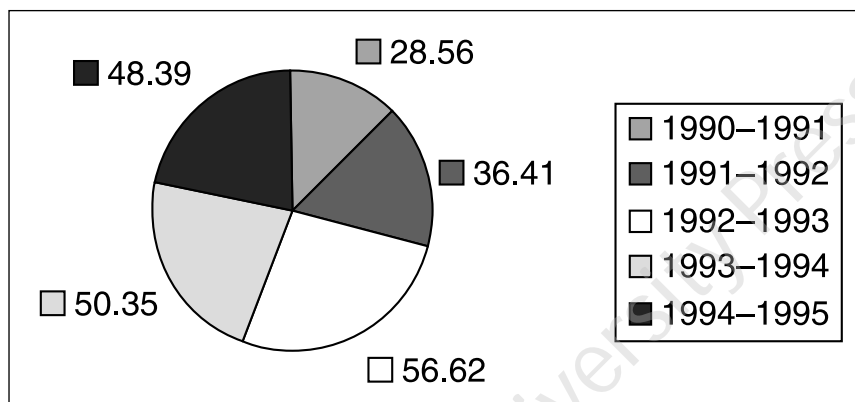


Figure 2 EXPENDITURE ON DEVELOPMENTAL PROGRAMMES

5. Secretariat and Travel

There is a lot of random variation in this segment. This can be attributed to the large-scale planning and huge infrastructural development going on in the state during 1990-1992. See the line graph shown in Figure 3.

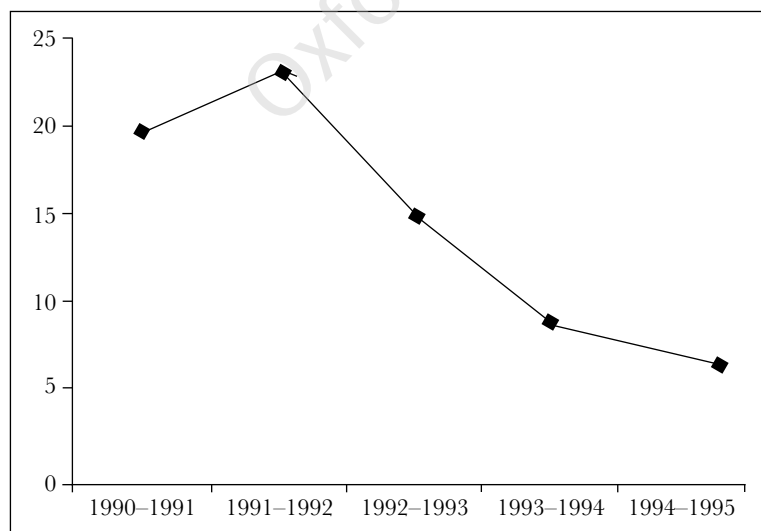


Figure 3 EXPENDITURE ON SECRETARIAT AND TRAVEL

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The personnel from the secretariat had to spend a large sum on travel for holding discussions, conducting meetings, survey of the site, and project survey. Hence expenditure was high during this period. But gradually, after 1992, with the infrastructure almost complete, travel-related expenses dipped year after year. Now, travel is required only for inspection and is no longer frequent.

6. Building and Equipment

In this field the expenditure was initially high but reduced later and again started increasing nominally (see Figure 4 below). This is attributed to the fact that the initial investment in building, construction, and infrastructure was high as the projects were in their nascent stage and they needed a strong infrastructure to support them (such as lab, corporate office, equipment, etc.). Once these were set up, gradually the infrastructure cost started declining as lesser amount was now spent on building and equipment (one-time investment). Hence, in 1993, this cost was almost reduced to null, i.e., a nominal 0.21%. However after 1993, the building & equipment now demanded maintenance for their efficient operation; hence, the expenditure again began to increase, though nominally (0.68% in 1995).

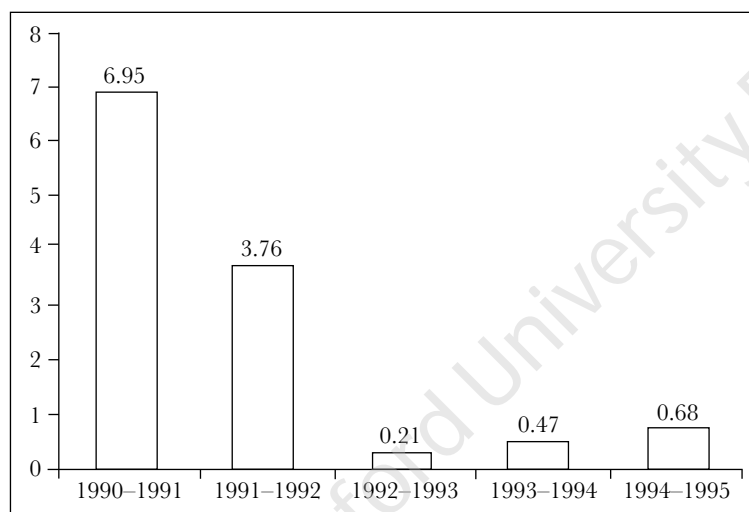


Figure 4 EXPENDITURE ON BUILDING AND EQUIPMENT

7. Overall Pattern

The overall pattern that emerges from the above discussion is presented in the bar graph given in Figure 5. The year-wise pattern of expenditure in different areas comes out clearly.

