

**ORGANISATION, ADMINISTRATION
AND
UTILISATION OF DRDO LIBRARIES**

**Thesis
Submitted for the Award of the
Degree of Doctor of Philosophy
In
Library and Information Science**



By

M. Santha Kumari

Supervisor

Dr. ROSAMMA JOSEPH



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DECLARATION

I, M. Santha Kumari, hereby declare that this thesis entitled „**Organisation, Administration and Utilisation of DRDO Libraries**“, has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles or recognition.

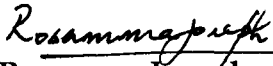

M. Santha Kumari

University of Calicut

Date 12.8.04

CERTIFICATE

This is to certify that this thesis entitled "**Organisation, Administration and Utilisation of DRDO Libraries** " is the authentic record of the research work done by Smt. M. Santha Kumari during 2001-2004, for the award of the degree of Doctor of Philosophy in Library and Information Science, under my supervision.


Dr. Rosamma Joseph
Supervising teacher

Calicut

Date 12.8.2004

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LIST OF ABBREVIATIONS

AD	:	Air Defence
ADA	:	Aeronautical Development Agency
ADE	:	Aeronautical Development Establishment
ADRDE	:	Ariel Delivery Research and Development Establishment
AGARD	:	Advisory Group of Aerospace Research and Development
AIAA	:	American Institute of Aeronautics and Astronautics
ANURAG	:	Advanced Numerical Research and Analysis Group
ARDE	:	Armament Research and Development Establishment
ASIEO	:	Advanced System Integration Evaluation Organisation
CABS	:	Centre for Airborne Systems
CAIR	:	Centre for Artificial Intelligence and Robotics
CASSA	:	Centre for Aeronautical Systems Studies and Analysis
CDA	:	Controller of Defence Accounts
CEES	:	Centre for Explosives and Environment Safety
CEMILAC	:	Centre for Military Airworthiness and Certification
CEP	:	Continued Education Programme
CPAR	:	Confidential Personal Assessment Report
CPDC	:	Composite Products Development Centre
CVRDE	:	Combat Vehicles Research and Development Establishment
DARL	:	Defence Agriculture Research Laboratory.
DBF	:	Director Budget and Finance
DBF&A	:	Directorate of Budget, Finance and Accounts
DBIT	:	Desidoc Bulletin of Information Technology
DEAL	:	Defence Electronics Applications Laboratory
DEBEL	:	Defence Bioengineering and Electro medical Laboratory.
DERL	:	Defence Electronic Research Laboratory
DESIDOC	:	Defence Scientific Information and Documentation Centre
DFRL	:	Defence Food Research Laboratory
DIFR	:	Defence Institute of Fire Research

DIPAS	:	Defence Institute of Physiology and Allied Sciences
DIPR	:	Defence Institute of Psychological Research
DLJ	:	Defence Laboratory Jodhpur
DLRL	:	Defence Electronics Research Laboratory
DMRL	:	Defence Metallurgical Research Laboratory
DMSRDE	:	Defence Materials and Stores Research & Development Establishment
DRDE	:	Defence Research and Development Establishment
DRDL	:	Defence Research and Development Laboratory
DRDO	:	Defence Research and Development Organisation
DRDS	:	Defence Research and Development Service
DRDU	:	Defence Research and Development Unit
DRIC	:	Defence Research Information Centre
DRIPS	:	Defence Research Information Processing System
DRL	:	Defence Research Laboratory
DRONA	:	DRDO Rapid Online Network Access
DRTC	:	Defence Research Training Centre
DSC	:	Defence Science Centre
DSL	:	Defence Science Laboratory
DSO	:	Defence Science Organisation
DTIC	:	Defence Technical Information Centre
DTRL	:	Defence Terrain Research Laboratory
ES	:	Eminent Scientists
EW	:	Early Warning
FRL	:	Field Research Laboratory
GD	:	Group Director
GOC	:	GOOD Offices Committee
GTRE	:	Gas Turbine Research Establishment
HAL	:	Hindustan Aeronautics Limited
HEMRL	:	High Energy Materials Research Laboratory
IASLIC	:	Indian Association of Special Libraries and Information Centres
IAT	:	Institute of Armament Technology

IEEE	:	Institute of Electrical and Electronics Engineering
IGMDP	:	Integrated Guided Missile Development Programme
INFLIBNET	:	Information and Library Network
INMAS	:	Institute of Nuclear Medicine and Allied Sciences
IRDE	:	Instruments Research and Development Establishment
ISRO	:	Indian Space Research Organisation
ISSA	:	Institute for Systems Studies and Analysis
ITM	:	Institute of Technology Management
JCDA	:	Joint Controller of Defence Accounts
JS	:	Junior Scientists
LC	:	Library Committee
LCA	:	Light Combat Aircraft
LRDE	:	Electronics and Radar Development Establishment
MTRDC	:	Microwave Tube Research and Development Centre
NCL	:	National Chemical Laboratory
NMRL	:	Naval Materials Research Laboratory
NPOL	:	Naval Physical Oceanographic Laboratory
NSTL	:	Naval Science and Technological Laboratory
PTA	:	Pilot less Target Aircraft
RAC	:	Recruitment and Assessment Centre
RCI	:	Regional Centre Imarat
SADF	:	South African Defence Force
SAG	:	Scientific Advisory Group
SASE	:	Snow and Avalanche Study Establishment
SLU	:	Standard Library Unit
SS	:	Senior Scientists
SSPL	:	Solid State Physics Laboratory
TBRL	:	Terminal Ballistics Research Laboratory
TIC	:	Technical Information Centre
TIRC	:	Technical Information Research Centre
VRDE	:	Vehicle Research and Development Establishment

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INTRODUCTION

M. Santha Kumari “Organisation, administration and utilisation of DRDO libraries ” Thesis. Department of Library and Information Science, University of Calicut, 2004

CHAPTER 1

INTRODUCTION

1.1. BACKGROUND

India, ever since her independence in 1947, has been adopting a policy of relentless pursuit of self-reliance in all fields. With her metamorphosis as a new politically independent nation, conscious efforts were made to enhance and modernize the scientific infrastructure of the country by establishing a series of National Laboratories, Institutes of Advanced Technical Education, Universities and Research and Development (R&D) Institutions, covering all disciplines. As a result of these pragmatic policies and systematic exploitation of science and technology for socio-economic development, India has, today, successfully transformed herself from a largely agrarian society with virtually no industry at the time of independence to a highly industrialized one and from a food-starving country to a food-surplus nation.

World is in transition from the industrial age to the information age. The driving force behind this transformation is the tremendous growth in the output of literature due to R&D activities in all fields of human knowledge and the rapid development and diffusion of Information Technology (IT). Innovations in computer, microelectronics and communication technologies referred to as IT, has provided new dimensions to the handling and processing of information, which has brought information at global level, to the finger tips of users. The development in any field depends upon the adequate availability of relevant information. The output of scientific and technical literature is so high that no individual can go through all publications that may be relevant to him. This calls for an effective system for information transfer. Today, the state of perfection of any information system is determined by its capability to sort out the precise information that exactly suits the requirement of the user, from the entire ocean of information. The

higher the quality of information accessed, the better the quality of the findings arrived at and decisions and policies made.

India is one of the leading countries in the field of basic research and her success in technology development in every field has been very significant. In pursuit of self-reliance in critical technologies relevant to national security, the Defence Research and Development Organisation (DRDO) of the Ministry of Defence (MoD) formulates and executes programmes of scientific as well as applied research in design, development, testing and evaluation of various systems, subsystems, devices and products required for the armed forces of the country. The defence R&D is multidisciplinary and interdisciplinary in nature. The DRDO with its large number of laboratories is engaged in scientific and technological research for end products necessary for defending the nation with its team of dedicated scientists and engineers.

The defence R&D has grown to embrace an ever-widening area. The defence science sector in India comprises of the research laboratories under DRDO, the Public Sector Undertakings of Government of India, the Defence Production Units under the Ministry of Defence Production, and other institutions under MoD. It differs only with regard to its limited clientele and restricted accessibility. There is also difference in the working environment where most of the research work is being conducted under the veil of secrecy and access to processed information is restricted due to security constraints. Surprise and secrecy are key elements in defence strategy. Protection of information about self and obtaining all possible information about enemy are vital for the success of every defence endeavour. Today it is not only the knowledge about immediate adversaries, knowledge about their direct and

indirect allies is also equally important. The knowledge about ones own strength and weakness is as vital as the knowledge about the adversary. Those having better knowledge than their opponents succeed in their effort.

There is no difference of opinion regarding the importance of Science and Technology (S&T) information for defence. According to Sahi¹, over a period of time no information can be termed relatively modern, if it does not undergo a constant process of upgrading. Scientific information is of vital importance to a defence planner for acquiring knowledge about the latest developments to sharpen one's own arsenal and to deny information of such scientific development to hostile nations by adopting scientific counter intelligence methods. It is also necessary to obtain maximum possible know-how about scientific application of information of defence interest available with the adversaries to carry out research and development to devise means to offset the enemy's capabilities with the least possible loss of time.

Scientific information is the basic raw material for defence R&D activity. This would call for the establishment of a strong scientific base where data can be collected, evaluated, and supplied to the planners at the helm of defence matters as well as defence scientists. The R&D activities of DRDO cover important demarcated disciplines like aeronautics, missiles, electronics and instrumentation, combat vehicles, engineering system sciences, advanced computing, life sciences including high-altitude agriculture, physiology, food technology, nuclear medicines and allied sciences. Modern electronics and precision instrumentation are the eyes and ears of the defence system. Digital Signal Processing and advanced antenna techniques are essential elements on which the sophistication of the future radar would depend. The DRDO renders technical advice regarding formation requirements, evaluation of

systems to be acquired, fire and explosive safety and mathematical/ statistical analysis of operational problems. The ambit of defence research is truly wide and highly specialised. Not only does it include the development of sophisticated weapon systems that must perform satisfactorily in the gruelling environment of the desert, snow, seas, etc. but also encompass modelling and simulation studies of operational problems, investigation of the psychological needs and physiological phenomena at high altitudes or at high speeds and a host of other analyses. Success in warfare is determined not by machines alone but also by the physical and mental efficiency of the men working under stress. To achieve the best results from the man-machine combination, extensive research is needed on all aspects of health too. The complexity of modern warfare in both methods and means demands correct analysis of the measures and counter-measures introduced at every stage. For this purpose, constant flow of scientific information on warfare is extremely essential. Latest information on new weapons, war materials, and battle tactics is necessary to gain self-confidence in fighting the adversary. With data available on the results of recent wars it becomes possible to study the operations in a qualitative and quantitative manner. Scientific analysis of the information regarding the performance of various weapons will indicate the advantages or deficiencies of those equipments and weapons and the tactics involved.

An effective Information System (IS) is indispensable since this sensitive area of defence relies on timely and reliable information for its efficient functioning. This responsibility is being thrust upon the information centres to function efficiently as active providers of up to date information to scientists for their R&D work. The Technical Information Centre (TIC) /

DRDO library attached to the laboratories is the fountainhead around which all R&D activities in a DRDO laboratory revolve.

The TICs, established to serve the information needs of the different R&D units, require to be coordinated and organised into an integrated system following uniform national and international standards to avoid or minimise wastage of resources through uncertainty and unintended reinvention, rediscovery, redevelopment and unfruitful decisions. The R&D work in the current era of high technology, calls for a highly efficient, effective and comprehensive information system network. The DRDO Information System is organised in the form of a number of libraries / TICs with Defence Scientific Information & Documentation Centre (DESIDOC) as the central coordinating agency. Each DRDO laboratory has a specific area of specialisation in defence research and has a well-organised and dedicated TIC to cater to the specific information requirements of the dependent scientists. The scientists of these laboratories simultaneously undertake various developmental projects in the respective fields of specialization. Bandyopadhyay² describes information requirements of the distinct phases of a complex project where concrete information is needed as follows:

1. Preliminary project formulation: In this phase, broad objectives are translated into preliminary practical alternative. For this pre-project study, the scientists require general information about the project. At this formulation stage they need review articles and state-of-the-art reports regarding the project. Any information of similar type of work conducted elsewhere is helpful to the scientists.

2. Feasibility study and report: Detailed information is needed in this stage. All the alternatives have to be studied and the basis of selecting the proposed one should be given. Exhaustive information is necessary for better reporting.
3. Detailed project report: The report contains (a) the general description analysing the environment to which the project belongs, (b) project descriptions giving analysis of alternatives and detailed description of the accepted one, (c) technological aspects covering technology / process to be used and availability of know-how, (d) financial aspect stating the estimated cost including the foreign exchange, (e) manpower requirement, and (f) system plan. Detailed and extensive information covering all the aspects of the project is necessary at this stage.
4. Progress of project work: The progress is reported periodically. At this stage the scientists require specific information and data about the project.
5. Final stage: After completion of the project work, the research product, undergoes user trials. After successful trials the design characteristics are finalised and this information is sent for use in connection with production. Relatively less information is required at the final stage in comparison to the earlier stages. The scientists generate certain amount of data at all these stages. These are to be verified with available similar data. The information supplied has to be very specific and correct.

The prime function of the TICs, which are considered to be the reservoirs of knowledge and information, is to provide precise, reliable, and relevant information to the defence scientists without any loss of time, in a form most convenient for utilisation. The traditional tools and techniques have proved inadequate and slow to harness the information deluge. The availability of, or the access to a piece of valid information is all the more important rather than the ownership of documents. The information explosion has necessitated the TICs to act as an able link and bridge the gap between the producers of information and the seekers of information, with the aid of a highly capable information infrastructure.

1.2. THE RESEARCH PROBLEM

Any information system, to ascertain its potential fully and to identify the deficiencies if any, must undergo objective assessment of the present methods of handling information. A comprehensive investigation of the prevailing practices and situations is required. Therefore, it is imperative to study the availability of resources and the provision of facilities to assess how far the system is able to fulfill the objectives for which it has been established. The utilisation of the resources and facilities also should be examined to ascertain the requirements and expectations of the users.

The review of the research studies conducted so far on defence libraries reveals that a comprehensive study on DRDO libraries has not been attempted as yet. Hence it was decided that a survey to study the collection, organisation, administration and utilisation of the DRDO libraries / TICs attached to the DRDO laboratories be conducted.

The research work undertaken is titled "**Organisation, Administration and Utilisation of DRDO Libraries**"

1.3. RELEVANCE OF THE STUDY

Each DRDO laboratory has a unique area of specialisation in defence research and has a well-organised TIC, attached to it to cater to the information needs of its scientist community engaged in defence R&D activities. In every organisation a smooth and systematic flow of information is necessary and in its absence the organisation suffers through delayed decisions or decisions based on insufficient information. There is a definite need for an efficient database of information with a modular structure, having capability to integrate, disintegrate, and re-integrate according to the search needs, for achieving a purposeful information service. An up-to-date and efficient TIC is an amalgam of three basic elements namely - collection, organisation and dissemination of information. The collection must be built up keeping in view

- the aims and objectives of the organisation,
- the short range and long range information needs of the scientists, and
- the on-going and anticipated R&D activities of the organisation.

The information requirements of the clientele should be clearly understood by the information scientists and their interest profile should be kept up to date on the basis of which the library collection should be developed. Once a balanced information collection is built up, it must be processed and organised in an efficient manner. The concept of information dissemination is the foundation upon which an IS is built, and it is here that the effectiveness of collection building and organisation is translated into a

reality. However good a collection may be, whatever means of processing might have been used, an information centre will not receive persistent support, if it is not equipped for effective dissemination of information.

The collection, organisation and dissemination of information are activities coordinated as well as balanced by administration. It provides the system the required management, leadership and direction. It supports the system by enabling to take decisions, fixing responsibilities of individuals and coordinates the joint efforts of all to achieve a common goal. It brings in order all the available means at its disposal to meet the desired ends for which the information centre exists. An efficient information scientist who runs the administration keeps the working of the information centre in tune with the organisational objectives.

This study which is intended to provide an in-depth analysis of the organisation, administration and utilisation of DRDO libraries endeavours to highlight the variations in the procedures adopted by the different DRDO libraries and identify the strengths and weaknesses in their organisational set up and administrative machinery. The study will have practical utility as it surveys the prevailing conditions with regard to their organisational and administrative set up, financial allocation and management, library resources and services and physical infrastructure. The study also aims at collecting opinions of the scientists regarding the documentary sources and the information services provided by the DRDO libraries, the analysis of which will enable to have a better understanding of the demands and expectations of the defence scientists. It will also analyse whether the resources and facilities of these libraries are responsive to the needs of the scientists and to find out how far the scientists are utilising the resources and services for

productive output. None of the previous studies in India attempted to find out the variations and similarities existing among the different grades of defence scientists in their frequency of library use, purpose of visiting the library and the utilization of the resources and services. The study also examines the adequacy / inadequacy of staff, the major resources and services and the physical facilities of the DRDO libraries surveyed. The study will also help to understand the problems faced by the scientists with regard to the library facilities and of the library staff in their routine work and suggest effective measures to rectify them so as to provide better, smooth and efficient services. In addition, the findings will also enable to identify more areas for further research.

1.4. OPERATIONAL DEFINITIONS

The operational definitions of the key terms in the title of the study are:

Administration: Administration conveys the idea of group cooperation under executive direction, seeking fulfilment of goals through planning and organisation. It refers to the use of personnel and materials in the fulfilment of the objectives of the organisation.

DRDO Libraries: DRDO is the abbreviated version of "Defence Research and Development Organisation", under the Ministry of Defence. DRDO operates through a network of laboratories established throughout the country and is engaged in pursuit of self-reliance in defence technologies relevant to national security. Libraries attached to the laboratories to cater to the information requirements of the scientists engaged in R&D activities in the laboratories are the DRDO libraries. They fall under the category of special libraries.

Organisation: Organisation is a systematic arrangement for a definite purpose. It is the arrangement of personnel for facilitating the accomplishment of some agreed purpose through the allocation of functions and responsibilities. It is the relating of efforts and capacities of individuals and groups engaged upon a common task in such a way as to secure the desired objective with the least friction and the most satisfaction to those for whom the task is done and those engaged in the enterprise.

Special Library: A special library is one with the responsibility of building up a collection of specific documents and other materials that caters to the needs of the specific user community of the library. The services of these libraries lay emphasis on the dissemination of nascent micro thought to the specialist users of the library pin pointedly, exhaustively and expeditiously. Special libraries include libraries of science and technologies such as that of DRDO libraries that are distinguished from other libraries by some special characteristics like limitation of subject, special patronage and the smallness of collection, staff, clientele, etc.

Utilisation: Library utilisation means well-planned and deliberate attempt to make use of the library resources and facilities. It includes visits to the libraries, time spent in the libraries, documents consulted and borrowed, using the various information services offered by the library, etc.

1.5. OBJECTIVES

The present study was undertaken with the following objectives:

1. to examine the existing organisational and administrative set up of the DRDO libraries,

2. to assess the adequacy of the resources – materials, finance, and manpower of the DRDO libraries,
3. to assess the adequacy of different services offered by the DRDO libraries,
4. to evaluate the degree of utilisation of the resources and services of the DRDO libraries, and
5. to examine the existing infrastructure within the libraries.

1.6. HYPOTHESES

The study formulated the following hypotheses:

1. The existing resources in the DRDO libraries are inadequate to meet the information needs of the scientists.
2. The services of the DRDO libraries are not satisfactory.
3. The physical infrastructure available in DRDO libraries is not adequate.

1.7. SCOPE AND LIMITATION OF THE STUDY

The present study endeavours to cover all the DRDO libraries of the country. Out of the fifty-two DRDO laboratories eleven do not have a library of their own. They are either field laboratories or are dependent on the rich nearby DRDO library. In addition, DESIDOC being the apex body is not included in the scope of the study. The remaining forty libraries spread across the country are included in the purview of this research study.

The user survey of the defence scientists, to study the information requirements and the utilisation of the resources and services of the DRDO libraries has been conducted only amongst the DRDO libraries in the State of

Karnataka. The user survey is confined to scientists grade 'B' to 'G' only, and omits scientists 'H', Distinguished Scientists and other categories of users like technical officers, technical assistants, technicians, etc.

1.8. MEANS AND METHODS

The nature of the present study required the survey of various DRDO libraries, which are scattered through out the country. Data were to be collected from these libraries to examine the prevailing situations in them. A survey of library is widely recognised as the best procedure for the evaluation of its organisation, administration, and resources and services. According to Harrods's³ glossary "Survey is an account of some research examination, or enquiry which has been done by scientific or organised method". It is one among the systematic methods of data collection, which involves questioning individuals on a topic or topics and describing their responses. With the help of a survey not only the past and the present conditions can be identified, but also the future requirements. The utility of the survey method has been pointed out by many social scientists. According to Moser⁴, "Surveys have their usefulness both in leading to the formulation of hypothesis and at a more advanced stage in putting them to the test. Their function in a given research depends on how much is already known about the subject and on the purpose for which the information is required"

Sadhu and Singh⁵ pointed out that "this type of research has the advantage of greater scope in the sense that a large volume of information can be controlled from a very large population. Survey research, no doubt, is more expensive but the amount and quality of information that is collected makes such investigation very economical. This information is also accurate, of course, within the range of sampling errors because trained and technically

knowledgeable personnel are employed for the job". Taking into consideration the advantages and feasibility of the method, survey was decided as most appropriate for the present research study.