When we compare the distribution of expenditure in the four headings, namely major projects, developmental programmes, secretariat and travel, and building & equipment, we find that except for the expenditure pattern on the last heading, the other three do not show a continuous decrease. Specially, the first two items show a lot of variations in the expenditure trend, that is to say, there is no uniform trend of increase or decrease. Particularly, the amount spent on development programmes during 1992-1993 is the highest among all expenses during the total period of 1990-1995 under debate. Similarly, the expenditure on building & equipment in the same year, 1990-1991, is the least of all.

The last section, namely Conclusions, tabulates the inferences drawn from the analysis. These inferences may lead to some fruitful decisions in future.

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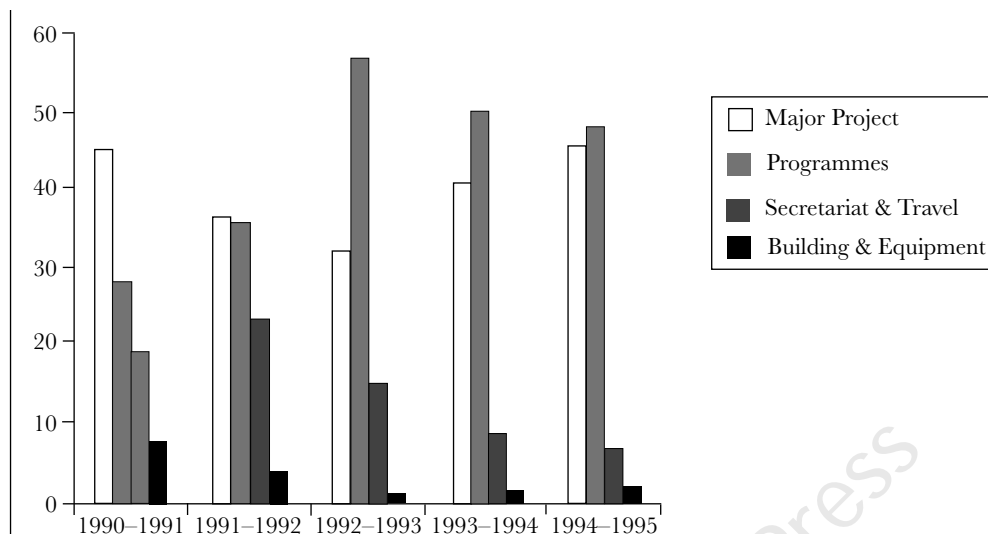


Figure 5 DISTRIBUTION OF EXPENDITURE BY RCST DURING 1990-1995

8. Conclusions

This report has clearly analysed the expenditure done by the council on the promotion of use of science and technology for development in the state. The preceding discussion highlights the following facts:

1. The general pattern has been that the expenditure incurred was high up to 1992-93, as the developmental process was in its nascent stage and huge amounts had to be invested for its set-up.
2. Initially, devices based on non-conventional sources of energy were given less importance. But after the Gulf War, they were also given high importance.
3. The initial costs were high and increasing largely, but after the initial set-up, the expenditure was only for operation and maintenance or inception of any new technology.
4. A further study and detailed review can throw more light on the factors affecting this pattern and can subsequently help in future analysis.

Annexure 8.4

Sample Inspection Report

EXCEL Technovation Pvt. Ltd
Ph. No. 377919 Fax: 0141-37978
CUSTOMER CALL FEEDBACK REPORT

Call Registration Number: _____ Date : _____

Customer: _____

Location: _____

Sys. Model:	SI.No.:	Peripheral/Add-on Model:SI. No.:	
Service Type	Warranty/AMC/IRB/ Chargeable/Others	Product	Home PC/Desktop/Server/ Sun/IBM/Datacomm/ SW/Peripheral/Others
Call Type	Ins/CM/PM/Proj/Upj/Upg/Siteinsp/Others		Call Category HW/SW

Problem Reported: _____

Event	Date	Time	Event	Date	Time
Call Reported			Start of Service		
Call Assigned			End of Service		
Travel Time			Engineer Hands on Time		

Action Taken: _____

Call Status: ☐ Closed ☐ Pending for Spares ☐ Pending for Customers
☐ Pending for Others

Part Replaced: ☐ Yes ☐ No ☐ Under observation

	Part Number	Part Description	Quantity	Part Serial No.
Part Replaced				
Part Removed				

For Customer's Use: Please rate this call by ticking an option:

☐ Extremely Dissatisfied ☐ Dissatisfied ☐ Neither Satisfied nor Dissatisfied
☐ Satisfied ☐ Extremely Satisfied

Customer's Feedback: _____

User Name : _____ Engineer Name : _____
Email ID/Tel.No : _____ Signature : _____
Signature : _____ Date : _____
Date : _____

Annexure 8.5

Memo Format

**MODERN INSTITUTE OF TECHNOLOGY
JAIPUR (RAJASTHAN)
INTEROFFICE MEMORANDUM**

To: Dean, Students Welfare Division
From: Chief Warden
Date: 15 October 2003
Subject: Negative effects of Internet facilities

Please refer to your letter No. SWD/IM/2003 in which you have asked me to study the negative effects of Internet facilities provided by the Institute. I would like to present my findings and recommendations.