The study covers two major areas:

- Survey of the DRDO libraries and
- Study of the utilization of the resources and services of the DRDO libraries by the defence scientists engaged in research activities.

Methodology of the study is discussed under the following heads:

1.8.1. Data Collection

Survey method allows researchers to study larger groups more easily. In almost all cases it is not possible to survey the entire population. For the results to be meaningful, a representative group should participate in the study so that the findings can be generalised. The present study deals with the population of DRDO libraries and the population of the defence scientists.

All the forty DRDO libraries were approached for the required data to study their organisational and administrative set up. Out of the forty, only twenty-six libraries responded. Eight libraries out of the ten (80%) located in North India and eighteen libraries out of the thirty (60%) located in South India are represented in the study. Among the fourteen States and one field unit where the forty DRDO libraries are scattered, nine States are represented. Similarly libraries from all age groups and the various areas of specialisation except naval research and development have representation in the study.

The user survey was limited to the State of Karnataka only, and taken as a case study to examine the utilization of the resources and services of the DRDO libraries by the defence scientists. Within the chosen State all the ten DRDO libraries were included in the survey.

1.8.1.1. Sampling

According to Young ⁶ "case study is a comprehensive study of a social unit, be it a unit, a person, a group, a social institution, a district or community." For the user study of this research work, the DRDO libraries in Karnataka were selected, the results of which can be applied to other DRDO libraries also. The State of Karnataka has the maximum number (10) of DRDO libraries in a State, out of the total of forty libraries, which amounts to 25% of the total libraries and 38.46% of the twenty-six libraries under study. Hence, only the libraries located in Karnataka were taken as sample for the user study. It is also pertinent to note that for the scientist community of the DRDO laboratories, the geographical location is not a concern since they are transferable within the DRDO set up. Amongst the ten libraries the scientist group is quite large and hence a representative group had to be selected as sample for the study.

The details of the strength of scientists of various categories were obtained from the Seniority Roll of Scientists as on July 2000, published by DRDO Headquarters, New Delhi. The scientist population under study belonged to six different grades viz, 'B', 'C', 'D', 'E', 'F' and 'G'. In order to ensure that all the grades are fairly represented in the survey, proportionate stratified random sampling was considered as the most suitable technique. Accordingly the names of all 976 scientists from all laboratories in Karnataka were fed into the computer for proportionate stratified random sampling,

stratified random sampling was considered as the most suitable technique. Accordingly the names of all 976 scientists from all laboratories in Karnataka were fed into the computer for proportionate stratified random sampling, keeping a target of 35% from each category from the overall list. The computer generated a list of 342 scientists. This list had to be rehashed a couple of times to generate fresh random sample list to cater for individuals who were away on other projects / long courses / long leave and those who retired / posted out / resigned. The researcher could collect 322 responses.

Table 1.1 gives the grade wise break up of the sample of the scientist population. For the convenience of analysis of data, the grades of scientists have been clubbed to form the Junior Scientists (JS) comprising of Scientists 'B' & 'C', Senior Scientists (SS) comprising of Scientists 'D' & 'E' and Eminent Scientists (ES) comprising of Scientists 'F' & 'G' categories.

Table 1.1 Category wise break up of the sample of scientists

Category	Junior Scientists		Senior Scientists		Eminent Scientists		Total
	Sc B	Sc C	Sc D	Sc E	Sc F	Sc G	
Number	74	70	78	61	30	9	
Total	144		139		39		322
(Percentage)	(44.72%)		(43.17%)		(12.11%)		(100%)

It can be observed from table 1.1 that the sample consists of 144 JS, 139 SS, and 39 ES. Out of the total of 322 sample scientists, Junior and Senior Scientists constitute 44.72% and 43.17% respectively, whereas Eminent Scientists constitute the remaining 12.11%.

1.8.1.2. Tools

As the information required included a great deal of qualitative and quantitative data it was decided to use the questionnaire as the most suitable research tool for data collection. A properly designed questionnaire is capable of extracting valuable and highly revealing data. The interview method could not be adopted as a tool because being defence research organisations it was difficult to get easy access to these organisations to conduct interviews. Hence, the only tools found useful for the present research work was questionnaire and personal observation. Two types of questionnaires were used for data collection.

Questionnaire I

Questionnaire administered to the personnel in-charge of the libraries of the DRDO laboratories was designed to extract maximum information on the organisation, administration and resources & services of the DRDO libraries. This questionnaire consists of thirteen parts as follows (Appendix-1):

1. General profile of the library
2. Infrastructure facilities of the library
3. Library Committee
4. Library budget and financial requirements
5. Selection and acquisition
6. Library collection
7. Technical organisation and maintenance
8. Library and information services
9. Computer applications

10. Manpower
11. Equipments
12. Auditing
13. Other information

Questionnaire II

Questionnaire administered to the defence scientists of the various DRDO laboratories in the State of Karnataka was structured to obtain information on the utilisation of the DRDO libraries. This questionnaire consists of five parts as follows (Appendix - 2):

1. Personal data of scientists
2. Library visits and use
3. Library resources and services
4. Library orientation
5. Suggestions

Personal Observation

All the DRDO libraries situated in Karnataka and a few others were visited personally to understand the existing organizational & administrative set up and to examine the infrastructure within the libraries. These visits also provided opportunity for discussions with the library professionals and scientists on the prevailing practices and conditions of the library.

1.8.1.3. Survey

Questionnaire I was administered to all the forty librarians through the Director of the laboratory, requesting permission to seek information from the librarians to collect data on the existing conditions of the DRDO libraries. Twenty-six librarians responded to the questionnaire, which amounts to 65% response.

Questionnaire II was administered to the 342 user scientists selected as per proportionate stratified random sampling, to study the degree of utilization of the library resources and facilities by the scientists. Questionnaires were distributed personally as far as possible and through the librarian. Scientists were very cooperative and the researcher could collect 94% response.

1.8.2. Method of Analysis

The data collected from the librarians were analysed manually while that from users were analysed with the aid of a computer. The data collected through questionnaires were supplemented with information obtained through observations and discussions with the librarian and staff of certain libraries. The collected data were analysed in view of the objectives. Simple statistical techniques such as percentages, mean score, chi-square test, t-test and one-way ANOVA tests were used for the analysis of data wherever applicable. Suitable tables and charts were also developed to facilitate interpretation of data.

1.9. ORGANISATION OF THE REPORT

The study is organized under the following chapters viz:

Chapter 1. Introduction:

This chapter presents the background, research problem, relevance, operational definitions of key terms, objectives, hypotheses, scope and limitations of the study and the methodology adopted in this study.

Chapter 2. Review of literature:

Related literature of previous studies conducted in India and abroad on the subject is reviewed in this section.

Chapter 3. Evolution of DRDO and its libraries:

This chapter broadly traces the origin and evolution of DRDO and its significant achievements. It outlays the role and importance of the libraries attached to the DRDO laboratories, the hierarchical organization of DESIDOC, etc.

Chapter 4. Institutional infrastructure:

A brief description of the profile of the laboratories, their areas of specialisation and some of their major achievements has been covered in this chapter. The important collections and services of the libraries attached to the laboratories have also been dealt with.

Chapter 5. Organization and administration of DRDO Libraries:

This chapter presents the analysis of the data collected from the librarians regarding the organization, administration, resources and services of DRDO libraries.

Chapter 6. Information requirements of defence scientists and the utilisation of DRDO libraries:

The analytical study of the data collected from the defence scientists for ascertaining their information requirements and the utilization of DRDO libraries is presented in this chapter.

Chapter 7. Findings and suggestions:

This chapter presents the results of the survey, suggestions and further areas for research.

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REVIEW OF RELATED LITERATURE

M. Santha Kumari “Organisation, administration and utilisation of DRDO libraries ” Thesis. Department of Library and Information Science, University of Calicut, 2004

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1. INTRODUCTION

An attempt has been made in this chapter to review briefly various studies conducted in India and abroad on the Organization, Administration and Utilization of defence libraries. This includes papers presented in seminars and conferences and doctoral and other important studies in the field. The review incorporates studies on all the major facets of defence libraries. The literature reviewed has been presented under two headings. Further, studies conducted abroad on defence libraries are reported, followed by studies conducted in India.

2.2. ORGANISATION & ADMINISTRATION

The unprecedented growth in the flow of information coupled with the advancement made in the field of IT has necessitated effective changes in the management of libraries. Their organization and administration depend upon the availability of resources and the services offered by them. Very few attempts have been made earlier to study the organizational structure and administrative pattern of the defence libraries. Available literature on these aspects is reviewed in this section.

2.2.1 Studies conducted abroad

Shadrake (1977)¹ in his paper delves on the War Studies Library at King's College, London University. The University began in 1953 with a special grant from the University of London. War Studies cover the historical, political, technical, economic and social problems connected with the preparation and conduct of war. The War Studies Library is housed with the College History Library. This paper gives the collection details of the library. It discusses expenditure, purchasing, cataloguing, classification, borrowing and photocopying facilities, space problems, and book losses. It also describes

the Liddell Hart Library - a self-contained collection of 7,000 volumes consisting of books and papers of the eminent military theorist Sir Basil Liddell Hart.

Morelli, Guido (1982)² studied the Italian Defence Documentation Centre (IDDC), with reference to its history, performance and future plans. This paper presents the difficulties encountered in its establishment, the structure of the centre, sectorial organisation, manpower details, administration, dependence, authority and tasks assigned to the centre, structural and operational inconveniences that affected the activities of the centre since its establishment, present services offered by the centre, future services under development and problems pending to be solved. The study embarked on a detailed analysis of the organisational, structural and financial ability of the IDDC with a view to enhance its service potential.

Burton and others (1986)³ conducted a study on resource sharing through integration of an Intelligent Gateway with a commercial online library support software system for Department of Defence (DoD) libraries in USA. The objective was to promote resource sharing in a distributed environment and to apply the DoD library model to other library communities. The study revealed that by incorporating the Intelligent Gateway Technology it was possible for the Defence Technology Information Centre (DTIC), which is the central headquarter unit of the DoD Library System, to provide a dynamic resource environment, including heterogeneous external and internal resources. The gateway software could provide full support to the various in-house administrative functions. Simultaneous connections to the local holdings file and the non-local DoD / DROLS (Defence Research Online System) files as well as any other locations such as relevant DoD field libraries, were also possible. The gateway could be

used to integrate information obtained, from other sources or for other functions such as electronic mail or teleconferencing. Data could be downloaded from an external host, reviewed in a local library and then sent on to a patron via E-mail. Another notable feature is that each function could be either supported or provided by the intelligent Gateway system.

Rothschild (1987)⁴ conducted a study on the Information Analysis Centres (IACs) of the Department of Defence (DoD), US. The objective of the study was to analyse the problems faced by the IACs. The methodology adopted was to obtain data from the twenty one IACs managed and funded by the DoD to study their organisation, administration, finances, technical expertise, acquisition, collection and dissemination of information, cost effectiveness, and the equipments and technological aids made use of. The study identified the problems in relation to IACs and concluded that the problems and concerns facing the IACs were not in isolation. They were part of the more basic issues that trouble all institutions and individuals involved with the transfer of scientific and technical information in the country and could only be understood in the light of the nations federal information policies.

Byrne and Micco (1988)⁵ conducted a study to evaluate the impact on the workload, after the Australian Defence Force Academy library decided to go on with a project to upgrade subject access in its OPAC by adding an average of twenty-one multiword terms from the table of contents and index of their book collection. User survey of the OPAC identified major problems in database access such as finding the right subject heading, ambiguous codes and abbreviations, currency and coverage, indexing and database accuracy, regular updating of the database, etc. Several methods were considered before the Enhanced Subject Project (ESP) method was chosen. This method consists

of selecting supplementary terms from the contents pages of books and the index. The ESP demonstrated that the use of contents terms is a viable and cost effective technique for increasing the number of subject access points to the books.

Farquhar (1989)⁶ studied about the holdings and customer services of the Defence Research Information Centre (DRIC) which is the Ministry of Defence's central deposit and dissemination point for defence scientific and technical literature to the UK and overseas defence community situated in central Glasgow. DRIC is the Procurement Execution division of the MoD. It is organised into Group 1 responsible for all aspects of reports handling, literature search and publication and Group 2 responsible for all aspects of information technology and administration.

The primary responsibility of DRIC is towards Defence Scientific and Technical Reports, which have limitations on their dissemination. DRIC holds comprehensive collections of MoD originated and sponsored 'Unlimited' reports, AGARD reports, and NASA originated reports. DRIC is the focal point in MoD for exchange of Scientific and Technical Reports between the UK and NASA. Volumetric details of DRIC holdings and customer services are assessed in detail. The study made additional recommendations to provide SDI in machine-readable form, provide an IT Help Desk facility to librarians in MoD establishments, implement an archival facility of DRIC document holdings, provide a Registry System for the receipt and processing of documents other than reports, automate the Management Information System (MIS) and the Budgetary System, and create an index card database.

Duffek and Harding (1993)⁷ conducted a case study on Quality Management in the US Military. The case study revealed how the top level

decisions of Department of Defence (DoD) affected a defence research laboratory even at the lowest field level. In the early nineteen eighties, the DoD started a quality improvement programme based on the principles laid down by Edward Deming which was based on the philosophy of continuous improvement for training its acquisition work force. As a part of the quality management programme, various measures were initiated so as to ensure the desired level of quality. One of them was to reorganise the various research laboratories. In 1990, as a part of the reorganisation of the Air Force research laboratories, the Phillips Laboratory replaced the Air Force Space Technology Centre. It took the laboratory almost a year to define policies and directives for financial management activities. The new guidelines, which were implemented, marked a significant shift in the management of the finances of the various support services, especially the purchase, library and printing. Initially these services were performed at no cost to the various scientific divisions, which were its main customers. The new management directed the laboratory to collect the costs of the services from the divisions requesting them. This created a situation whereby the library had to start marketing its library services more aggressively, trying to improve their utility to the scientists by way of providing better services at the minimum costs. This suggests that a change in the top management strategy can bring about changes in the related lower level areas also.

2.2.2. Studies conducted in India

Surendar Mohan (1976)⁸ in a paper presented at the second All-India Library Conference in January 1976 studied the documentation and information centres in Delhi. Delhi has national documentation and information centres for science and technology, medicine, agriculture, defence science and social sciences. The study provided information on the

organisation, resources and future projects of five major centres namely the Indian National Scientific Documentation Centre (INSDOC), Defence Science Information and Documentation Centre (DESIDOC), Social Science Documentation Centre (SSDC), National Information System for Science and Technology (NISSAT), and National Informatics Centre (NIC).

Bhatia (1977)⁹ analysed the functions and activities of DESIDOC, based on a survey conducted on the functions and activities of its divisions. The paper projects DESIDOC as the premier agency for information in the defence scenario. DESIDOC coordinates the information activities of all the laboratories, detachments and the technical directorates under the aegis of DRDO, which conduct R&D activities on all aspects of defence science. DESIDOC has been organised into the following eight primary divisions / groups to carry out the above functions effectively, each under the headship of an Assistant Director. They are Library, Documentation, Polygraphy, Publications, Reprography, Translation, Technical coordination, and Administration. The detailed accounts of the functioning of the various divisions are presented in the paper. A diagrammatic representation reflecting the organisation chart of DESIDOC has also been incorporated in the study.

Narayana and Desai (1981)¹⁰ studied the possibility of a computerised document handling system for a group of libraries. A pilot project was initiated for the establishment of a computerised document handling system covering the resources of the Institute of Armament Technology, (IAT), Pune, and other sister establishments in the DRDO, by which, the concept of a National Defence Science Information System originated. The project proved the capability of the design to cover the entire resources of DRDO and the feasibility of establishing a National Defence Science Document Handling System.

Murthy and Rangra. (1982)¹¹ endeavored to analyse the Information Services of the DRDO establishments. A detailed study of the tasks undertaken and performed in DRDO establishments and the resultant information needs of the scientists had been highlighted. The information needs of DRDO are mission oriented, project oriented, and problem oriented, depending upon the level of management served. Three management levels, which differ in their requirement of information in respect of quantity, quality and mode of presentation, were identified as Strategic - representing the top management of DRDO, Tactical - representing middle management comprising the Directors of Laboratories and Operational - representing lower level management comprising project leaders and group officers. The study recommended that formal professional training of the staff to enhance knowledge and skill was required as a major step for improvement of information services. The annual meeting of the Heads of TICs was recommended in which matters of mutual interest such as elimination of duplication, wastage of effort, simplification of administrative procedure, etc should be discussed.

Ambrish Kumar and Shrivastava (1986)¹² endeavoured to study a user-friendly computer based online interactive data processing system for the production of accession list for the Defence Science Library. The scope of the system was to provide / develop a user-friendly system with outputs to include classified accession list entries, keyword index, author index, title index, series index and see entries. Direct data entry from online terminal and processing of data created facility for training library staff in the operation of primary computers and execution of programs for data input and data processing. The method of analysis had input, output, processing of information to obtain the desired output as logical components and hardware configuration as physical components. It was concluded that any library

professional could learn the menu driven software package developed within a couple of hours of practice.

Ambrish Kumar and Srivastava (1986)¹³ carried out another joint study on DRDO Information Retrieval System (DRDO-IRS). The objective was to plan, analyse, design and implement an online interactive computer-based integrated information storage and retrieval system on technologies of interest to defence. Manually operated information storage and retrieval systems were no longer able to cope effectively with the problems of information supply due to the multi-disciplinary nature of subject areas, proliferation of documents containing information on such and similar complex areas of knowledge, increase in the number of users of such information for different applications, and the need to disseminate information at places that are far away.

The IR system developed and implemented at DESIDOC was operational since 1983. It was observed that, to provide information services to various categories of scientists in different areas of science and technology, covering worldwide scientific literature, there is a need to create large bibliographic databases on computers having trillions of bytes of dedicated mass storage and associated software. The creation of such an information facility would be highly labour intensive and investments made in terms of manpower and installation of hardware and software might not prove cost-effective. Therefore it was decided to restrict the size of the database, covering only core areas of interest.

Gopalaswami (1986)¹⁴ studied the possibility of an information system strategy for the DRDO. The author's analysis of the growth history of DRDO revealed that the rate of growth of the corporate information system

infrastructure in the DRDO has not kept pace with the organisational growth and change. Any programme to introduce new information systems and technologies must be concerned not just with the management of information, but with the management of change too. Three dimensions of change which take place simultaneously in the DRDO were identified as change in the age of the organisation resulting in change in the size of its projects, budget, manpower, specialisations, facilities, etc., change in the age of the individuals, i.e. scientists, engineers, technicians, administrators whose information requirements change according to their position in the hierarchy of the organisation and change in the existing state of science and technology, its evolution as single discipline, and then as multi-disciplinary fields. Each dimension of change has five different phases or stages, which cyclically interact with one another. At every one of these five stages of growth of science and technology the information need is quite different from that of the others. The information scientists need to develop computer-based techniques for successful communication that takes care of this factor. Suggestions were also made for formulating and implementing a creative information strategy in DRDO.

Rangra (1986)¹⁵ has traced the historical development of norms for manpower requirements in Technical Information Centres (TICs) and libraries in India based on the work done on the subject in DRDO. The functions of a typical TIC in DRDO were identified. The study evolved separate manpower formulae applicable for the Library unit - comprising of procurement, technical processing, physical maintenance, issue and return, reference services and handling of security documents, the Information unit - comprising of scanning and identification of information, indexing and maintenance of index file, abstracting, computer input preparation, current awareness services, and supply of information on demand, Translation unit -

comprising of translation from foreign language material on demand, translation of contents of foreign language periodicals and issue of current awareness services, maintenance of index of translations and information processing and allied work and Reprography unit - comprising of microfilming, enlargements, Xerox copying, duplicating from offset masters, colour photography, slide making, maintenance of equipment and accounting. The minimum staff strength for a new library, keeping in view the functions and workload had been suggested. The manpower norms thus formulated had been tested in some of the DRDO TICs / libraries and the result had been found satisfactory.

Taneja and Murthy (1986)¹⁶ carried out a detailed survey, based on personal observation and verification of official records, of the various functions, activities, organisational and administrative set up of DESIDOC. The study highlighted the process of evolution of DESIDOC as the major source of information to the defence scientists and its transformation into a promoter of Information Technology (IT) for Library and Information Service (LIS) in India. DESIDOC conducts specialised courses and workshops in the application and use of IT for LIS professionals. It organises refresher courses in specific areas like indexing, data base organisation, computerisation of information, information processing and dissemination, accessing information and networking, technical writing and presentation, printing technology, scientific photography, multimedia applications, library networking, etc. More than fifty such courses were organised. It also provides facility for training programmes in IT conducted by other organisations. The research activities of the centre on systems and software development for various information activities and services resulted in the software packages like Sanjay, DELMS, and Suchika and also packages for the production of union catalogues and online information retrieval of DESIDOC databases.

DESIDOC provides technical help to DELNET and INFLIBNET and collaborates with other institutions on selected projects in LIS activities to provide new and better information products and services.

Vinod Kumar and Ramanujam (1986)¹⁷ conducted a study on the information requirements in respect of non-metallic defence materials like plastics and rubber, which are of paramount importance for both the civilian industries and the defence sector. Defence Material and Store Research and Development Establishment (DMSRDE), Kanpur, is engaged on a number of projects relating to these materials. Research of this nature has interdisciplinary overtones and requires information from diverse sources. The study highlighted the endeavour in retrieving unclassified information in respect of these materials. Information explosion, Information security, Economy, Language barrier, Information monopoly, Conference proceedings, Time lag, Software, Personal possessiveness etc were found to be restraints on the retrieval of information.

Yogendra Singh and Kumar (1986)¹⁸ studied the various areas of library information work where microcomputers can be used. They can be used for administration, technical services, public services, patron use and library and information science training. The software packages available for each application are explained. Use of TRS-80 microcomputer in IAT library is described as a case study. IAT library is using TRS-80 microcomputer for compilation of union catalogues and preparation of DRDO periodicals directory. It was concluded that within the next few years, microcomputer would become a normal working tool in any library.

Janardan Shriram (1986)¹⁹ carried out a detailed study on the importance of information security and its management in the R&D

organisations in defence sector, which is very closely linked with various non-defence organisations and other public and private sector undertakings. A secured information system is penetration proof from potential hazards. The security control enables to protect against hardware, software and manpower failures. Recognition of the information value of a research result by a scientist, identification of possible hazards, application of logical, physical and procedural security techniques, enforcement of various security regulations and formulation of various enactments for control of dissemination and exchange of information within and outside the organisation were identified as the various elements for achieving a secured information system. The study also had recommended steps to enhance information security in defence R&D environment.

Mehta and others (1986)²⁰ jointly attempted to survey and analyse the resources of various libraries / TICs of different departments of the MoD. The departments covered were the Department of Defence, the Department of Defence Production and Supplies, the Department of Defence Research and Development, the three services (Army, Navy and Air force), and the Defence Public Sector Units. The objective of the survey was to find out the feasibility of maximising the availability of materials and services to users at minimum cost, reducing waste of money, manpower and materials, creating the infrastructure for a resource sharing network and to find out possible areas for cooperative acquisition.

Nigam (1986)²¹ studied the importance of technical report literature as a medium of communication in science and technology, which is invaluable for defence R&D. The study outlined the nature and types of reports received in DESIDOC from various institutions, local and foreign, and points out some practical problems in the identification, selection and procurement of reports.

Reports are grouped into Feasibility reports, Progress reports, Final / Closing reports, Annual reports, State-of-art reports and Security classified reports. The objective of the study was to streamline the procedure in the identification, selection and procurement of scientific and technical reports in various establishments of DRDO.

Subramanian and Muthusamy (1986)²² tried to delineate the trends in hardware and software requirements and discussed the design of a system - Defence Research Information Processing System (DRIPS) for dissemination of information among the heterogeneous and increasing number of users in the defence R&D sector. The various stages of design and development namely initial theoretical drawing board design, production, and testing with modifications are dealt with at length. The objective of the study was to suggest a suitable infrastructure for enhanced operations management, taking into account the need for integration as well as the recent trends and their impact. DRIPS has been designed to underscore the need for standardisation as well as scope for sophistication. The methodology in analysing the information system covers the various problems anticipated in the information retrieval system namely indexing and keyword searching. The design of DRIPS involves an in-depth study of system analysis, system design, Structured Systems Analysis and Design Technique (SADT), programming languages support, operating system software and hardware requirements. The system integrations requirements, education and training had also been adequately stressed.

Narayana and Desai (1987)²³ evolved personnel standards for defence R&D libraries and Technical Information Centres (TICs) based on an integrated, inter-related and function wise approach in the process of designing a standard library unit incorporating all the facets of a library. The

study based on the concept of a standard library unit, formulated a work to staff relationship constant. This concept of standard library unit, can be applied even to other types of libraries for formulating human resource norms. The study emphasized that personnel planning for libraries needs greater attention and also opined that the practice of entrusting the charge of libraries to non-professionals as part time assignments needs to be reviewed.

Murthy and Rangra (1990)²⁴ as a joint venture carried out a detailed study of the organisation and functions of the DESIDOC in comparison with the similar type of arrangements available with other well equipped defence information centre like Defence Technical Information Centre (DTIC) in the USA and Defence Documentation Centre (DDC) in the UK. The various specialised services offered by DESIDOC like DIALOG search service, DESINET, Common Communication Format (CCF), etc, have been minutely dealt with. The study also covers the various DRDO publications and the publications by the scientists apart from the various training programmes coordinated by DESIDOC:

Sonia Relan and Vijayalakshmi Kakar (1993)²⁵ studied the CD-ROM systems, databases and CD-NET networking system available at DESIDOC. Advantages and disadvantages of online and CD databases were compared. The study aimed to survey the problems faced in acquisition, installation of various databases and retrieval software problems of major CD database producers and find out concrete solutions. The study recommended various measures for the expansion of the CD-ROM facility.

Sumati Sharma and others(1994)²⁶ carried out a study on the collection development in the Defence Science Library. The study ventured into the details of collection development, user group analysis, collection

development policy, selection of books and book like materials, during the period from 1985 to 1993. The study laid stress on periodic weeding and evaluation of the collection as part of a well designed collection development plan. The study strongly recommended resource sharing among the libraries keeping in view the rising cost of printed materials.

Gowtham and Kamat (1995)²⁷ undertook a study of the expert system of classification of technical documents developed by the Defence Metallurgical Research Laboratory (DMRL), Hyderabad, using the UDC schedule for metallurgy as knowledge base and the UDC classification rules as rules base. Some benefits of the system are that it interacts with the classifier making them conform to the route suggested by the classification scheme. It alerts the classifier to the minor variations in the scheme thus avoiding overlooking them. It leads to consistency in class number generation and ensures that the classifier has incorporated all the concepts of the subject in the class number by leading the classifier through all the groups, which is not possible in the manual UDC scheme.

Rathore, (1997)²⁸ conducted an elaborate study on the collection, manpower, computer hardware, software, databases, etc. of twenty eight DRDO libraries in India. The study revealed that the DRDO libraries individually may not have enough collection but the DRDO library family as a whole has substantial collection of resources. The DRDO libraries do not have proper library officer / manager for information management work and these libraries need immediate placement of Scientist 'B' of Library Science discipline to have effective information management. It was also observed that the DRDO libraries are building their databases through a variety of software packages which creates problems in networking, therefore it was suggested that a common software be selected which should be distributed to

all DRDO libraries. Networking of DRDO library collection is essential for each DRDO library to function as a true information centre, since no library can be self sufficient in the present information age.

Ashok Babu, (1997)²⁹ conducted a survey and gathered information regarding the collection of books and periodicals, software used, automated on-line services, budgetary provisions, etc. of the various special libraries in and around the twin cities of Hyderabad and Secunderabad. The survey included Scientific Libraries, Scientific and Technological Libraries, Industrial Libraries, Agricultural Libraries, Defence Libraries, Medical Libraries, Social Libraries and Humanities Libraries. It revealed that most of the special libraries are in the forefront in the adoption of IT. The Computer Centre and the Technical Information Centre of DRDL (Defence Research and Development Laboratory), Hyderabad, jointly designed, developed and implemented the Integrated Library Information System (ILIS). This system is aimed at creating a centralised database of the information resources of the Technical Information Centres of DRDO complex at Hyderabad. The defence libraries included in the survey were DRDL, DMRL (Defence Metallurgical Research Laboratory), DERL (Defence Electronics Research Laboratory), RCI (Research Centre Imarat) and HAL (Hindustan Aeronautics Limited). The survey revealed that resource sharing and networking of the special libraries in Hyderabad and Secunderabad would improve the efficiency of these libraries.

Bedi and Rajeev Vij (1998)³⁰ examined the scenario in the marketing of the DRDO publications and identified the various techniques used for marketing them in India and abroad. The study was aimed to critically evaluate the existing marketing set up and techniques followed in DESIDOC, with a view to suggest a strategy to optimise the marketing of not only sales /

subscription of DRDO publications, but also of other information services and products. The methodology adopted included the study of each priced DRDO publication from the viewpoint of its importance, potential clientele and promotion & distribution channels being used for marketing. The major part of the study was devoted to collect statistical data on the sale of each publication from 1992 to 1998 in order to determine the trends in sale. The sales trends were then linked to the various marketing techniques adopted by the centre in order to identify the limitations. The study identified the problem areas and recommended alternative techniques that could be applied in the form of marketing mix as a strategy to significantly improve the sales of the DRDO publications.

2.3. SERVICES AND UTILISATION

Literature relating to the studies on the information services offered by the defence libraries and the utilization of the defence libraries are reviewed in the following paragraphs.

2.3.1. Studies conducted abroad

Robert H, Rea (1974)³¹ carried out an in depth study of the functions of the Defence Documentation Centre (DDC) and the various services provided by it. The DDC a field activity of the Defence Supply Agency of the Department of Defence, makes available thousands of R&D reports produced each year by United States military organizations. The DDC also operates computer-based data banks and technical information and retrieval systems. Novel programmes and services like Technical Report Programme, Report Abstracts, New Technical Vocabulary, Announcements, Automatic Magnetic Tape Dissemination (AMTD) Automatic Document Distribution (ADD) and

Retrospective Bibliographies on Magnetic Tapes (RBMT) are also covered in the study.

Sheppard (1976)³² conducted a study on the problem of optimization of user benefit in scientific and technological information transfer of NATO. It discussed the operation and development of a computer-based SDI system, which interrogates the databases of ADSATIS (Australian Defence Science and Technology Information System) and the US National Technical Information Service's Government Reports Announcements. It also discussed in detail a questionnaire survey of users, which covered the relative importance and use of various sources of information, the performance of the service and the relative value of its characteristics. The study analysed a survey of non-users of the service and discussed the precision ratio and presented the use statistics too.

Otto (1977)³³ studied about the documentation service of the South African Defence Force. The South African Defence Force (SADF) Archives has the responsibility for collecting and storing newspaper cuttings about SADF. Developments such as the storing of newspaper reports on microfilm are discussed. STAIRS (Storage and Information Retrieval System) is used to retrieve information from the reports. The SADF Documentation Service, set up in 1974, consists of three sub-divisions to deal with archives, library service, and information service. It examines the efficiency of the service, the storage and retrieval capacity of the computer, and the active and passive information functions of the system. Information from books, archives, periodical articles, newspaper reports, and photographs is indexed and stored.

Bonnett (1981)³⁴ undertook a survey to determine current use of automated functions in DTIC (Defence Technical Information Centre) and User Technical Libraries. The author analysed the responses to 'survey by DTIC's military users on current and planned Technical Library / Information Centre automation' to ascertain the areas where new services and support were desired from DTIC, and what automation efforts were to be planned and budgeted. Forty-seven percentage (47%) of the responses indicated that some automated functions in the library concerned, ranging from access to DROLS (Defence Research Online System) or commercial services by terminal to totally automated integrated systems, were desirable.

Sauter and Lushina (1982)³⁵ in their study describe the Defence Technical Information Centre (DTIC) and the National Aeronautics and Space Administration (NASA), in terms of their history, operational authority, information services provided, user community, sources of information collection, efforts underway to improve services, and external agreements regarding the exchange of documents and databases. The contents also show how DTIC and NASA provide aerospace / defence information services in support of US research and development efforts. The importance of scientific and technical information and the need for information centres to acquire, handle, and disseminate it are dealt with at length. A comparative and comprehensive study of both DTIC and NASA were attempted at with a view to highlight the interdependency and also project their independent contributions in the field of IT.

Grutmacher (1982)³⁶ studied the feasibility to calculate a cost-benefit analysis for the activities performed and services provided by a documentation and information centre. The objective of the Royal Netherlands Armed Forces Scientific and Technical Documentation and

Information Centre (TDCK) was to collect, record and make accessible, those publications in the field of science and technology of defence interests, to defence organizations in an efficient way. An in-depth study of the utilisation and services provided by the TDCK including automation and the finances involved on an annual basis was practically carried out under the aegis of the Director.

2.3.2. Studies conducted in India

Rao (1966)³⁷ made a pilot survey about information activities in twenty-one R&D laboratories of the MoD. The survey produced simple data about available information facilities, publishing pattern and broad communication activities. This was the first study reported with some statistical data and one of the very few attempts of user surveys at the national level by a government agency. The survey found that the optimum size of an R&D laboratory for maximum production of papers is 250 persons, and that laboratories other than equipment intensive laboratories showed greater output in terms of research papers.

Rahat Hasan (1976)³⁸ surveyed the reprographic facilities available in the libraries of Delhi. The survey listed out the various types of equipments available in these libraries. DESIDOC was also included in the survey. DESIDOC has an independent reprographic and photographic unit, the services of which are available to the defence services staff and those engaged in defence science research. Since these services are available only for official use, there is no service charge. The survey analysed the implications of the copyright law and development of indigenous reprographic equipments and recommendations were made to improve utilisation of the then existing facilities.

Rangra and others (1979)³⁹ had made an attempt to study the objectives of effective management information system and their relevance to the requirements of the DRDO. It highlighted the Selective Dissemination of Information (SDI) system to serve the top management in DRDO. The study claimed that the system is conventional and is not computer based. It provides in anticipation, current pertinent information along with the text. It identifies the areas for coverage in the form of User's Interest Profile, which is matched with the Document File built by systematic scanning, indexing and reprocopying of information appearing in the current journals.

Chakraborty and Saxena (1986)⁴⁰ studied the language barrier and its impact on information flow with special reference to defence preparedness in India. For defence requirements India still depends heavily on large-scale import of military hardware that often becomes obsolete very fast and requires replacement. Purchase of every item is accompanied by notes, handbooks, manuals, etc concerning the specifications, working instructions, maintenance and overhauling instructions, storing procedures, each one of which requires thorough study to assess their potentials. Access to the language of their origin is essential if they have to be commissioned into service soon after their procurement. Authentic translations of such highly technical documents are very costly if procured from the countries of their origin. A good number of qualified translators and interpreters can possibly help to overcome this barrier partially. The methodology followed made a detailed survey of the various languages in which the publications of defence interest are produced and the multilingual international scenario. It also studied the information required for the acquisition of strategic, logistic and tactical appliances and technical know-how of the production of hardware that are required for an effective R&D work. It suggested translation activities

as a remedy to break the language barrier. Translation is a costly and time-consuming affair and it is rather difficult to get quality translations. These factors have induced the dependence and creation of a good number of translation agencies and translation banks such as National Translation Centre, Chicago, USA; British Library Lending Division (BLLD); Boston Spa, UK; Centre Documentation de l'Armement (CEDOCAR), France; All Union Translation Centre, USSR; International Translation Centre, Delft, Netherlands. In the Indian scene more than 200 organisations are engaged in translation activity. INSDOC is the major producer of scientific translations and has more than 25,000 scientific translations in its collections and adds more than 1,000 translations per year. In the defence sector DESIDOC has been providing translation services to meet the requirements of the defence scientists since 1958.

Mahesh and Ghosh (1998)⁴¹ in a case study analysed the Database of Indian Databases (INDAB) compiled by National Information System for Science and Technology (NISSAT) and surveyed nine libraries attached to leading Science and Technology institutions in New Delhi to find out the usage of indigenous databases reported in INDAB. The demand for indigenous databases in the various branches of science and technology is on the rise owing to the difficulties in accessibility of international databases, which resulted in the growth of Indian S&T databases. The aim of the study was to examine the availability and use of such databases by the major S&T libraries in Delhi. Nine major libraries in Delhi including the Defence Science Library (DSL) were chosen to study the usage of indigenous databases.

Sumati Sharma (1999)⁴² studied the role played by IT in special library environment. The changing IT environment and matching role of the library professional in the 21st century was explained. It analysed the complete

spectrum of the impact of IT on Defence Science Library (DSL), the specialised central library of DRDO functioning at DESIDOC. The study highlighted the special services offered by DSL. It also established that DSL is one of the best-equipped libraries in the country and has the largest collection of documents on defence S&T. The study also found out that with the use of latest technologies, DSL has been able to provide its users fast and efficient access to a variety of information resources with maximum user satisfaction and has also achieved the very basic goal of providing right information to the right user at the right time.

Satish Kumar and Jayaraman (2002)⁴³ in their study on the networking of CD / DVD-ROMs discussed the benefits of sharing CD / DVD-ROMS over a network and introduced a device called CD libraries / servers for sharing CD title discs over the network. The study based on the technology and facilities available at the DRDO library of Electronics Research and Development Laboratory (LRDE), Bangalore, highlighted the advantages of the technology for this resource sharing and areas of library applications. The jukebox device for accessing large number of (over 200) CD / DVD-ROMS, can store upto 600 discs in a single enclosure. The tower of changers, another novel device, contains multiples of five disc changers with a reader. A tower of changers with 280 disc capacity has 58 readers allowing 58 users to access simultaneously 58 unique disc titles. The study concludes that this facility provides significant benefits such as easier accessibility through LAN / intranet, management and control, cost savings with increased security and productivity.

2.4. CONCLUSION

This section reviewed the available literature on the organization & administration and services & utilisation of the defence libraries. It can be concluded from the review that the organization and administration of a library largely depends on the resources and services provided by it, which in turn depends on the information requirements of the users. The exponential growth of information and the developments in the field of IT calls for a continuous review of the existing system so as to enable the adoption of latest techniques for information transfer.

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EVOLUTION OF DRDO AND ITS LIBRARIES

M. Santha Kumari “Organisation, administration and utilisation of DRDO libraries ” Thesis. Department of Library and Information Science, University of Calicut, 2004

CHAPTER 3

EVOLUTION OF DRDO AND ITS LIBRARIES

threat is strength and vigilance. The process of planning for such defence does involve a long term assessment of the threat perceptions, international relations, international economic trends, economic and political developments in neighbouring countries, global developments in the field of military science and technology vis-à-vis own potential. This background knowledge is essential for formulation of the defence policy.

The defence and national security planning is an activity which necessarily comprehends a timeframe of not merely a few years but a few decades. This is mainly because translation of defence technology into actual capability is a difficult process, involving long lead-time and gestation period, besides heavy expenses. Any country that does not keep pace with the explosive expansion of the frontiers of S&T runs the risk of being relegated to permanent obsolescence. Indian government has been consistently laying emphasis on the development of S&T as a major instrument for achieving national goals of self-reliance and socio-economic development. Over the years a strong S&T infrastructure base has been established in the country. This covers a chain of national laboratories, specialised centres, various research and development centres and academic institutions and training centres, which continuously provide expertise, technically trained manpower and technological support. Decision-making, be it for long-term planning or day-to-day functioning is increasingly dependent on instant availability of the required information. The national strength in defence is based on its capabilities in S&T. Relevant information on S&T as applicable to defence science plays a vital role in the field of Research and Development (R&D)

and formulation of policy matters and decisions in the defence scenario. In order to meet the defence objectives adequately, it is essential to continually develop new technologies / infrastructure on which our defence industry could be based cost-effectively.

3.2. EVOLUTION OF DRDO

The defence forces of a country - the men in uniform with combat responsibility, need the support of a substantial infrastructure both within the state sector and in the country at large. Such support is needed primarily in the material sphere to develop, produce, upgrade and maintain combat and support systems. Several national laboratories were set up soon after independence. Nuclear research was taken up as a thrust area. In 1948 Pundit Jawaharlal Nehru invited Professor P M S Blackett, a British Nobel laureate in Physics and the President of the Royal Society, to advise how a national base for defence production could be created. Blackett's view was that India should build up from the actual level of technological and industrial capabilities it possessed at the time. In July 1948, the first Scientific Advisor to the Defence Minister was appointed and a Defence Science Organisation (DSO) was set up a year later. The emergence of the DSO immediately after independence paved the way for the creation of numerous laboratories in the country to spearhead the R&D activity in the field of defence science and technology. The limited R&D contributions to the defence in the first decade of independence came from the Technical Development Establishment within the armed forces or with the Ordnance Factories. In 1958 these were merged with the DSO to form the Defence Research and Development Organisation. In

1967, a full-fledged Department of Defence Research and Development was created in the defence ministry, and the Scientific Advisor to the Defence Minister, was made the head of DRDO¹.