Findings

The data for the report was collected by interviews with wardens, Mess Managers and the Chief of Information Processing Centre. Also, the medical records of the students were collected from the office of the Chief Medical Officer.

Physical Problems

A preliminary look into the medical records shows that about 75% of the students owning a computer and regular users of the IPC have complained about some physical problem or the other during the past one year. Dr R.K. Sen, Chief Medical Officer, told me that these were the symptoms of Carpal Tunnel Syndrome (CTS), a deadly disease that affects many computer users all over the globe. He also explained that these were due to excessive time spent in front of the computer, improper sitting posture, and the lack of physical exercise amongst the students. Also lack of proper sleep is a cause of this fast growing disease.

Academic Performance

Another disturbing trend has been the decline in academic standards of the student. Most of the wardens and teachers have complained about the declining academic output of the students since the facility was provided to the students. From the talks with Dr T. Bansal, Chief, IPC, I have concluded that most of the students make improper use of the Internet facility. The most common use is for chatting and watching movies over the Web. Though listening to music is also attributed as a problem, one may say that music is good for the students as it has a soothing effect. This abuse of the facility hampers the mental development of the student. Many have got so hooked to it that they live in a virtual world and the only friends they have are chat friends. This is an alarming fact and the trend must be stopped from growing.

Food Habits

The food habits of the students have also been a cause of concern lately. Most Mess Managers agree that the attendance for meals has gone down considerably since the last year, after the introduction of the computer centre. Also, the growing use of junk food by the students is a cause of concern, according to Dr Sen.

Recommendations

Given below are a few suggestions which may help in tackling the problem in question:

- The amount of time spent by a student in the computer lab should be fixed to no more than 4 hours. This can be easily implemented according to the IPC Chief.
- Undesirable sites should be blocked.
- Awareness should be raised among students about CTS and also how to prevent it.

(Contd.)

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- Considering Dr Sen's advice, chairs in the computer centre should be changed to specially designed ones for more comfort.
- Student participation in sports and cultural activities must be encouraged to shift their attention from computers.
- The computer lab must be shut down between 12 PM and 9 AM to give students proper rest.

I hope that this report will give you an insight into the nature of the problem and also its possible solutions. I would be glad to provide any clarification or additional information required in this regard.

Amit Goyal
Chief Warden

Annexure 8.6

Letter Format

SINLEY DISTRIBUTING COMPANY

3204 Jawaharlal Marg, New Delhi

September 27, 2003

Mr S.S. Moondra
Akshay Supermarket
Vidya Vihar
Pilani, Rajasthan

Dear Mr Moondra:

Subject: Advantages of Fully Stocked Shelves

As inquiries are increasing from several supermarket executives concerning grocery and drug shelf stocking, I have undertaken an investigation to determine the effect of fully stocked shelves on sales. This survey has been made considering representative grocery and drug products, with attention given to percentage increases through mass stocking.

Effect of Diversification

Seven supermarkets were surveyed, with several brands of products checked for a two-week period under normal shelf-stocking conditions, and then for two more weeks under fully stocked shelf conditions. Enclosed is the complete result of the survey: below is a simple breakdown:

Table 1: SALES IN RELATION TO NUMBER OF ITEMS STOCKED

	On Total Grocery Product Sales	On Total Drug Sales	On All Products
Number of items checked	128	69	197
2 weeks' unit sales under normal conditions	8,404	607	9,011
2 weeks' unit sales when shelves were kept fully stocked	10,287	902	11,189
Change in percentage	+22.4%	+48.5%	+24.2%

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If you notice the change in the percentage of sales resulting from fully stocking the shelves, it is obvious that this procedure is of tremendous value:

Grocery product sales	22.4 per cent increase
Drug product sales	48.5 per cent increase
All products sales	24.2 per cent increase

Margin and Turnover

We all know that it is the desire of every supermarket to offer goods at the lowest possible prices. This can be accomplished only by reducing markup and increasing stock turnover. Now, if you can increase sales on all products by 24.2 per cent merely by fully stocking your shelves, it is apparent that you will be able to reduce markups and offer merchandise at lower prices. By your giving maximum exposure to different commodities, the consumer has the opportunity to see more and as a result is motivated to purchase something that would never have entered his mind if certain brands had not caught his eye.

The rise in the general standard of living has caused a proportional increase in the demand for service. By our very nature, we cannot offer personalized service; therefore, we must do the next best thing—give intensive exposure to a large variety of brands. That is, substitute displays and printed selling appeals of various manufacturers for personal selling. The consumer is still our livelihood, and the more he sees, the more he will buy.

Recommendations

I suggest that you keep your shelves fully stocked at all times to increase sales of merchandise. It has always been our policy to sell through our retailers, which has been brought to light by the survey.

Yours sincerely

M.K. Hingle
President