The DRDO operates through a network of laboratories engaged in research activities leading to design, development and induction of state-of-the art weapons, materials and equipments required by the defence forces. There are also some field laboratories for the purpose of carrying out trials on equipments under the varying climatic conditions. A separate department of Defence Research and Development Organisation Head Quarters, responsible for formulation and execution of R&D plans and administration of laboratories was formed. Two agricultural research farms, and one animal husbandry farm are also functioning under this organisation.

The DRDO has registered significant achievements² in its various R&D activities. The notable developmental successes of DRDO include the surface-to-surface missile - Prithvi, the state-of the-art main battle tank - Arjun, flight stimulators for aircrafts, Pilotless Target Aircraft (PTA), balloon barrage system, parallel supercomputer Pace-plus, etc. The weapon and ammunition developed by the organisation and productionised by the production agencies include the Indian field gun, INSAS rifle 5.56 mm, charge line mine clearing for safe passage of vehicles in the battle field, illuminating ammunition for enhancing night-field fighting capability, cluster weapon system for fighter aircraft, new generation bombs for high-speed aircraft, naval mines and 105 mm

PSAPDS. Multi barrel rocket system Pinaka is already under trials by the army. In the area of electronics and instrumentation, amongst the significant developments are low-level tracking radar Indira - I, Indira - II, for army and air force, light-weight field artillery radar, battlefield surveillance radar, secondary surveillance radar, automatic electronic switch, avalanche victim detector, tidex, EW systems, night vision devices and secured telephones (Sectel). Some of the achievements in the area of engineering systems are bridge-layer tank Kartik, military bridging systems, various types of shelter, crash fire tenders, and rapid intervention vehicle. In the area of naval systems and materials, the organisation has developed an advanced ship sonar system, marine acoustic research ship - Sagardhwani, underwater anti-fouling paints, torpedoes, naval simulators and jackal steels. Submarine sonar and weapon control system - Panchendriya, is already undergoing harbour / sea trials. The indigenous Light Combat Aircraft (LCA) Tejas and the Remotely Piloted Vehicle Nishanth have successfully undergone flight trials.

India's Integrated Guided Missile Development Programme (IGMDP) comprises four missile systems: Prithvi -surface-to-surface tactical battlefield missile, Akash - medium-range surface-to-air missile, Trishul - short-range surface-to-air missile, and Nag - third-generation anti-tank missile. Trishul is getting ready for user trials. Akash and Nag are in advanced stages of development. This programme also includes the development of the intermediate-range ballistic missile - Agni.

The DRDO has also successfully developed 'convenience foods' for the armed forces placed at remote field areas. It is vigorously pursuing the goal of technological self-reliance in defence systems through a ten-year national self-reliance mission. State-of-the-art technology systems are also being channelled to make available bio-medical equipment at a much lesser cost.

3.3. DEFENCE INFORMATION SYSTEM

India, with its vast Science & Technology infrastructure, is regarded as a scientifically advanced country. The development of S&T in India owes to a series of policies enunciated by the parliament which emphasises the government's responsibility to foster, promote and sustain, by all appropriate means, the cultivation of science and scientific research in all its aspects - pure, applied and educational. The policy envisages a well-planned effort for promoting the growth of S&T personnel on a scale adequate enough to satisfy the nation's needs in areas of agriculture, education, industry and defence. There has been significant growth in the capabilities and achievements in high technology areas, like nuclear and space sciences, defence electronics, microelectronics, informatics / telematics, biotechnology, renewable energy sources, ocean sciences, etc. This progress attained must be sustained and improved upon. The continued sustenance and further acceleration of the momentum achieved so far depend on the availability of timely, accurate and precise information which is the raw material for any development.

It has been universally recognised that information is the key factor essential for making sound decisions and policies, from the lowest to the highest level. People are dependent on information in every sphere of activity. Georges Anderla³ defines information as a resource, " a resource as fundamental as energy or water, which affects all human activity and an indispensable, irreplaceable link between intellectual and material activities". Information has been described by Kemp⁴ as "the fifth need of man ranking after air, water, food and shelter". The role and significance of information cannot be emphasised further.

Ching-Chih-Chen⁵ defines information as "all knowledge, facts, data and imaginative works of mind which are communicated formally or informally in any format". Information is the raw material, by distilling, shaping and integrating which, knowledge emerges. It is because of the vital role played by information, its importance and involvement in the very structure, warp and weft of society, that today's society is christened as 'Information Society'. Society has undergone significant changes at various periods of human society. The agrarian society gave way to the industrial society and the post-industrial society in turn, has paved way to the emerging information society.

The Information Centres are the most vital social institutions for the dissemination of knowledge and information. Teaching, research, and scientific activities in all institutions are centred around the Information Centres. Each library or information centre forms part of a larger organisation whether it be a local authority, a large industrial organisation, an academic or government institution and lays stress on

different areas of specialisation with the aim to support the parent organisation. The government libraries came into existence in 1857, as a result of the formation of the Government Departments during the beginning of formal British rule. The Government of India with its headquarters in Calcutta organised a few departments on the pattern of the administrative structure in England, to deal with the problem of law and order, collection of revenue, regulations of commerce, etc. For the help and guidance of the officers working in these departments some statutes, reports, guide books, etc were also collected. As their number increased, the collection emerged in the form of a departmental library. Libraries at the national level were set up in various ministries and departments to serve the legislative, administrative and development functions of the government.

The MoD has a number of R&D laboratories, training institutions, design centres, production units, fabrication and maintenance workshops, etc for meeting the various technical / operational requirements of the armed forces and other agencies. These technical facilities come under three departments into which the work of the defence ministry is organised. They are

- The Department of Defence,
- The Department of Defence Research and Development Organisation, and
- The Department of Defence Production and Supplies.

Each of the above departments has huge information requirements for carrying out their functions / services effectively and there are good numbers of libraries / TICs in each of the department. There are about eighty-five such libraries / TICs spending annually more than two crores for the acquisition of scientific and technical literature.⁶ In earlier days, intelligence agencies had to grapple with the problem of acting on too little information. Whatever information was obtained came from attaches resident in foreign countries, from spies and from various other more or less reliable sources.⁷ Today the problem is just the reverse, viz. of handling a flood of detailed information obtained through networks that encompass the globe. It is a task demanding the use of data processing systems of immense capacity and speed, instant-retrieval systems, and many other devices, almost all electronic, that give information in great detail. Growth of knowledge and the resultant literature produced is practically limitless. Information scientists therefore must have some methods to keep track of this 'information world'. Modern technologies such as digital communication techniques using satellites and sophisticated computer systems have reduced the time gap required for the generation, processing, and dissemination of information and provide useful methodologies for decentralised collection of information and its retrieval. It is essential to make the maximum possible use of these modern technologies even for routine library tasks in the defence establishments. The sensitive area of defence relies on timely and reliable supply of information for its efficient functioning. An effective information system at national level is an indispensable infrastructure facility for defence R&D. Such an organisation should have ready access

to defence oriented scientific information from all over the world and have close liaison with defence R&D establishments. The Defence Scientific Information and Documentation Centre (DESIDOC) fulfils these requirements.

3.4. DESIDOC

DESIDOC, is the apex information agency of the DRDO. DESIDOC meets the information requirements of the defence R&D Headquarters as well as other institutions and organisations engaged in defence activities. DESIDOC has now attained the status of national information centre on defence science. The focal points of DRDO's information system are the libraries or TICs of the respective laboratories and the DESIDOC.

DESIDOC started functioning in 1958 and it was then known as Scientific Information Bureau (SIB). It was one of the divisions of the Defence Science Laboratory (DSL), a major laboratory of DRDO. As the activities of DRDO increased and expanded, the activities of SIB also correspondingly increased. In 1967, it was renamed as Defence Scientific Information and Documentation Centre with expanded charter of duties. The hierarchical position of DESIDOC in the MoD is appended below.⁸

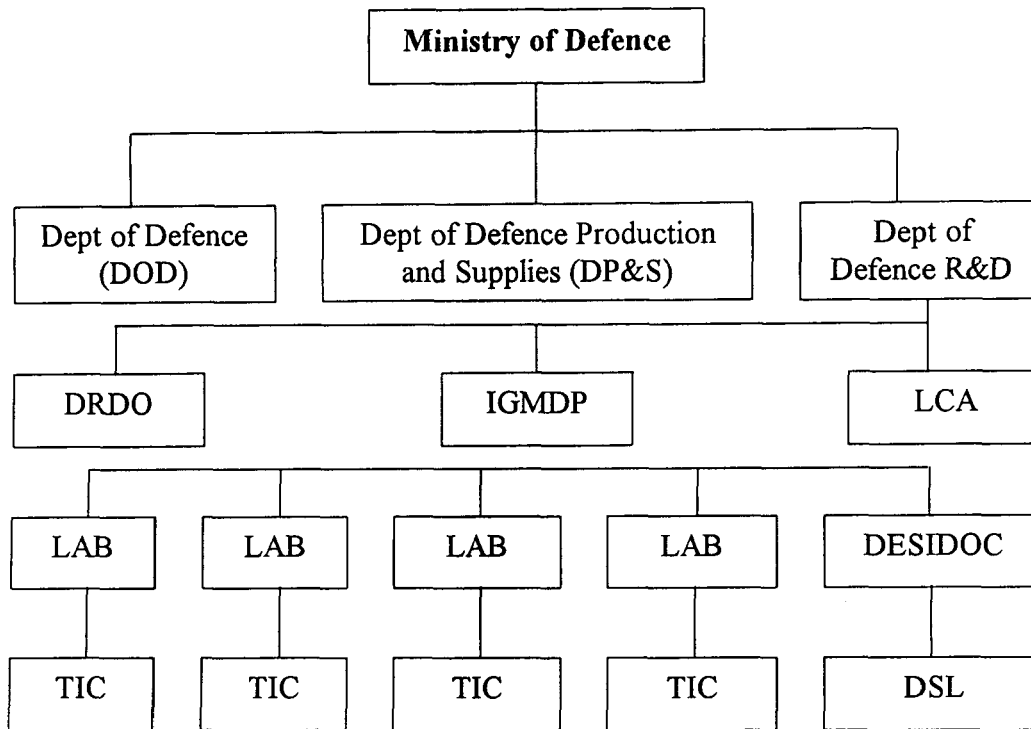


Fig.3.1: Hierarchical position of DESIDOC in the Ministry of Defence

The MoD in the Government of India has three departments, each headed by a Secretary. Figure 3.1 displays the administrative structure of the MoD and the position of DESIDOC in the ministry. It does not show the hierarchy in terms of protocol.

DESIDOC, while concentrating its efforts to meet the S&T information requirements of DRDO in particular, and the Ministry of Defence in general, was also extending its services to other non-defence agencies or organisations on a reciprocal basis till 1992. Since January 1993, DESIDOC has opened its services to many individual agencies or

organisations against payment. Since the centre has a very rich information base in its library and has expertise, skills and capabilities in several areas of information processing and dissemination, the policy of DESIDOC is to endeavour to serve non-defence requests also, while concentrating its efforts to meet the DRDO demands.

DESIDOC is a pioneer among Indian libraries and has the status of National Information Centre for defence science. Sumati Sharma's⁹ study conducted in 1999 establishes DESIDOC as the best-equipped library in the country and having the largest collection of documents on defence S&T. As per the data available from DRONA (DRDO Rapid Online Network Access) DESIDOC as on 1/1/2002, has a membership of 1184. The DESIDOC library has a seating capacity for 150 users. The library has a collection of 72261 books. It subscribes to 573 journals and has 52237 bound volumes of journals. There are 101099 technical reports and 41 CD ROM databases. It has a huge collection of 198445 patents and 50800 standards and specifications. The centre has computerised the various library activities. The data on the holdings of the DSL are maintained in database form and an integrated database of the holdings of all the DRDO libraries is being organised. DESIDOC functions as a central agency of DRDO to collect scientific and technical information from various published and unpublished sources, process it in various usable forms and disseminate the same to DRDO laboratories and other agencies of MoD. Fig 3.2 displays the organizational structure of DESIDOC.

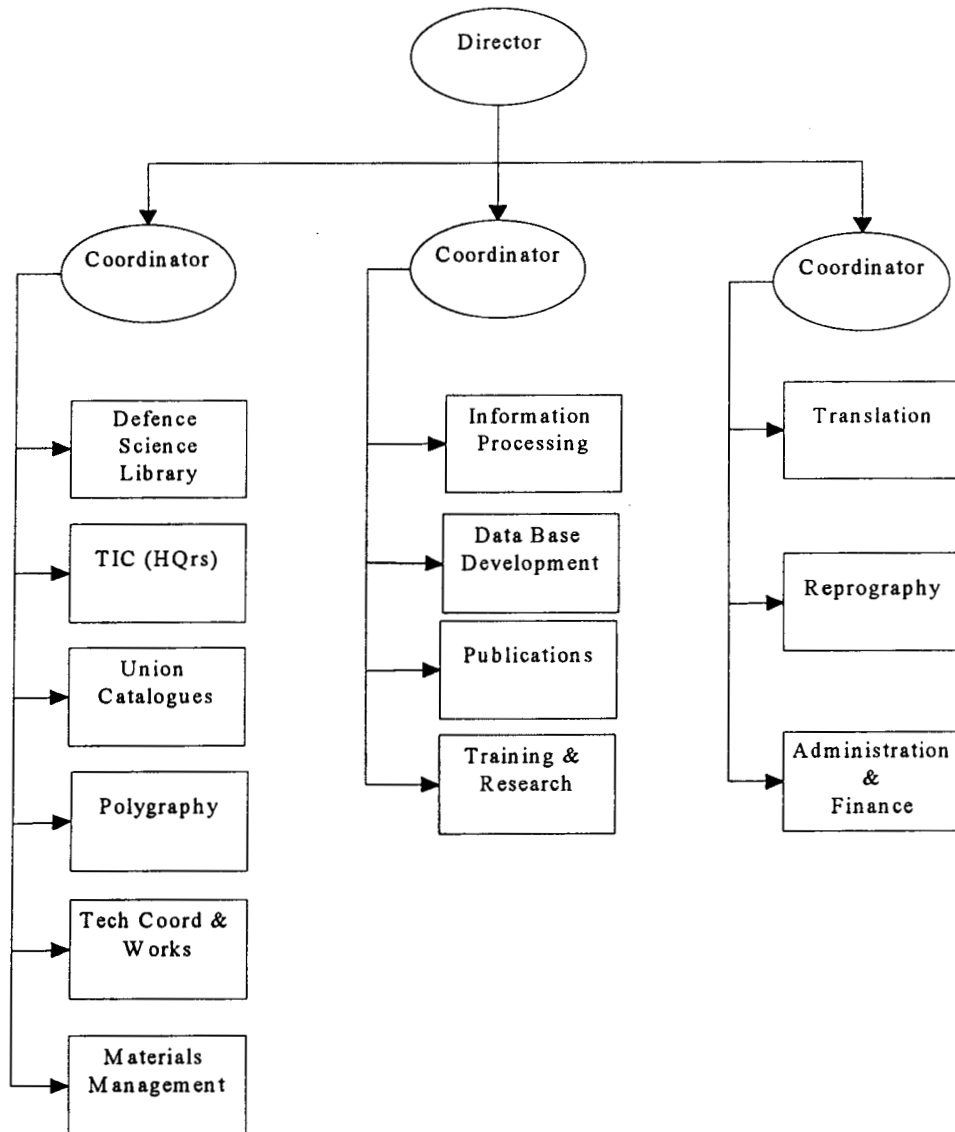


Fig. 3.2 Organisational chart of DESIDOC

DESIDOC is also responsible for developing a database and information system in defence science and technology. It is also expected to carry out R&D work in information science relevant to defence needs. It coordinates the library and information activities of DRDO libraries.

DESIDOC provides the following major information services / package:

1. SDI Service: Selective Dissemination of Information is a personalized service to researchers and top managers in the areas of their interest.
2. Patent Information Alerts (Bi-monthly): Patents are considered an important source of information for R&D. This abstracting service covers various foreign and Indian patents.
3. Defence Reports Abstracts: Since technical reports are the best source of information to scientists, extracts of a large number of technical reports released by NASA, NTIS, RAND (USA) and DRIC (UK) are made available.
4. DESIDOC List is an indexing service and contains references of current published articles on topics of defence interest.
5. Literature searches are normally conducted on request.
6. Translation Services: An estimated 48% of science journals in the world are published in languages other than English, such as, Russian, German, French and Japanese. DESIDOC provides translation service to the scientists on demand through a team of well-qualified and experienced translators. It also maintains a translation bank of the unclassified translations done by its translators.
7. CCLIS: Current Content in Library and Information Science is a bimonthly service based on about forty-eight journals in the field of Library and Information Science.

3.5. CONCLUSION

Since the last five decades, DRDO has undergone a series of evolutionary transformation to encompass the vital ingredients required for its role as a national organisation for attaining self-reliance in defence technology through the network of its laboratories. The DRDO libraries / TICs attached to the laboratories are the information agencies for collection, processing and dissemination of scientific and technical information of interest to their parent laboratory.

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INSTITUTIONAL INFRASTRUCTURE

M. Santha Kumari “Organisation, administration and utilisation of DRDO libraries ” Thesis. Department of Library and Information Science, University of Calicut, 2004

6.1

CHAPTER 4

INSTITUTIONAL INFRASTRUCTURE

4.1. INTRODUCTION

The Ministry of Defence (MoD) has a number of R&D laboratories / establishments, training institutions, design centres, production units, fabrication and maintenance workshops, etc for meeting the various technical / operational requirements of the armed forces. The Defence Research and Development Organisation forms a vital department in the MoD. DRDO operates through a network of fifty-two laboratories / establishments engaged in pursuit of self-reliance in defence technology. The DRDO information network system consists of the Libraries / TICs, attached to the DRDO laboratories with Defence Scientific Information & Documentation Centre as the central coordinating body. It is the apex information agency of the DRDO that meets the information requirements of the defence R&D Headquarters as well as other institutions and organisations engaged in defence research activities. The Libraries / TICs of DRDO are responsible for collection, processing and dissemination of scientific and technical information of interest to their parent laboratory / establishment. These DRDO libraries form the basis of the present study.

Some of the laboratories are field laboratories meant for recording data and trials under extreme climatic conditions such as Field Research Laboratory (FRL), and Proof and Experimental Establishment (PEE), Balassore. These laboratories do not have a library of technical nature. Similarly there are some laboratories located close to other big DRDO

libraries that are extremely rich in their collection and facilities. These laboratories also do not have a library of their own. DTRL, DSC, ISSA and SAG located in Metcalfe House, Delhi depend on DESIDOC, located in the same campus, for their information requirements. Similarly ASIEO is dependent on ADE, Bangalore. Again CPDC and DRDU are staging units and do not have a library. ANURAG is a newly raised laboratory and the library is under formation and ADA is a coordinating agency. DESIDOC being the apex body is not included in the purview of the study. Out of the fifty-two DRDO laboratories mentioned, only forty have their own Library / TIC.

4.2. GEOGRAPHICAL LOCATION OF DRDO LABORATORIES

The DRDO laboratories are scattered through out the country. Twenty laboratories are located in North India while thirty-two laboratories are located in the South. They are spread out in fourteen States and one field unit. The State of Karnataka has the maximum number of laboratories followed by Delhi.

The map displaying the geographical location of all the fifty-two DRDO laboratories is given in Figure 4.1. The laboratories that do not have a library, those did not respond to the survey and those responded favourably have been marked using different colour bullets.

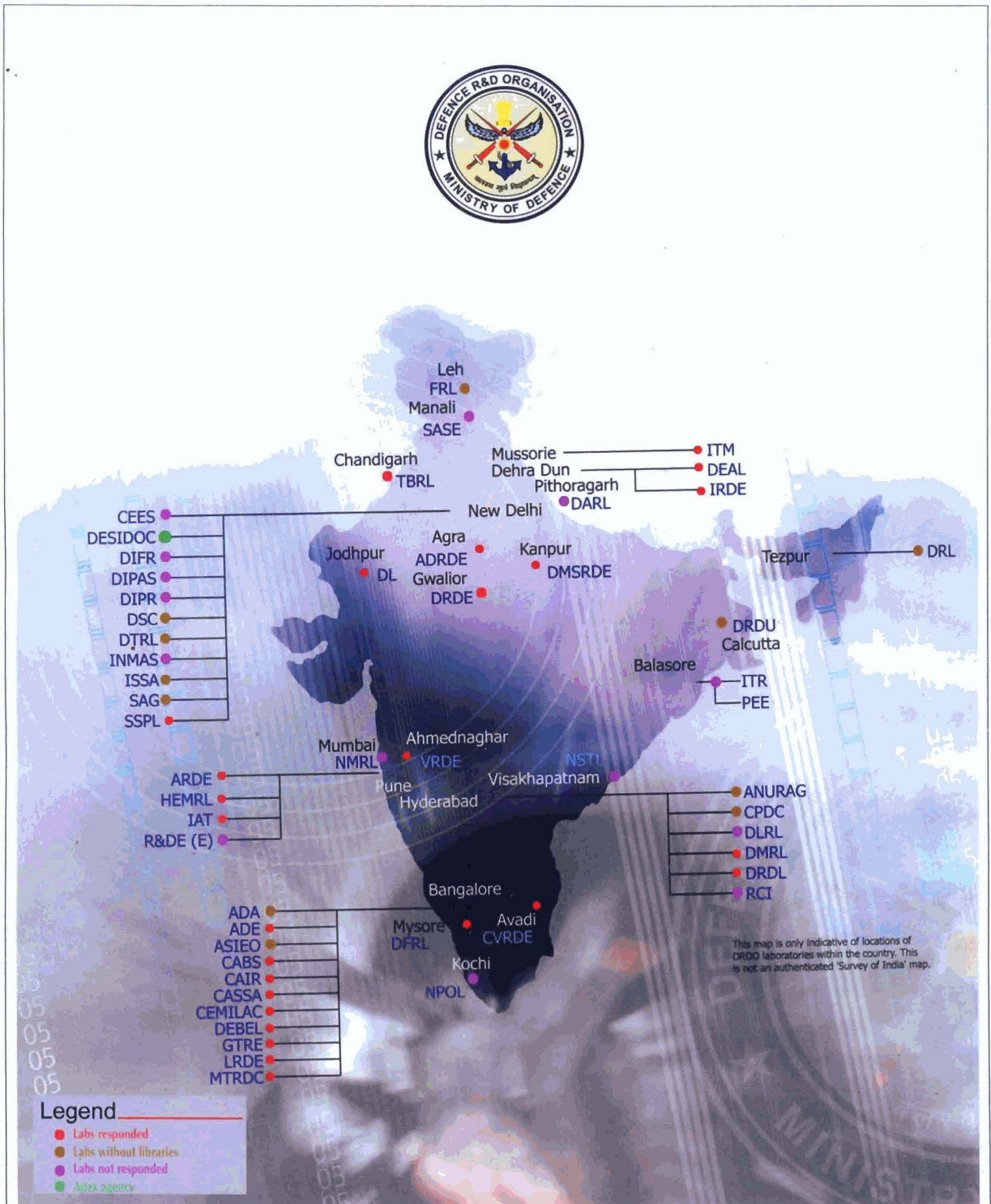


Fig. 4.1 Geographical location of DRDO laboratories in India

4.3. PROFILE OF THE STUDY AREA

Even though all the DRDO laboratories with a library were included in the study only twenty-six laboratories responded to the survey. Infrastructure profiles of these twenty-six laboratories / libraries are dealt with, in the following paragraphs.

4.3.1. ADE (Aeronautical Development Establishment)

Aeronautical Development Establishment, Bangalore, was established in January 1952. The establishment was initially entrusted with the task of acquiring equipments for the Air Force. During the seventies and eighties rapid expansion of R&D activities were initiated in ADE when it was assigned the establishment of flight simulation facility, design and development of air-launched expendable target aircraft systems, pilot training simulators, re-usable rocket pods, head up displays, electro optic sensors for aircraft, Flight Control System (FCS) evaluation, unmanned aircraft including Pilot less Target Aircraft (PTA) and Remotely Piloted Vehicle (RPV), and development of digital fly-by-wire FCS for the Light Combat Aircraft (LCA). The 1990s saw the emergence of ADE as the major aeronautical systems research laboratory of the DRDO involving in practically all major aspect of aeronautical research, design and development relevant to military aviation. The laboratory carries out research in aeronautical standards and specifications, test procedures for new prototype aircraft and aircraft materials and their safety.

The library of the establishment named as Knowledge Centre has an independent building of 10000 sq.ft. and is centrally located. This adequately spaced and furnished library has a very valuable collection of 18081 Books, 6198 Reports, 11420 Bound volumes and 7000 Microforms. 200 journals are

being subscribed and many are received as gift. The library is fully computerized and is manned by ten qualified professionals along with others. OPAC, indexing, content page, reprography and ILL services are provided. Internet and Intranet facilities are also available.

4.3.2. ADRDE (Aerial Delivery Research and Development Establishment)

ADRDE, has its origin as a small air store section in 1959 and after a long process of evolution it was located at Agra in 1965. It is the only establishment in the country engaged in the development of parachutes and aerial delivery systems. The establishment that was formerly classified as a laboratory of the general stores group has now been classified as a laboratory of the aeronautical group. The laboratory is involved in the design and development of stores / equipment, techniques / systems required for aerial delivery of men, materials, ammunition and heavy equipment, brake parachutes for fighter / bomber aircraft and to undertake design modifications for further expansions. ADRDE has developed competence in various fields relating to parachute technology. Many processes developed by the establishment have since been passed on to private entrepreneurs for commercial exploitation.

The library of ADRDE is known as Technical Information Centre with an area of 7200 sq ft. It has a collection of about 9000 books and 1000 bound volumes. The library is subscribing to 60 journals. New additions lists are circulated among scientists and bibliographies are prepared on request. Two qualified professionals with seven others man the library.

4.3.3. ARDE (Armament Research and Development Establishment)

ARDE, was established in 1958. ARDE embarked on its mission in a rudimentary facility within the campus of Ammunition Factory, Kirkee, and personnel were drawn from erstwhile Technical Development Establishment (Weapons) located in Jabalpur and Technical Development Establishment (Ammunition) at Kirkee. In 1966, ARDE moved to its present location at Pashan. It is entrusted with the design and development of conventional armaments, evaluation and acquisition of foreign armament, product improvement and modernization of weapons and ammunitions, transfer of technology to Ordnance Factories and public / private sector industries for the production of ARDE-developed armament stores and equipment. ARDE has been monumental in the design and development of 5.56 mm Indian Small Arms System (INSAS) consisting of Rifle (fixed and folding butt), Light Machine Gun (fixed and folding butt), Carbine (folding butt) and Ammunition, Armament System for MBT (Main Battle Tank) Arjun, Tandem warhead for NAG (Anti-Tank Missile-3) and pre-fragmented (PF) type missile warheads for PINAKA, AKASH and PRITHVI missiles.

A wide variety of illuminating ammunition has been developed by ARDE for illuminating the ground during night operations for identifying targets and directing aimed fire. These have been developed for 81 mm, 120 mm, and 105 mm for IFG and 130 mm guns. Another novel development is the explosive charge for use by divers in underwater sabotage operations. It has a Glass Reinforced Plastic (GRP) body with electromechanical timer system. The mine can be attached to the hull of target by a set of powerful magnets and is provided with anti-lifting device. ARDE is also a pioneer in

the design and development of warheads for MBRLS (Multi Barrel Rocket Launcher System) and HE / Smoke Illuminating munitions for Mortars

The library known as Technical Information Research Centre (TIRC) is well equipped and fully computerized. Though it does not have a separate building, it is ideally located within the easy reach of the users. The library collection comprises 34000 books and reports, 7000 standards and specifications, 5500 bound volumes of journals and 400 microforms. It is managed by 11 staff members including seven qualified professionals. Online library catalogue is available. Indexing of important articles is done. News clipping service, content page, reprography and ILL services are provided. Internet and Intranet services are also available.

4.3.4. CABS (Centre for Air Borne Systems)

Established in 1986, the laboratory is concerned with research in design and development of airborne radar technology and multi sensor real-time systems, flight research & development, and development of aircraft support systems. It is also assigned the responsibility for up-gradation of radar and other avionics systems on in-service platforms and installation, integration flight testing / trials and evaluation of airborne radar and other systems including those developed by other design and development establishments. Some of the remarkable achievements of the laboratory include development of Airborne Surveillance Platform (ASP), Airborne Surveillance Radar, Airborne Early Warning Control System (AEWCS) and development of Global Positioning System (GPS) receivers.

The library called Technical Information Centre (TIC) is located in the main complex, has an area of 4000 sq ft and has 5500 books and reports and

over 600 bound volumes of journals. Around 70 journals are subscribed and many are received as gift. Circulation, cataloguing and most of the library services are computerized. Two qualified professionals along with two others man library.

4.3.5. CAIR (Centre for Artificial Intelligence and Robotics)

CAIR, was established in October 1986, to conduct basic and applied research in the fields of artificial intelligence, robotics, vision, neural networks, control systems and automation with emphasis on defence requirements.

In the field of artificial intelligence CAIR has developed the Pilot Associate Kernel, which provides features for event-based programming in a multitasking environment and also provides methods for control, communication and synchronisation between tasks, Controllers and Drivers for Robots, Intelligent Wheel Chair developed for physically handicapped persons etc. As part of the National Control Law Team the control group at CAIR is involved in the development of the flight control laws for the Light Combat Aircraft (LCA) Technology Demonstrator (TD-1).

The library known as CAIR Library covers an area of 3500 sq.ft and is lodged within the main research complex. It has over 2900 books and reports. 100 journals are being subscribed. OPAC is available. Indexing, photocopy and ILL services are provided.

4.3.6. CASSA (Centre for Aeronautical Systems Studies and Analysis)

Established in 1972 at Bangalore, the Centre was devoted to systems analysis for Aircraft and Air Defence Systems used in Defence. It also

concentrates in performance assessment, evaluation, cost-effectiveness and optimization, war gaming and simulation studies of weapon systems. In the field of research and development it has strong interaction with the Indian Air Force and with Army on specific areas such as Air Defence Artillery. The laboratory is committed to war gaming and simulation and related software development for the various training institutions of the defence services, war head and weapons effectiveness analysis for Air Defence guns, Sensor and weapon system modeling and reliability analysis for a number of indigenously developed DRDO systems. It also conducts courses of instruction and training in Systems Analysis.

The Technical Information Centre of CASSA has an area of 3800 sq. ft. It is housed adjacent to the War-gaming Laboratory in the main office complex. This compact TIC has over 6000 books and reports and 1500 bound volumes of journals. 43 journals are being subscribed. Only circulation and cataloguing are computerized. OPAC and ILL facilities are available. Library is manned by one qualified professional with two others.

4.3.7. CEMILAC (Centre for Military Airworthiness and Certification)

Flight safety and operational readiness are the uncompromised priority needs of military flying machines, be it an aircraft or unmanned vehicles or a missile. Over the last fifteen years, significant advancements in aeronautical activities with the thrust on self-reliance and indigenisation of aviation materials, consumables, equipments, systems and growing complexities of military missions has brought in greater challenges for airworthiness assurance.

Till late 1950s military aircraft and airborne systems in our country were largely under license programmes. To ensure continued airworthiness through life evaluation, updates and product improvement a separate establishment was created in 1994 at Bangalore known as CEMILAC. It has 15 field units and is committed to bring together technical capabilities of the industry and demands of military aircraft. The activities encompass assurance of airworthiness on abinitio development projects, license projects, life extension of aircrafts / aero engines etc.

CEMILAC has a library of 6750 sq.ft called Technical Information Centre with about 4500 books. 40 journals are being subscribed. At present a single librarian mans it. Most of the library operations are computerized. Internet and Intranet services are also available.

4.3.8. CVRDE (Combat Vehicles Research and Development Establishment)

In 1965, a detachment of VRDE, Ahmednagar was established as a nucleus at Avadi, Chennai to facilitate a decision for manufacturing Vijayanta Tank and for handling tasks relating to the production of armoured fighting vehicles. This detachment of VRDE was redesignated as CVRDE, Chennai in 1975. The areas of research involves design, development and manufacture of prototype tracked vehicles, conversion of existing vehicles in service for new roles, and applied research in automotive engineering pertaining to fighting vehicles. Technical guidance is also given by CVRDE to public/private sector, Heavy Vehicles Factory & Ordnance Factories in production of vehicles for armed forces.

The Library known as Technical Information and Research Centre is housed in the main complex. The TIRC has over 13000 books and reports

and over 3000 bound volumes of journals. It has a very valuable collection of 11700 standards and Specifications. Ninety journals are being subscribed to by the establishment. Automation of the library is in progress. It is manned by ten qualified professionals with others.

4.3.9. DEAL (Defence Electronics Applications Laboratory)

DEAL came into existence in 1965 as the then Himalayan Radio Propagation Unit (HRPU) at Mussoorie, responsible for helping the defence services to setup communication links in the border areas and provide frequency prediction using data collected from propagation studies. It was also responsible for collecting ionospheric data from the field stations at Jammu and Tejpur. During 1968 the laboratory was renamed as Defence Electronics Applications Laboratory and shifted to Dehradun.

The laboratory has within its ambit of research, radio propagation studies and very low frequency (VLF) to millimeter wave communications, satellite communication techniques, surveillance and reconnaissance, real time image processing, design and system engineering of jam resistant video /voice data links for airborne vehicles, and tactical radio communication. Total communication support is given by DEAL to the Indian Antarctic Expedition since 1995.

Some of the major achievements of the laboratory include underwater Radio (VLF) Communication for use by the Indian Navy, transportable satellite communication system, Jam-Resistant Data Link, and Wire Guided Torpedo (WGT) Modem for use by the services, Image Processing for enhancing and identifying remotely located objects through digital image

processing techniques using remotely sensed data and Millimeter Wave Communication for secure and short range applications.

The Technical Information Centre has an area of 10 000 sq ft. It has over 13000 books and reports and 8000 bound volumes of journals. 108 journals are being subscribed. Library is managed by one qualified professional with six others.

4.3.10. DEBEL (Defence Bioengineering and Electro Medical Laboratory)

DEBEL, Bangalore was formed in 1982. It is the nodal agency of the Society for Biomedical Technology (SBMT), an inter-ministerial initiative of the Government of India to utilize defence technology spin-offs for the production of low-cost healthcare systems. The R&D activities comprise development of life support and protective equipments for defence service personnel and design, development, evaluation and testing of biomedical equipments required for the three defence services. Interaction with industries for development of proto-types and manufacture of equipments, also form part of DEBEL's duty.

The core competency area encompasses Biomedical Technology, development of medical equipment (Cytoscan, the Stress Test System and ECG Analyser have been transferred to private sector for mass production), development of indigenous 'Pulse Oximeter' instrumentation, human engineering, design and development of Crew Protective Equipment for hazardous environments for the Indian Air Force and Navy, life support systems, environmental protection, protective measures against thermal stresses, chemical stresses, high altitude stresses, biomedical informatics etc.

The SBMT was set up to facilitate utilisation of Defence technology for providing affordable and appropriate healthcare technology for common man. The Society was established under the Department of Defence Research and Development in collaboration with Department of Science and Technology, Ministry of Welfare, and Ministry of Rural Development with some of the leading medical institutions as its partners. The Society was officially launched in 1993 and is registered under Karnataka Registration Act (1960) with its Head Office at DEBEL, Bangalore.

A few research and development programmes such as external cardiac pacemaker, cytoscan system for cancer detection, coronary stent (Kalam-Raju Stent), cardiovascular catheters, ophthalmic laser, slit lamp microscope have already been successfully completed by the Society. Ongoing projects under SBMT are in the areas of development of total hip joint, artificial limbs, haemodialysers, bone plates and dental implants, new proposals cover ventilators, functional electrical simulation and biomedical metal devices & consumables.

The library is called Technical Information Centre. This small and compact TIC has an area of 6300 sq ft. It has about 6000 books and reports and 3000 bound volumes of journals. 47 journals are being subscribed and automation of the library is in progress. Cataloguing has been computerized and Internet and Intranet services are also available. Most of the library services like OPAC, indexing, compilation of bibliographies, SDI, news clipping, reprography, ILL etc. are provided.

4.3.11. DFRL (Defence Food Research Laboratory)

DFRL came into being in December 1961 at Mysore to cater to the varied food requirement challenges of military and para-military forces. This

laboratory is engaged in R&D in Food Science and Technology and production and supply of processed foods on a limited scale to the Armed Forces. Toxicological, nutritional and biochemical studies, development of pack rations, their quality assurance methods, preservation of foods, food packaging, food safety, evaluation of nutritional requirements of troops deployed under different climatic conditions are all under the research purview of this laboratory.

The notable achievements of the laboratories include, High Temperature Short Time (HTST) Dehydration for the dehydration of starchy vegetables like peas, carrots, yam, potato, etc. This is also useful for converting perishable products into value-added products suitable for designing convenience foods. DFRL has also developed Retort pouch processing of foods for long term preservation in polypropylene films, useful for processing of fish, shrimp and prepared dishes like, pulav, halwa, vegetable curry etc. Processed tender coconut water that imparts shelf stability for 4-6 months in plastic pouches and aluminum cans, pre-processed vegetables, stay fresh chemicals which delays the rate of ripening thereby enabling marketing of fruits and vegetables for longer periods, stay fresh salt that prevents storage deterioration through the reaction of fats with atmospheric oxygen and helps in extending the shelf life of fried products are a few of the other hallmarks. Hurdle technology and intermediate moisture foods for preserving fruits like pineapple, apple, mango, papaya, guava, coconut kernel, etc has also been developed by DFRL.

DFRL has also developed methods for chemical and microbiological evaluation of foods for the detection of Salmonella and E.Coli and for the measurement of extent of deterioration in vegetable oils, atta and milk

powder during storage. This premier institute of defence food research also conducts a PG Diploma Course in Food Analysis and Quality Assurance.

The Library is called Technical Information Centre. It has an independent building covering an area of 3300 sq ft. The TIC has over 6000 books and reports and around 5500 bound volumes of journals. 72 journals are being subscribed. OPAC and Internet services are available. Intranet services are also available. Services like indexing, compilation of bibliographies, SDI, reprography, ILL are also provided.

4.3.12. DLJ (Defence Laboratory, Jodhpur)

DLJ was set up in 1959 at Jodhpur to provide facilities for carrying out exposure trials on indigenously designed / developed / manufactured equipments / weapons under extreme hot and dry climate of desert region. The laboratory carries out research work in integrated water management and radio isotopic application problems related to desert operations.

With over five decades of dedicated research, the laboratory has many achievements to its credit. Some of these are the Raksha Anusandhan and Vikas Irradiator (RAVI), a multipurpose gamma irradiation facility for sterilization of various medical and biomedical products and for research activities (The Department of Atomic Energy (DAE), has accorded a Certificate of Approval and issued license for food irradiation at RAVI, the only irradiator outside Bhabha Atomic Research Centre (BARC) which has been given license for this purpose), Drinking Water Technology (The Laboratory has successfully developed a domestic water desalination plant of capacity 5-15 l/hour operated by conventional and also non-conventional power (photovoltaic cells) for converting brackish water up to 3000 ppm into potable water of < 500 ppm. The Ministry of Non-conventional Energy

Sources has evinced keen interest in this domestic plant operated by solar power pack. This is under evaluation at different areas), Water Testing Field Kit for assessing the physico-chemical and bacteriological quality of water in the field (the chemical quality assessment is based on the determination of eight parameters, viz., TDS, chloride, nitrate, iron, hardness, nitrite and free chlorine is completed in 30 minutes, whereas bacterio-logical examination is carried out in 4-10 hours by determining the presence of E. coli by a new culture medium developed by the laboratory), Emergency Survival Kit (Sea Water) for providing potable water from sea water for sailors, Water, Sterilising Outfit for Snow-bound Areas for converting snow-melted water into wholesome drinking water, which is otherwise flat in taste and at times unsafe for consumption and the Desert Water Desalting Kit.

The library known as Technical Library is fully computerized. It does not have a separate library building, but occupies two big halls of approximately 9600 sq. ft. in total. It has a collection of over 16000 books and reports and 12000 bound volumes of journals. 114 journals are being subscribed. Library is manned by three qualified professionals along with six others. Internet and Intranet services are available. Most of the library services like OPAC, indexing, compilation of bibliographies, SDI, circulation of new additions list, reprography, ILL etc. are also provided.

4.3.13. DMRL (Defence Metallurgical Research Laboratory)

DMRL, Hyderabad was established in 1963 to cater to the requirement of complex metals and materials for modern sophisticated warfare weapons systems. Its technological expertise encompasses powder metallurgy based fabrication and development of alloys, armour and rocket motor steel, aerospace light alloys, magnetic materials, etc. Development of

appropriate material technologies and processes for defence hardware, R&D of futuristic materials and processes to provide advanced technology options, form the realm of research activities of the laboratory.

DMRL has to its credit a variety of achievements. The contribution of the laboratory to the defence forces include brake pads for MIG and other aircrafts using copper-based friction material, heavy alloy penetrators, composite armour for Vijayanta and Arjun tanks, jet fuel starter, reactive armour for MBT and special magnetic materials. Samarium-cobalt ring magnets and neodymium-iron-boron magnets have been developed for space applications in collaboration with VSSC, ISRO, Thiruvananthapuram. DMRL is also pioneer in fabricating high strength steel for rocket motor casing and heavy alloy pre-fragments for IGMDP warheads in effective use against aerial targets.

The Library known as Technical Information Centre has an independent three storied building of 7500 sq ft with 32000 books and 10000 bound volumes of journals. 130 journals are being subscribed. It is a fully computerized library providing all library services and managed by three qualified professionals along with nine others.

4.3.14. DMSRDE (Defence Materials Stores Research and Development Establishment)

DMSRDE had its origin in 1929 as Inspectorate of General Stores in the Harness & Saddlery Factory, Cawnpore (now Kanpur). Since then, it had undergone a series of transformation as Technical Development Establishment (TDE), Defence Research Laboratory (Stores), Textiles & Stores Research & Development Establishment (TSRDE) and Defence Research Laboratory (Materials). The major role of these establishments in

their formative years was to inspect trade supplies, assess their quality and rationalise inventories for inter-services use. In addition, they were called upon to investigate service failure and offer solutions and identify indigenous substitutes for imported products. The Defence Materials & Stores Research & Development Establishment was established in 1976 by the amalgamation of three different establishments, the erstwhile DRL(M), TSRDE and the Defence Institute of Stores Preservation and Packaging to facilitate interdisciplinary R&D and speedy supply of indigenously developed items to the three services. Over the last two decades, DMSRDE has achieved a high level of expertise in the area of non-metallic materials encompassing development activities. Synthesis and development of polymers and composite materials and protective equipment including head gear, R&D in clothing and heavy fabricated textile items, proofing and coating of textiles, and protective clothing for extreme cold weather and against toxic chemicals, studies on high performance lubricants and greases, additives, high energy high density hydrocarbon fuels, and related research activities form the core of R&D activity of the establishment.

DMSRDE has indigenously developed important components like, radar cross-section augmentor, radar scattering camouflage net specially developed disruptive pattern garnishing adaptable to variety of geographical features, Cardiovascular Catheters (developed five types of angiographic cardiovascular catheters using polymeric materials for use in coronary arteriographic investigation and treatment of blockage of blood vessels), anti-riot equipment, seals and 'O' rings for aerospace application and coolants for motor vehicles operating at temperatures up to -10 °c and -40 °c respectively.

The Technical Information Centre has 23920 books and book like materials, 20000 bound volumes of journals and the library subscribes to 129 journals. The library operations are in advanced stage of computerization.

4.3.15. DRDE (Defence Research and Development Establishment)

The origin of DRDE dates back to 1924 when the then Maharaja of Gwalior established a research laboratory to explore forest products and mineral resources in the erstwhile Gwalior State. The laboratory came into existence and was inaugurated by Lord Mountbatten, the then Governor General of India in 1947. It was then known as Jiwaji Industrial Research Laboratory. Due to the expansion of research activities, it was taken over by the Ministry of Defence and was made a full-fledged accounting unit with a separate charter of duties in 1973. Defensive aspects of chemical and biological agents as well as associated toxicological problems were the major thrust areas of the laboratory, which later reorganized to work in the fields of synthetic and analytical chemistry, protective devices, process technology development, pharmacology and toxicology, microbiology, entomology, biochemistry, biotechnology, virology, electron microscopy etc.

Some of the major innovative products of the establishment that have undergone successful user trials and accepted by the services include Water Poison Detection Kit (WPKD), Residual Vapour Detection Kit (RVD), Three Colour Detector Paper, Portable Gas Chromatograph (PGC), Filter Absorbers for Static shelters, MBT / BMP2 / T-72 tanks, Naval ships of Eastern & Western Origin, and Submarines for internal pollution control, First Aid Kit CW (Chemical Warfare) Type A, First Aid Kit CW Type B, Personal Decontamination Kit (PDK), Portable Decontamination Apparatus (DAP) etc.

The DRDE Library has a collection of around 18480 books and 11500 bound volumes of journals. 107 journals are being subscribed by the library. Internet and Intranet services are available. Other library services like OPAC, indexing, compilation of bibliographies, SDI, content page, reprography, ILL etc. are also provided. The library is managed by five qualified professionals with seven others.

4.3.16. DRDL (Defence Research and Development Laboratory)

DRDL was established in 1961 at the campus of Defence Science Centre, Delhi as an expansion of Special Weapon Development Team (SWDT) formed in 1958. The laboratory was moved to Hyderabad in 1962, to work on the design and development of missiles. During the initial phase, the laboratory successfully designed anti tank missile and indigenous rockets, which proved successful in flight. The first computer IBM 1620 was installed in DRDL as early as in 1965. Necessary infrastructure and test facilities were established during 1972 to 1982, which included aerodynamic, structural and environmental test facilities, liquid and solid propulsion facilities, fabrication engineering facilities, control, guidance, FRP, rubber and computer facilities. DRDL took a quantum jump in design and development of various types of missiles simultaneously leading to limited series production under Integrated Guided Missiles Development Programme (IGMDP) from 1982 onwards. Prithvi- a surface to surface missile, Trishul - a quick reactions short range surface to air missile, Nag- a third generation anti tank missile and Akash - a medium range surface to air missile, besides Agni - a technology demonstrator were also taken up.

The spectrum of research activities encompass system design and analysis, guidance and control design, warhead damage assessment, design of tactical missiles, communication & range systems, development of C4I systems, air defence simulation, virtual reality simulation and range safety support.

The Technical Information Centre covers an area of over 10,000 sq.ft. and is housed within the main office complex. It has a rich collection of over 40,000 books and reports, 12,000 standards and specifications, 11,000 bound volumes of journals and 2700 Microforms. 204 journals are being subscribed. All library services including Internet and Intranet are provided. This fully computerized library has thirty staff, including nine qualified professionals.

4.3.17. GTRE (Gas Turbine Research Establishment)

In the year 1959, a nucleus of present-day GTRE was formed with the inception of Gas Turbine Research Centre (GTRC) at Kanpur. The GTRC team, comprising just eight engineers and twenty technicians, was to design and test-run the GTRC CF-1, India's first centrifugal type gas turbine engine. In 1961, the venue for GTRE's frontline work in aero gas turbine technology was moved to Bangalore as the full-fledged GTRE and brought under the aegis of the DRDO.

GTRE, Bangalore is a committed research organization in implementing a comprehensive engine development program with highly effective aero gas turbine engine systems suited to specific Indian requirements. Research on gas turbine components, design and development of gas turbine engine systems for military application, specialist support in gas turbine technology and setting-up test facilities comprise areas of research activity of the establishment.

Among the notable achievements of GTRE the Kaveri engine for the Light Combat Aircraft (LCA) and the indigenous turbo charger for the Main Battle Tank take the top notch.

The Technical Information Centre covers an area of 6900 sq.ft. It has over 19000 books and reports, 3000 standards and specifications and 6000 bound volumes of journals. The library is subscribing to 143 journals. Services like OPAC, Circulation of new addition list, reprography, ILL, Internet and Intranet are provided. Seven qualified professionals with two others man the library.

4.3.18. HEMRL (High Energy Materials Research Laboratory)

The history of HEMRL dates back to 1908 when it started as the Chemical Examiner's Office at Nainital. It underwent a series of changes in its name and location. In 1962, it was named as Explosives Research & Development laboratory (ERDL) and was housed along with its sister establishment, ARDE in the Pashan Complex of DRDO at Pune. ERDL was rechristened as the High Energy Materials Research Laboratory in March 1995, a name that encompasses all aspects of high-energy materials research. The R&D activity encompasses basic and applied research in all aspects of high energy materials, synthesis of new compounds, characteristics of present and new materials as well as their behavior during explosion, study of detonation phenomena, formulation, design and development of propellants, high explosives, pyrotechnics, polymeric materials, liners / insulators etc and chemical engineering process.

HEMRL Technical Library covers an area of 9900 sq.ft. It has 18300 books and reports, 5000 standards and specifications and 6000 bound volumes of journals. 90 journals are being subscribed. The library is fully automated and provides all library services. Five qualified professionals with three others man the library.

4.3.19. IAT (Institute of Armament Technology)

IAT, Pune came into being as the Institute of Armament Studies in 1952 within the campus of the College of Military Engineering at Dapodi, Pune. To begin with, only the Technical Staff Course for Army Officers was being conducted at the Institute. In course of time, other courses / programmes were added to cater to the requirements of the three Services, DRDO, Defence Quality Assurance, Defence Ordnance Factories, Defence Aeronautical Quality Assurance, etc. In 1967, the Institute moved to its present location at Girinagar. The institute is dedicated to impart higher education and training in various fields of science and technology having a bearing on defence requirement in general and weapon systems in particular, carry out research, design and development activities with a view to maintain adequate academic standards, maintain active interaction and liaison with universities and other civil and defence teaching institutes in the country and abroad and maintain a close liaison with the Services HQrs regarding the courses sponsored by or of interest to them. The Institute is the Centre for Advanced Technical Education in all branches of engineering and technology related to defence. It has the unique distinction of training not only DRDO Scientists but also the Indian Army, Navy and Air Force officers. It is a premier institute imparting training to a number of personnel from government and non-government organisations including DRDO, Ordnance Factories, three Services, Coast Guard, Public Sector Undertakings and educational institutions

systems and devices with its related fields are the other core competencies of this establishment. Some of the prominent achievements include, optics for viewing the image displays, day vision optics for weapon systems, zoom optical system, thermal imaging systems, fabrication of multifaceted scanner, and thin film technology.

The Technical Information Centre has an area of around 10500 sq ft. It has over 6800 books and reports, 8000 bound volumes of journals and 108 current journals. Library is being computerized. Photocopy and ILL services are available. It is manned by two qualified professionals and seven others.

4.3.21. ITM (Institute of Technology Management)

ITM, was established as Defence Institute of Workstudy (DIWS) on 26 February 1962 at Landour Cantt., Mussoorie. DIWS excelled in its field with the motto of 'Productivity through Work-study'. The Institute now lays emphasis on education, consultancy and research in management and active interactions with other management institutions in the country and abroad. ITM is a major technology management training and research institution of the country. The area of activity of the institute include training in management, with emphasis on management of technology, to all personnel from DRDO, the three Services, and officers from Govt. undertakings and public and private enterprises, conducting courses under the Continuing Education Programme (CEP) of DRDO, for skill up gradation at Mussoorie and other centers, conducting research in Technology Management, and providing management consultancy to government and non-government departments for creating and maintaining necessary management databases.

The Technical Information Centre covers an area of 4000 sq.ft. It has around 13,000 books and 1500 bound volumes of journals. 46 journals are

being subscribed. It provides photocopy and ILL services and is manned by one qualified professional with three others.

4.3.22. LRDE (Electronics and Radar Development Establishment)

RDE has its genesis in the Inspectorate of Scientific Stores created in 1939 at Rawalpindi, which was redesignated as Technical Development Establishment (Instruments and Electronics) in 1946 and located in Dehradun. The establishment was renamed in 1962 as Electronics and Radar Development Establishment and shifted to Bangalore. LRDE is dedicated to the design and development of radar and communication equipments. The core competency areas include phased array radar technology for simultaneous surveillance and tracking, 3-dimensional medium range surveillance radar, man portable light weight battery powered battle field surveillance radar, air-borne maritime patrol radar, radar networking and radar data utilisation centres.

The library known as Information Processing Group covers an area of 7000 sq.ft. It has 26,000 books and reports, 2000 standards and specifications and 8000 bound volumes of journals. 235 current journals are being subscribed. This fully computerized library is manned by two qualified professionals, thirteen semiprofessionals and nine nonprofessionals. It provides all library services.

4.3.23. MTRDC (Microwave Tube Research and Development Centre)

MTRDC, Bangalore was established in the year 1984. MTRDC initially started in a small accommodation in Bharat Electronics Limited (BEL), Bangalore Complex, and moved into the present technical accommodation

within the campus in the year 1992. To facilitate continuous interaction between the R&D and production teams, this Centre is located near BEL's Microwave Tubes Division.

The main objective of MTRDC is to establish itself as a strong R&D centre with technical competence for developing advanced microwave tubes to meet the present and futuristic needs of the country. The laboratory is tasked to designing microwave tubes for transmitters of different radars and ECM systems, computer-aided design (CAD) and computer-aided simulation of microwave tubes.

The Technical Information Centre is housed in a separate building of 2800 sq.ft. It has 2500 books and reports and 1500 bound volumes of journals. It subscribes to 31 current journals. Only cataloguing and circulation are computerized. Library is managed by one qualified professional.

4.3.24. SSPL (Solid State Physics Laboratory)

SSPL, Delhi is one of the laboratories in the electronics group of the DRDO. The activity of the laboratory is interdisciplinary in nature and calls for skills in the study of the physics of solids, chemistry and metallurgy of modern materials, electronic applications and engineering practices. It started with a small nucleus of scientists in 1962, with the broad objective of conducting investigations of solid state materials & their properties, undertake preparation and purification of semiconductors and development of futuristic defence electronic equipments employing solid state technique.

The Technical Information Centre of SSPL has 11,000 books and 12,000 bound volumes of journals. 61 journals are being subscribed. Computerisation is in progress. Services like circulation of accession lists, photocopy and ILL are provided.

4.3.25. TBRL (Terminal Ballistics Research Laboratory)

TBRL, Chandigarh was established in 1961 as one of the modern armament research laboratories. While the main laboratory is situated in Chandigarh, the firing range spread over an area of 5000 acres at Ramgarh, 22 km away, in Haryana. The Laboratory facilitates basic and applied research in the fields of high explosives, detonics and shock waves. It is also committed to evolving data and design parameters for new armament stores and assess terminal effects of ammunition. The specific areas of work include performance of armour defeating projectiles and immunity profiles, preparation of safety templates for various weapons, studies of underwater detonics and pressure wave propagation, explosive forming, cladding and welding and detonics of high explosives etc. TBRL has developed software packages for computation of antipersonnel efficiency of high explosives ammunition and damage capabilities of high explosive anti-tank ammunition.

The library of TBRL, known as Technical Information & Resource Centre (TIRC) covers an area of 15,600 sq.ft. It has a collection of 15500 books and reports 4700 bound volumes of journals. 91 journals are being subscribed. It has already computerized most of the library operations. All

information services like OPAC, indexing, SDI, news clippings, reprography and ILL are provided. Library is managed by three qualified professionals with five others.

4.3.26. VRDE (Vehicles Research and Development Establishment)

VRDE, one of the premier institutes of DRDO, was originally raised in 1929 as Inspectorate of Mechanical Transport at Chaklala, now in Pakistan. In 1943, the status of the Establishment was raised and it was renamed as Chief Inspectorate of Mechanisation. It moved to Ahmednagar in February 1947 and was redesignated as Technical Development Establishment (Vehicles). In August 1960, TDE (V) was redesignated as Technical Development Establishment (Vehicles and Engineering Stores). In February 1962, the Engineering wing of the Establishment was segregated and set up as an independent unit at Dighi under the name Research & Development Establishment (Engineers) which later moved to Pune. The Establishment that remained in Ahmednagar reverted to being TDE (V). On 1 August 1965, TDE (V), Ahmednagar was further bifurcated into Chief Inspectorate of Vehicles and Vehicles Research & Development Establishment, both located in Ahmednagar. In 1971, tracked vehicles and wheeled vehicles activities were separated. VRDE, Ahmednagar was made responsible for wheeled vehicles and an establishment named CVRDE was created at Avadi, which was made responsible for tracked vehicles. Later, in 1985 the development activities of light tracked vehicles were also entrusted to VRDE.

The areas of operations covered design, development and technical trials on all types of wheeled and light tracked vehicles upto 25 tons class,

act as a nodal point for interaction with automotive industry relating to introduction of vehicles into Defence Forces, carry out road worthiness, fuel efficiency and pollution tests on vehicles and type testing of automotive engines, and testing of vehicles and components for homologation/certification for the purpose of export to East European Countries, under the Indo-EEC Co-operation Programme.

The technological achievements of the establishment include, turbo charging of BMP-2 engine, development of mobile shelters / containers, electro hydraulic multi-wheeled steering system for multi-axle vehicles, tri-axle suspension system, operation theatre complex on wheels, mobile kitchen lorry, mounting of air defence guns on high mobility vehicle, ground systems for IGMDF and missile transporting system.

VRDE has indigenously developed electronic soil cone penetrometer, a state-of-the-art equipment designed and developed indigenously for reconnaissance parties for assessing mobility of different vehicles in sandy and marshy terrains, scientists and engineers for studying the soil properties, and vehicle drivers for knowing whether their vehicles can pass through a given terrain.

The Technical Information Centre has around 9800 books, 1500 bound volumes of journals. 80 journals are being subscribed. Computerisation is in progress. List of new additions are circulated among scientists. ILL facility is also available. The library is managed by two qualified professionals with five others.

4.4. CONCLUSION

DRDO is a premier R&D organization in defence sector with a network of laboratories engaged in research activities in different areas of specialization. Each DRDO establishment has its own unique area of specialisation like, Aeronautics, Armaments, Combat Vehicles & Engineering, Computer Sciences, Electronics, Life Sciences, Manpower planning & Development, Materials, and Missiles etc. The twenty-six laboratories covered in the study have represented all these subject fields, The profile of the laboratories had attempted to give a birds eye view of the area of their work and important achievements of the laboratories and endeavoured to touch upon the resources and services of the libraries attached to them.

ORGANISATION AND ADMINISTRATION OF DRDO LIBRARIES

M. Santha Kumari “Organisation, administration and utilisation of DRDO libraries ” Thesis. Department of Library and Information Science, University of Calicut, 2004

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CHAPTER 5

ORGANISATION AND ADMINISTRATION OF DRDO LIBRARIES

5.1. INTRODUCTION

The ever-increasing and diverse information requirements of the defence scientists have effected a series of evolutionary process and transformation to the role and functions of DRDO libraries over the years. Each DRDO laboratory engaged in defence research has a well-organised and dedicated technical library, which is the nerve centre of the research activities in the laboratory. These libraries referred to as Technical Information Centres (TICs) or Technical Information Research Centres (TIRCs) or DRDO Libraries, cater to the diverse information requirements of the defence scientists. How far these libraries fulfil the objectives for which they are established is the subject of this study. An attempt is being made in this chapter to study the organization, administration, resources and services, manpower, physical infrastructure etc of these libraries. Other aspects like membership in professional associations, librarian's immediate future plans for the library etc. are also covered.

The data for this section of the study were obtained mainly through the responses of the personnel in charge of the library to the questionnaire. This data has been supplemented by the information obtained from the discussions with the librarian wherever possible and personal observation on the organisation, administration and functioning of the libraries located in Karnataka State and a few others.

5.2. RESPONDENTS DATA

The DRDO is a network of fifty-two laboratories including DESIDOC, spread through out the country with a variety of specializations among them as their names indicate. Some have very advanced library while some do not have a library. With a view to collect general information about the DRDO

laboratory, questions were included in the questionnaire regarding the location of the laboratory, year of establishment, field of specialization, etc. These data were analysed and presented in the subsequent sections.

5.2.1. Quantum of Response

The quantum of response of the laboratories / libraries to the survey is presented in table 5.1

Table 5.1 Quantum of response of laboratories

Respondents	Non-respondents	Laboratories without libraries
ADE	CEES	ANURAG
ADRDE	DARL	ADA
ARDE	DIFR	ASIEO
CABS	DIPAS	CPDC
CAIR	DIPR	DRDU
CASSA	DLRL	DRL
CEMILAC	INMAS	DSC
CVRDE	NMRL	DTRL
DEAL	NPOL	FRL
DEBEL	NSTL	ISSA
DFRL	PEE	SAG
DLJ	RCI	
DMRL	R&DE	
DMSRDE	SASE	
DRDE		
DRDL		
GTRE		
HEMRL		
IAT		
IRDE		
ITM		
LRDE		
MTRDC		
SSPL		
TBRL		
VRDE		
Total 26	14	11

*DESIDOC not included

NB 4529 TA
026.355 SAN/O

Table 5.1 gives the details of respondents to the survey. It can be seen that out of the total of fifty-two laboratories, twenty-six libraries have responded while fourteen did not. Eleven laboratories have no libraries and DESIDOC is not included in the study.

5.2.2 Geographical Distribution

Many factors like terrain, proximity to the sea or mountains, climate, area available, communication network, development prospects, employment opportunities, etc might have been taken into consideration before deciding on the location of these laboratories. An arbitrary division of the country into North and South with the dividing line running from Gujarat in the West to Orissa in the East gives the breakup of the number of DRDO laboratories located in these two geographical blocks. Table 5.2 gives the distribution of the laboratories based on geographical division and the percentage of response received from them.

Table 5.2 Distribution of libraries by region

Geographical Division	Total No. of DRDO labs	Labs with library	Response received	Percentage of response
North India	20	10	08	80.00
South India	32	30	18	60.00
Total	52	40	26	65.00

Table 5.2 reveals that twenty (20) laboratories are located in North India, ten (10) of which have libraries while thirty-two (32) laboratories are located in South India, thirty (30) of which have libraries. As is evident 80% of the laboratories in the North and 60% in the South are being represented in the survey. 65% (26 out of 40) of the DRDO libraries are included in the study.

Table 5.3 gives the state wise location of the DRDO libraries and their response to the questionnaire.

Table 5.3 State wise distribution of libraries

State	No. of Labs	No. of Labs with libraries	Response received
AP	7	5	2
Assam	1	Nil	-
Chandigarh	1	1	1
Delhi	11	6	1
J&K	1	Nil	-
Karnataka	12	10	10
Kerala	1	1	-
MP	1	1	1
Maharashtra	6	6	4
Orissa	1	1	-
Rajasthan	1	1	1
TN	1	1	1
UP	6	6	5
WB	1	Nil	-
C/O 56 APO	1	1	-
Total	52	40	26

Table 5.3 reveals that the laboratories are scattered over fourteen States and one field unit. Nine States have been represented in the survey. Kerala, Orissa and 56 APO, where only one laboratory each is located did not respond and hence not represented.

5.2.3 Chronological Distribution

The organizational structure, administrative potential, collection of resources, and quality of services of a library generally has relation to its age. Older the library, it will have more collection of reading materials as compared to younger or new libraries. It will have efficient organizational

and administrative machinery, a set of streamlined operating procedures and a team of matured and experienced staff.

All fifty-two (52) DRDO laboratories were categorised into six (6) groups by their year of establishment. The number of laboratories, laboratories with library and number of libraries that responded to the survey are presented in table 5.4.

Table 5.4 Chronological distribution of laboratories

Year of establishment	No. of laboratories	Laboratories with library	Response received
Before 1950	8	6	1
1951-1960	13	11	8
1961-1970	17	12	8
1971-1980	4	4	4
1981-1990	7	5	4
After 1991	3	2	1
Total	52	40	26

It is found from table 5.4 that out of the twenty-six libraries covered in the study, twenty-five libraries (96.15%) were established prior to 1990. More than 50% i.e. 16 libraries were established between 1961 and 1990. CEMILAC, established in 1994, has the youngest library under study. Therefore it can be presumed that all these libraries are old and mature enough to provide reasonably efficient services as far as its age is concerned. It is evident that the libraries under study have representation from all these age groups.

5.2.4. Area of Specialisation

DRDO has classified various laboratories as per their subject areas of specialization into ten groups. Table 5.5 gives the distribution of the twenty-six laboratories under study, according to their subject areas of specialization.

Table 5.5 Distribution of laboratories by their area of specialization

Area of specialisation	Name of laboratory	No. of labs
Aeronautics	ADE, ADRDE, CABS, GTRE, CEMILAC	5
Armaments	ARDE, HEMRL, TBRL	3
Combat Vehicles & Engineering	CVRDE, VRDE	2
Computer Science	CAIR, CASSA	2
Electronics	DEAL, LRDE, MTRDC, SSPL, IRDE	5
Life Sciences	DEBEL, DFRL, DRDE	3
Manpower Planning & Development	IAT, ITM	2
Materials	DLJ, DMRL, DMSRDE	3
Missiles	DRDL	1
Naval Research & Development	No response	-
Total		26

It is evident from table 5.5 that the laboratories covered in the study have representation from all these groups except one, the Naval Research & Development.

5.3. ORGANISATION AND ADMINISTRATION

The unprecedented growth in the flow of information and the variety and vibrancy in the nature of information being sought by the users have

effected a conceptual change in the organizational and administrative set up of the modern library.

5.3.1. Organisational Structure Of DRDO Libraries

In order to assess the organizational pattern of the DRDO libraries, the librarians were asked to furnish a chart showing the organisation of their library. On detailed examination of these charts a common lay out could be arrived at. Fig 5.1 displays the standard layout of the organisation of the DRDO libraries.

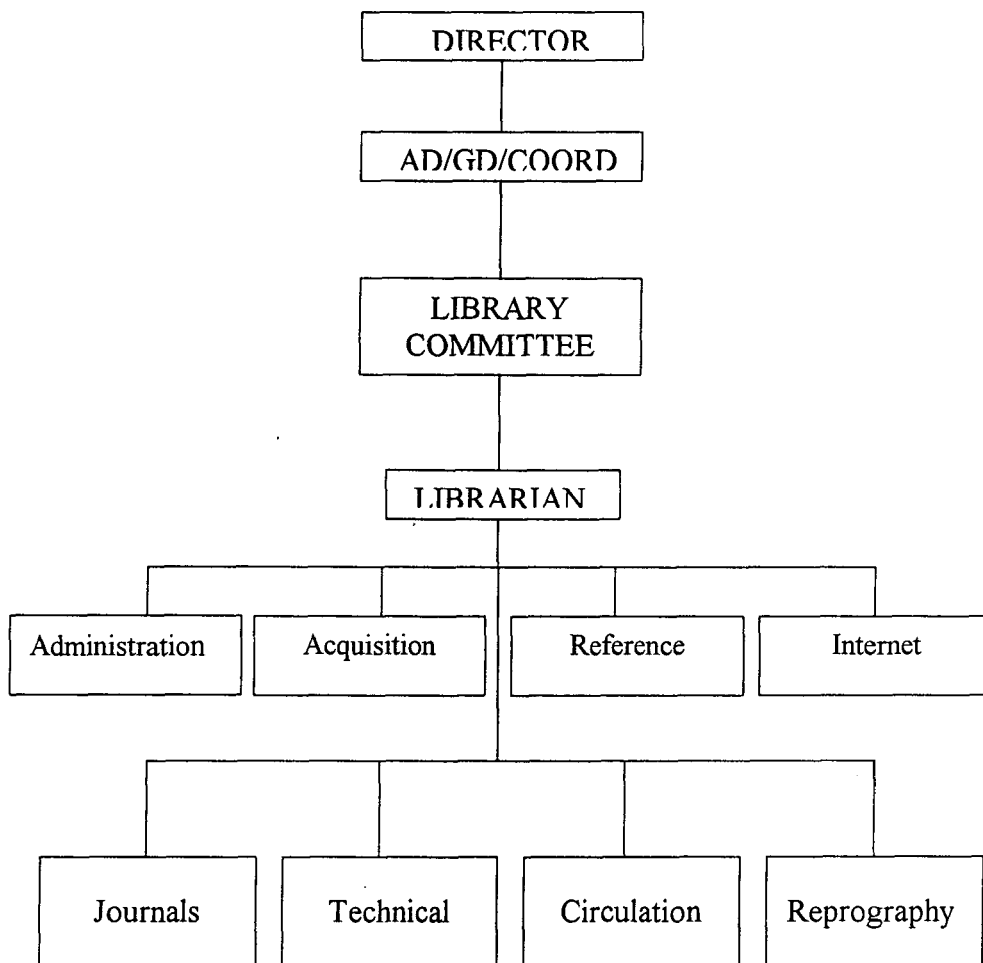


Fig. 5.1 Organisational Chart of DRDO libraries

It is evident from the organisation charts of the libraries, that in the case of all libraries the Director of the laboratory is at the helm of affairs. Under the Director there is Associate Director (AD), Group Director (GD) and Coordinator (Coord) who organise, coordinate and supervise the library activities. Even though the Librarian practically directs the various functions of the library in his capacity as the Head of the library, he is accountable to the Director through the AD / GD / Coordinator for all the activities of the library. It is also observed that in all DRDO establishments there is a Library Committee (LC) comprising of the various officials mentioned above and selected scientists representing the various subjects of specialization with the librarian as the convenor / member secretary. The LC is found to be very active in coordinating the library activities. The composition and duties of the LC have been dealt with, in detail separately. It is found that depending on the number and type of services offered, each library has independent sections like acquisition, reference, bound volumes, computer, circulation, technical, reprography, administration, etc manned by section heads supported by adequate staff who are responsible and accountable to the librarian.

Organisational structure of these libraries varies from each other depending on the number of services being provided and the availability of staff. With every addition of service the organisational machinery has to be geared up to ensure its effective utilisation. For the efficiency of the library services offered, the organizational structure has to be reinforced by the physical facilities, manpower and the administrative machinery of the library.

5.3.2. Library Administration

Although the librarian is the actual working head of the library, there is a Library Committee (LC) to tender advise as well as to guide the library activities. It is revealed from the responses that every DRDO library has an active LC, which has an important role in the development of the library, guiding and advising the Librarian and the Head of the institution in framing policies, conducting library activities and providing library services, except in CASSA, which has reported that it has no LC.

5.3.2.1. Constitution of LC

LC is appointed by the Head of the laboratory and consists of a Chairman, who is not below the rank of Scientist 'E' or equivalent and members representing various subject disciplines of the laboratory. The Librarian is the Member Secretary / Convener. Three to fourteen subject experts are members in the LC depending upon the subjects of specializations of the parent organisation. Up to three library professionals are also found to be members in the LC of various libraries. However in the case of CAIR and MTRDC, library professionals are not seen to be included in the LC. When this aspect was correlated with manpower details it could be found that these two libraries have only the librarian in charge / librarian and no other professional to assist him. To the question whether LC governs the library, ten libraries have responded in the affirmative while fifteen have described LC as only an advisory body.

5.3.2.2. Functions of LC

The functions of the Library Committee could be summed up from the responses as follows.

- To lay down the general library policy.
- To lay down sound library rules.
- To provide support to important decisions for facilitating / improving library services - like change in the working hours of the library, change in library rules regarding membership, loan privileges etc..
- To review the procedures for the library to optimise efficiency and image of the library services.
- To scrutinise the demands for acquisition of documents with the help of the subject experts and make necessary recommendation for approval by the Head of the Laboratory.
- To decide upon the obsolete documents and other materials to be weeded out from the library at regular intervals.
- To determine the equipments, furniture and other amenities required for efficient running of the library.
- To recommend for additional staff and facilities in the library keeping in view the latest technological trends.
- To deal with any other matter concerning the library which may arise from time to time.

LC is advisory in nature and the decisions taken by the LC are subject to the approval by the Head of the Laboratory.

5.3.2.3. Role of the Librarian in the LC

The role of the librarian in LC is that of Secretary / Convener. Responses reveal that the librarian has an important role to perform in the overall development of the library through the LC. It is the duty of the Librarian to

- convene meetings of the LC at regular intervals and as and when required, as special cases,
- presenting the various requirements of the library,
- scrutinising the user demands and recommendations,
- preparing the minutes of the LC meeting,
- convene meetings of the library staff for the implementation of the decisions of the LC with the approval of the Head of the Laboratory,
- planning and co-ordination of the follow up works to be done to execute the orders for the library.

5.3.2.4. Frequency of LC meetings

The responses to the question on the periodicity of LC meetings are tabulated in table 5.6.

Table 5.6 Distribution of libraries by frequency of LC meetings

Interval	No. of libraries	Percentage
Once in a month	5	19.23
Once in 2 months	3	11.54
Quarterly	6	23.08
Irregular	11	42.31
No LC (CASSA)	1	3.84
Total	26	100.00

The responses reveal that there is no regular periodicity for convening the LC meetings. The data in table 5.6 shows that in 42.31% libraries LC meetings are convened at irregular intervals. Laboratories follow their own periodicity of convenience. However all librarians have stated that they do resort to the practice of holding meetings as and when required.

5.3.3. SELECTION AND ACQUISITION

Selection and acquisition of reading materials are the most important functions of any library. DRDO libraries are special libraries dealing with supply of information to the defence scientists involved in the defence preparedness of the country. Their demand for information and services are to be catered to with utmost priority and without any time lag. Their requirements are very specific on highly advanced technologies and the latest developments in fields relevant to their research work.

5.3.3.1. Books

Books form the primary collection of a library. Judicious selection based on systematic evaluation will lead to a valuable collection capable of satisfying the requirements of the clientele.

Selection tools

The various tools of book selection considered are user demands, publisher / book sellers catalogue, subject bibliography, reviews, fairs / exhibitions, Internet and books on approval basis. The librarians were given these seven choices of selection tools to ascertain the selection criteria

followed in their library. Table 5.7 presents the distribution of libraries by usage of various selection tools.

Table 5.7 Book selection tools

Selection tool	No. of libraries	Percentage
User demand	26	100.00
Publishers / Book sellers catalogue	26	100.00
Subject bibliography	15	57.69
Reviews	16	61.54
Fairs / Exhibition	08	30.77
Internet	12	46.15
On approval	17	65.38

It is observed from table 5.7 that all the twenty-six libraries consider user demands and publishers / sellers catalogues as their major tools for selection. Number of user demands ranges from 50 - 350 from library to library for the year 2000 / 01 as per the data furnished by the librarians. In addition seventeen libraries consider selection of books on approval basis too. Sixteen libraries use reviews also for selection. Book reviews published in scientific and technical periodicals and newspapers, under several headings or captions, such as 'Book Reviews', 'New Thought', 'New Publication', 'See your Books', 'Current Books', 'Your Books of the week', 'Review updates', 'Books Received', 'Book Plus', etc are used to select books. Fifteen libraries use subject bibliographies while twelve libraries search Internet also for books of interest. Eight libraries select books from fairs / exhibitions also. The data collected revealed that no library is using all the seven tools for acquisition. However ARDE, DEBEL, DLJ, DMRL, DRDL, HEMRL, IAT, MTRDC and TBRL have been using six out of the seven tools. Circulation record is also referred to by many librarians to find out the books and the subject areas on demand.

The librarian prepares a list of books selected, keeping in view of the subject specialisation of the parent laboratory and funds available for the procurements of books and puts up to the LC. Utmost care is taken to avoid duplication, as these books are very costly. LC further scrutinizes the list with the help of the subject experts and recommends for the approval of the Head of the Laboratory who is the sanctioning authority for selection of books.

Vendor selection

Vendors are registered for the supply of books and current journals. They are selected on the basis of their past performances, distributorship of publishers, reputation and recognition, infrastructure available with them and their client base.

Responses reveal that as a general policy, books and book like materials are to be procured from vendors / distributors who are registered with any of the DRDO libraries. However, it is understood that occasionally procurement of a few titles can be made from other sources also at the discretion of the Head of the Laboratory, limited to Rs.5000/- per transaction. Individual libraries or a cluster of libraries can also invite quotation for the supply of books and book like materials specifying the terms of supply regarding discount, conversion rates, handling charge, mode of delivery etc. and get their terms of supply finalised and approved by the Head of the Laboratory. Procurement is made from any of the registered vendors on the approved terms and conditions. Same procedure is found to be followed for subscription of current journals and bibliographical databases also.

Registration of vendor

From the responses, the procedure for the registration of vendor / distributor /supplier of library documents could be summed up as follows:

The vendors are registered with the laboratories for the supply of books, periodicals, CD-ROMs, etc. separately. The credentials of firms seeking registration are verified to ascertain their credibility with regard to financial standing, capacity, reliability, bonafides and past performance, etc. For this purpose, specialists from the respective fields will be included in the screening committees while examining the applications of vendors seeking registration. A committee comprising a minimum of three officers i.e. librarian and specialist technical / scientific officers will examine the applications of vendors and offer their recommendations to the Directors of laboratories for approval of vendors for registration or removal. The registration is awarded to the vendors who are publishers, authorised stockists /distributors /dealers who fulfil all requirements. The firms seeking registration with laboratories have to apply in prescribed application form available with respective laboratories, on payment of a non-refundable nominal fee of Rs.100/- payable by bank draft drawn in favour of the Director. Fresh registration will not be necessary for the firms already registered with any of the DRDO laboratories. For each category of publication /documents, an appropriate screening committee appointed by the Director scrutinises the application forms received for registration.

The firms approved for registration for one or more categories of publications /documents are allotted a registration number, which remains valid for a period of three years. Such registration can be renewed further for another period of three years on payment of Rs.100/-, subject to furnishing

the updated information regarding credentials as per the application form. Renewal of registration is however subjected to satisfactory performance evaluation. A register for allotment of registration numbers is maintained by the laboratory. This register will give the names and details of all vendors registered with them.

Payment procedure

The supplier produces the bill for payment, at the Reserve Bank of India (RBI) conversion rates prevailing on the date of supply order. However, it is seen that in exceptional cases, the date of billing is also accepted at the discretion of the Head of the Laboratory. In case of bulk central purchases for all the DRDO laboratories, particularly selection of publications during World Book Fair / Book Exhibition etc., terms and conditions regarding discount and payment are scrutinised by a special committee set up for the purpose by the DRDO Head Quarters.

The supplier is expected to produce authentic source / price proof along with the books for price verification. Supplier of books has to certify on the bills that the prices charged are correct and the books supplied are the latest copies and not the remaindered titles. The supplier has to give a declaration on the bill to the effect that the prices have been correctly charged. The discount on remaindered titles will be 30% of the published prices and separate invoices as per orders are given. The discount for foreign publications and Indian publications is 10% and 15% respectively.

Conversion rates

Even though the general practice is to adhere to the RBI conversion rates as on the date of placing order, from the responses of the libraries it is

found that five libraries (ARDE, HEMRL, IAT, ITM, and TBRL) accept the GOC conversion rates also. All the libraries insist on price proof for verification of prices.

Accession Registers

Different Accession Registers are found to be maintained for different kinds of documents such as books, reports, standards / specification, patents, bound volumes, CD ROM, and journals, by all the DRDO libraries.

5.3.3.2. Journals

Journal publications are essential for R&D work, as the articles published in these are the primary means of communication for the exchange of latest scientific information. It is therefore desirable that all such periodicals containing information relevant to the research work of the laboratories are invariably subscribed to in the library.

Journal selection criteria

Responses reveal that the selection and renewal of periodical titles are done on the basis of user requests, utility survey and new projects of the laboratory to which the library belongs. Two libraries have not responded to this question.

Table 5.8 Journal selection criteria

Selection / Renewal	No. of libraries	Percentage
User request	24	92.31
Utility Survey	22	84.62
New projects	16	61.54

It is evident from table 5.8 that most of the libraries (92.31%) consider user requests as the main criteria for journal selection. However, it is found that utility survey is also given due importance. Twenty-two libraries (84.62%) consider it as an important criterion for selection and renewal of journals. The librarian conducts a survey of the journals regarding their utility and ranks them according to their usefulness to the scientists. Utility survey is conducted by analysing the circulation statistics and user statistics of the journals. Circulation statistics of the journals is taken from the issue counter. To obtain the user statistics each journal is pasted with a user slip at the time of accession of the issue to the library. Every one consulting the journal is requested to put his/her signature in the user slip. User statistics is compiled from these user slips. User statistics together with circulation statistics contribute to decide whether a journal is to be continued or not.

Project oriented periodicals are also subscribed when new projects are taken up by the laboratory. The LC with the help of subject experts prepares the final list of journals for subscription.

Mode of subscription

It is evident from the responses that the mode of subscription and the physical format of journals are determined by the LC.

A consolidated list of all periodicals on the basis of user requests, utility survey and new projects is prepared by the librarian and put up to the LC for consideration for their subscription or renewal of subscription. The LC scrutinises the list and recommends the titles to be subscribed for the next year after consulting subject experts from the various divisions of the laboratory. The LC suggests the mode of subscription and mode of supply (airmail, sea mail, airfreight, hand delivery etc). The LC also decides the

format of periodicals like paper, magazines, microform, etc. The LC then recommends and forwards the list to the Head of the Laboratory for approval along with the total subscription cost and current status of funds.

To get a clear picture of the mode of subscription five choices were given in the questionnaire. The librarians were requested to state the various modes of subscription being followed in their libraries. The response is tabulated in table 5.9.

Table 5.9 Mode of subscription

Mode of subscription	No. of libraries	Percentage
Direct from publishers	14	53.85
Through vendors	25	96.15
Through membership	05	19.23
Exchange	03	11.54
On gratis	08	30.77

All libraries except one (96.15%) are found to appoint vendors for the supply of journals to them. IAT subscribes periodicals directly from publishers only. Fourteen libraries (53.85%) approach publishers directly for particular journals and vendors for the rest of the journals. A lesser percentage of libraries (19.23%) are seen to get journals through membership to various associations, institutions, etc also. Few (11.54 %) are found to exchange journals and some (30.77%) accept gift journals.

The most common mode of subscription is ordering through local vendors / subscription agents. Order is placed to any local vendor approved

by the laboratory and possessing a license from RBI for carrying out subscription activities.

In libraries where fund for journals exceeds Rs. 5.00 lakhs, quotations are called for. Quotation received from the vendors / subscription agents is scrutinised by a Board of Officers appointed by the Head of the Laboratory for the purpose.

Many factors are found to be considered for vendor selection. Location of the office of the vendor, reputation, income tax clearance certificate (ITCC- vendor should supply the latest ITCC issued by the bank. Defaulter of income tax department should not be considered), RBI license (should be a holder of trade license issued by RBI), mode of supply (many vendors supply by air freight / hand delivery without charging extra cost which has advantages over other modes, reduces the chances of missing issues during transit), refund for missing issues (Refund or extend subscription period), mode of payment (advance payment or otherwise), conversion rates (no handling charges to be paid), services to other libraries, discount offered, etc are considered for the selection of vendors.

The Board recommends appointment of one or more vendors depending on the number of titles to be subscribed and subscription cost involved. In case the Board recommends appointing more than one vendor, the librarian distributes the titles on the basis of services rendered by the vendor in the past.

No library under study is found to subscribe journals by consortia. All the libraries except GTRE and DFRL are found to maintain subscription register. GTRE is maintaining the journal holdings in computer using library software while DFRL is maintaining the kardex.

Payment procedure

In case of advance payment received from the library the vendor is to furnish a Bank Guarantee of one equivalent amount received from the library for a period of sixty days. The vendor also has to furnish proof that the money has been transferred to the publisher on behalf of the library. The Controller of Defence Accounts (CDA) is the payment authority and the local office of CDA (R&D) makes the payment.

5.3.3.3. Reports

In DRDO, a number of research projects are undertaken simultaneously and the scientists consult reports issued by other bodies or agencies. Report is a document that states the results of or progress made in a particular research or investigation submitted to the person or the body on whose behalf the work was carried out. The DRDO libraries on the basis of requirements of parent laboratory, acquire reports like feasibility reports, progress reports, final /closing reports, annual reports, state of the art reports and security classified reports.

Reports are usually published by Government departments, commercial organisations / agencies, academic institutions and research laboratories. Their distribution is limited. Many are available free of cost and some are deposited in selected libraries. They are seldom indexed or abstracted in bibliographic sources. Hence these libraries make all efforts to compile the lists of agencies generating / distributing / releasing the reports of their interest and procure all the reports of interest to their parent organisation.

A list of the reports to be procured is prepared and submitted to the Head of the Laboratory through the LC for approval. The procurement procedure is found to be same as for books.

5.3.3.4. Standards and Specifications

These constitute another important collection of the DRDO libraries. Standards are technical specifications accepted by recognised standardising bodies. They include Dimensional standards, Performance or quality standards, Standard test methods, Terminological standards, Codes of practice and Physical & Scientific standards. Standards are issued by the international standardising bodies like ISO (International Organisation for Standardisation) IEC (International Electro-technical Commission) and various other national bodies.

Standards are acquired by placing order direct to the bodies issuing standards or their authorised distributors. Procurement procedure is identical to that of books and reports.

5.3.3.5. Online / CD-ROM databases

A number of foreign publishers publish monographs, periodicals, patents, standards, etc. in the form of CD-ROM databases. On line and CD-ROM databases are subscribed on user demands or on request from the parent laboratory. Some CD-ROM databases are available on one-time procurement. The procurement procedure followed is as per the procurement norms applicable to books. Some CD-ROM databases are procured on subscription basis. Utility survey is conducted before renewal of subscriptions. Once the updates are complete they are accessioned in the CD-ROM register.

5.3.4 TECHNICAL ORGANISATION

A meticulously planned collection and state of the art services backed by sound technical organisation and maintenance are the basic tenets of a good library. The available collection has to be systematically classified, properly catalogued, prominently displayed and correctly arranged for easy location and retrieval. Regular maintenance and accounting of the documents are also equally important.

5.3.4.1. Classification

Classification is the technique designed to facilitate and expedite the maximum possible use of the knowledge stored in the library. It is the formal process by which a mechanism is established in grouping together related subjects. Relative location of subjects is a great time saver, for it places together the items likely to be used together. Classification sequence provides a physical arrangement where similar materials are closely located on the shelf and within subject groupings, an order of 'general to specific' is maintained, which is of maximum benefit and time saving to the users.

Responses reveal that in most of the DRDO libraries only books are classified. Technical reports and standards & specifications are usually not classified. To a question whether all documents are classified, nine (34.62%) libraries answered in the affirmative. Seventeen libraries (65.38%) classify only books.

In twenty-three libraries (88.46%) the UDC scheme is used for classification while CEMILAC, ITM and MTRDC use the DDC scheme. UDC allows the linking of two distinct subjects by means of its general relationship

sign, the colon (:). It is also capable of classifying highly specific subjects pinpointing the subject information content of journal articles, conference papers, report literature, patents, etc. which form the much sought after resources of R&D organisations. The ITM librarian has mentioned that they are not satisfied with the DDC scheme and prefer the UDC scheme.

Regarding arrangement of documents the responses reveal that only books are arranged by their call number in almost all the DRDO libraries. Bound volumes and current journals are arranged alphabetically. The arrangement of reports and standards & specifications vary in different libraries. Nine libraries had mentioned that they classify all documents where they may be arranging reports and standards & specifications also in the classified order. In CVRDE these documents are arranged accession number wise under different subjects. DRDL, GTRE and HEMRL have stated that since user approach is by organisation / institution of the reports and standards & specifications, they are arranged serially under the name of the organisation / institution. In some libraries they are arranged as per their specific numbers under their respective series.

5.3.4.2. Cataloguing

An efficient catalogue is an index by author, title and subject to all the documents in the library, apart from giving details like publisher, place and year of publication, collation, name of series, ISBN, any other detail of interest and also the number of copies of a particular book available. It directs the reader to the exact location of the book on the shelf. Responses to the questions on cataloguing revealed the following.

All documents are catalogued in all the DRDO libraries. A few libraries have mentioned that secret / confidential / restricted documents,

which are kept separately under closed access, are not catalogued. Even if they are catalogued they are filed separately and maintained under safe custody.

All DRDO libraries are using the AACR for cataloguing, except MTRDC and DFRL, where CCC is used. From the responses to the question on the physical format of catalogue it is observed that most of the libraries have already introduced the Online Public Access Catalogue (OPAC) even while maintaining the original catalogue. Distribution of libraries by physical form of catalogue is presented in table 5.10

Table: 5.10 Physical form of catalogue

Physical form	No. of libraries	Percentage
Card form	8	30.77
OPAC	2	07.69
Card form & OPAC	16	61.54

It is observed from table 5.10 that eighteen libraries (69.23%) have OPAC facility out of which sixteen libraries maintain the card catalogue also. It is found that in all the eight libraries (30.77%) where only the card form of catalogue is available, automation is in progress and OPAC will be ready for use in the very near future. CAIR and ARDE have switched over to OPAC and have stopped preparing the card catalogue.

Responses to the question on the type of catalogue are represented in table 5.11

Table 5.11 Type of catalogue

Type of catalogue	No. of libraries	Percentage
Classified catalogue	2	07.69
Dictionary catalogue	2	07.69
Both	20	76.93
Only OPAC	2	07.69
Total	26	100.00

It is observed from table 5.11 that twenty libraries (76.93%) maintain both classified and dictionary catalogue. Classified catalogue is the subject index of the library collection while the dictionary catalogue is the author and title index of the collection. It is found that ADE and CEMILAC have only classified catalogue with OPAC facility. DEBEL and CASSA have dictionary catalogue with OPAC while ARDE and CAIR have only OPAC.

5.3.4.3. Catalogue of journals

The current and back volumes of journals are to be systematically catalogued. Librarians were asked how the journal holdings of their libraries are catalogued. Their responses are presented in table 5.12

Table 5.12 Catalogue of journals

Form	No. of libraries	Percentage
OPAC	14	53.85
Kardex	05	19.23
Card Form	07	26.92

A greater percentage (53.85%) of libraries are found to use the OPAC for cataloguing their journal collection while a lesser percentage (26.92%) is

maintaining the card form of catalogue by name of the journal. A still lesser percentage (19.23%) of libraries is found to maintain the Kardex.

5.3.4.4. Shelf list

Shelf list is prepared to have a first-hand record of all the documents of the library and consulted by the library staff every now and then to avoid duplication of books as well as call numbers. Shelf list is usually not available for users and is kept in the acquisition or technical section. It is filed in the same order as documents on the shelf and each entry represents a book on the shelf, giving full bibliographic description. Responses to the question on the availability of shelf list reveal that only nine libraries (34.62%) maintain shelf list while seventeen (65.38%) do not.

5.3.4.5. Maintenance of documents

Maintenance of documents includes proper shelving, dusting and cleaning, preparation and maintenance of guide cards and location charts, proper labelling of racks, shelf rectification, binding, preservation, stock verification and weeding out programmes.

5.3.4.5.1. Binding

It is essential that each document in the library is kept physically fit. A well-scheduled maintenance programme includes periodic segregation of books and materials for prompt repair and binding. Response to the question on binding show that generally in almost all the DRDO libraries binding is outsourced and is done on requirement basis. Most of the libraries resort to binding every two to three years. DFRL is the only library where binding is done on an annual basis. The usual practice followed in DRDO libraries is binding on contract even though eight out of the twenty-six libraries have mentioned that they have bindery in their libraries. It has been observed that

detailed instructions on the policy and procedures to be followed while resorting to contract for binding are laid down.

5.3.4.5.2. Stock verification

Library is an institution, which aims at maximum use of books. Books change hands very frequently and the chances of loss of books increase. In the open access system the tendency of losing books is more. Hence, stock taking becomes a necessity to find out the loss of documents in a library so that measures can be taken to eliminate losses. Stock verification is checking all kinds of documents in a library physically. Physical verification of books, periodicals, reports, patents, standards, specifications, theses, translated documents, and also CD ROM databases, audio and video cassettes, etc are carried out and loss assessed as on the date of verification.

Responses reveal that stock verification is usually done annually. To the question on the periodicity of stock verification, twenty-one libraries (80.77%) responded by saying that they conduct it annually. It is observed that five libraries (19.23%) conduct stock verification within a gap of two to five years only as they have large collections making it difficult to conduct annual stock verification. They are listed in table 5.13

Table 5.13 Variation in the periodicity of stock verification

Name of laboratory	Periodicity of stock verification	Collection of books, reports, standards & specifications	Bound volumes
ARDE	3 years	41000	5500
DMRL	5	32000	10000
DRDL	5	53248	11094
HEMRL	2	23300	6000
IAT	5	60467	23400

The variation in the periodicity of stock verification has the sanction of the respective Directors of the establishment. All the libraries listed in table 5.13 are found to have more than 20,000 books including reports, standards & specifications and over 5000 bound volumes and hence it can be presumed that they are not in a position to carry out stock taking on an annual basis. However libraries like ADE, DMSRDE and LRDE, which have 24000, 23920 and 28000 books / book like materials and 11000, 20000 and 8000 bound volumes respectively, carryout stock taking every year. GTRE has mentioned that stock taking of books is conducted annually while that of reports, standards / specifications and journals is conducted once in three years. It is observed that the decision on the frequency of stock verification is vested with the LC and the Director of the laboratory.

The responses reveal that in all the DRDO laboratories a separate Stock Verification Board of officers are constituted for stock verification of the documents of their libraries. The Chairman of the board is not below the rank of Scientist 'E' or equivalent. The Board will also have two members and three to five assistants. The chairman and the members will be from outside the library. However the board will be assisted by the library staff in stock verification.

Libraries are closed for stock verification, in some laboratories. The responses received to the question, as to how long the library is closed for this purpose, are tabulated in table 5.14. Closure of library is against professional ethics, which violates the laws of library science. It is observed that efforts are made not to disturb the routine functioning of the library as far as possible or to make the closure as short a period as possible. The LC, the Board and the Director take the final decision.

Table 5.14 Closure of libraries for stock verification

Period of closure	No. of libraries	Percentage
Not closed	11	42.31
7 days	8	30.77
15 days	7	26.92
Total	26	100.00

It is observed from table 5.14 that eleven libraries (42.31%) do not close the library at all for stock verification. Eight libraries (30.77%) are found to close down the library for seven days while seven libraries (26.92%) close down for fifteen days.

Barcode ensures accuracy and speed in stock verification. Only nine libraries (34.62%) are found to use barcode technology for stock verification. More than 65% of the libraries do not use barcode technology. It is observed that they are yet to computerize stock verification.

It is observed that all documents are physically verified in twenty-three libraries (88.46%). It is also found that CVRDE, DFRL and IAT conduct only random verification.

Loss of documents

Loss of documents is inevitable in any open access library. Responses reveal that in DRDO libraries there is provision to cater for the loss of three volumes per thousand volumes issued or consulted in a year. This loss is considered reasonable in an open access library. Statistical records of consulted / issued documents need to be maintained by the library to justify

the loss of documents reported in the stock verification and for the preparation of loss statement. The list of documents found lost during stock verification is prepared and put up to the Head of the Laboratory who is empowered to write off losses up to Rs.5000/- Cases involving losses beyond Rs.5000/- are referred to DBF&A along with statement of case, loss statement and copy of Stock Verification Board proceedings, for regularization.

With regard to loss of documents by individual users, libraries are found to follow different rules. Responses reveal that the first option is to replace the document with the latest edition by the user. If replacement is not possible, the cost is recovered. It is observed that most of the libraries charge the user the current cost of the document plus 10% handling charge. CASSA has stated that three times the cost of the lost book is to be remitted by the member to the Public Fund of Director, CASSA. In ARDE the cost of the book is recovered from the salary of the member through the Administration wing.

5.3.4.5.3. Weeding out

No library can afford, nor it is essential, to store permanently all the documents acquired. Library documents are not to be treated as store items. Mutilated and obsolete documents should be weeded out at regular intervals for a healthy and quality collection. Absence of proper weeding out can impair the efficiency of the reference collection. Directories, yearbooks, almanacs, annual reports, obsolete editions of books and reports, outdated versions of standards / specifications and manuals, damaged and irreparable documents, etc. are to be periodically reviewed and weeded out from the library collection. A systematic and consistent weeding out programme would save shelf space and heavy recurring expenditure on preservation and maintenance of documents. It will also eliminate the growth of inactive documents with very limited use, which might overshadow the more active

documents on shelves. A careful review of documents is required to avoid the risk of weeding out useful documents.

Twenty libraries (76.92%) responded favourably to the question on weeding out program while six libraries (23.08%) stated that they do not have such a programme. They are CAIR, CASSA, HEMRL, IAT, ITM and MTRDC.

Regarding the procedure for weeding out programme, it is revealed from the responses that, the Director constitutes a Board on the recommendation of the librarian, even though the LC is empowered to recommend documents for weeding out. The Weeding Out Board will have a Chairman not below the rank of Scientist 'E' or equivalent, three to five members representing various subjects, a representative of CDA (R&D) and the librarian as Member Secretary.

Documents to be weeded out are removed from the shelves and the Board assesses their current and archival value. A list is then prepared which is sent to the Head of the Establishment for approval. This list is circulated among other DRDO establishments so that they can select required documents from the list. Necessary arrangements are made to transfer such documents permanently with the approval of the Head of the Establishment to the laboratory, which makes a demand for documents from the list. Another list is then prepared of the non-demanded documents. This list is again circulated or distributed to other government departments, academic institutions, autonomous bodies, etc., and repetitions of actions follow. List of mutilated and damaged documents are not circulated and they are weeded out. Often the board fixes a reduced price for documents not demanded by any of the above, and sold to employees of the DRDO laboratories. The remaining documents are donated to social organisations / trusts / public

libraries, etc. in the best interest of the utilization of such weeded out documents. Other left out items are disposed off through weight and the amount thus obtained is remitted to Public Fund account.

5.4. BUDGET AND FINANCIAL REQUIREMENTS

One of the vital factors that ultimately determine the efficiency of a library is its financial resources. Libraries big or small need adequate funds to build up quality and efficient user services.

The DRDO libraries / TICs are fully funded by the MoD. The main objective of the library is to provide relevant information without any time lag to the scientists working on various projects in the parent laboratories. The financial resources should be made available in such a way that the growing needs of the libraries in meeting the information requirements of its clientele are met.

Responses reveal that the librarian prepares a draft for the annual library budget at least five months before the beginning of a new financial year, based on the expenditure incurred during the previous financial year. It is found that in most of the libraries a budget file is maintained by each section of the library so that they are able to, note down their financial requirements from time to time, which are to be incorporated in the budget. The librarian considers the following while drafting the budget requirements of the library for the year.

- Type of services already being provided by the library.
- New services to be started in the ensuing year.
- Increase / decrease in the memberships of the library.

- New projects undertaken or ongoing projects completed by the laboratory.
- Emergence of new subject / disciplines of interest to the parent organisation.
- Increase in the cost of the library documents.
- Inflation in the Indian & Foreign currencies.
- Addition / deletion of titles in the current subscription list of periodical publication.
- New formats (CD-ROM, Microfilms, etc) of documents to be acquired by the library.
- Number of torn books, loose issues of journals and other documents to be bound, repaired or laminated in the coming financial year.
- Conversion of recorded information from paper format to optical, magnetic, electronic or other formats.
- Automation of any library activities or services during the financial year.
- New equipment if any to be procured for the library.

The librarian works out a formula of the ratio of amount to be spent on various types of documents, i.e. books, periodicals including abstracting and indexing journals, newspapers, magazines, patents, standards/specifications, dissertation / thesis, etc. The budget estimate calculated as per the formula is duly recommended by LC and approved by the Head of the Institution and sent to the Finance and Accounts Department with full justification. The Finance and Accounts Department consolidates library budget with other budget requirements of the parent organization and forwards it to the Directorate of Budget, Finance and Accounts (DBF&A) at DRDO HQs. The

budget forecast for the next year is done in the month of October or November.

The library has to plan expenditure within the ceiling limit fixed by the DRDO HQs. It is also noticed that in case, surplus funds are available in the local purchase grant, the same can be utilised for the procurement of library documents after raising the ceiling limit of library grant by making a request to DBF&A as it is not objected.

In case complete budget is not utilised by the library during the current financial year, the librarian is to report back to DBF&A through the Head of the Laboratory well before the end of the financial year so that the same can be transferred to another laboratory.

5.4.1. Sources of Finance

Responses to the question on the sources of finance reveal that all libraries utilise the library budget (under LP grant) and the General budget of the laboratory for collection development and services of the library. In certain cases the project budget is also utilized when the laboratory undertakes new projects. Books and other documents required for the project initially is purchased using the project budget depending upon availability.

It is observed that the library budget is mainly used for purchase of books and book like materials, journals, microforms, etc. Expenses towards equipments and AMC for the equipments, furniture, computers with AMC and accessories, library software, Internet connections for the library, etc. are met from the general budget (under Build Up) of the laboratory. Binding is also done using both library budget and general budget in all libraries except in ARDE & DRDL where it is met from the library budget.

5.4.2. Financial Expenditure from 1996/97 to 2000/01

In order to find out the rate of growth in expenditure, the librarians were asked to provide the particulars of expenditure in respect of their libraries for the last five years from 1996/97 to 2000/01. Seventeen libraries furnished the complete details where as nine libraries gave the details for the year 2000/2001 only. Table 5.15 elucidates the financial expenditure of DRDO libraries from 1996/97 to 2000/01.

Table: 5.15 Financial expenditure from 1996/97 - 2000/01 in lakhs

Name of Estt	1996/1997	1997/1998	1998/1999	1999/2000	2000/2001
ADE	26.00	29.25	32.00	34.00	36.00
ADRDE	-	-	-	-	08.00
ARDE	10.40	13.25	12.00	12.00	26.00
CABS	-	-	-	-	17.50
CAIR	09.00	09.00	09.00	18.00	23.00
CASSA	04.00	04.49	05.31	05.33	04.20
CEMILAC	01.35	01.35	01.30	02.00	02.60
CVRDE	08.00	08.50	09.50	13.10	14.23
DEAL	-	-	-	-	40.00
DEBEL	03.00	02.80	04.80	05.00	05.00
DFRL	12.98	13.30	13.84	15.84	15.38
DLJ	25.00	28.00	30.00	37.00	45.00
DMRL	-	-	-	-	75.00
DMSRDE	-	-	-	-	60.00
DRDE	-	-	-	-	15.00
DRDL	79.00	90.00	101.00	122.00	131.00
GTRE	18.76	22.00	28.00	32.00	36.00
HEMRL	10.00	10.00	13.00	14.00	14.00
IAT	24.73	29.00	40.22	42.20	70.00
IRDE	-	-	-	-	27.00
ITM	06.00	08.00	11.00	15.00	16.00
LRDE	25.00	45.00	59.00	67.00	70.00
MTRDC	05.60	06.35	07.40	07.11	04.90
SSPL	-	-	-	-	27.00
TBRL	06.00	08.75	22.00	20.00	20.00
VRDE	-	-	-	-	10.00

It is observed from table 5.15 that there is a gradual increase in the annual expenditure of funds from 1996/97 to 2000/01 in all libraries except CASSA, DFRL, and MTRDC where a decrease is noticed in the year 2000/01 by Rs.1.13 lakhs, Rs.46, 000/- and Rs.2.21 lakhs respectively. In CEMILAC during the year 98/99 a decrease of Rs. 5000/-is found which could be considered negligible. It is therefore inferred that in all DRDO libraries, with very few exceptions as mentioned above, there is an increase in the annual expenditure of funds.It is also observed from the above table that the range of expenditure varies from 2.60 lakhs to 131 lakhs for the year 2000/01. DRDL has expended the largest amount of Rs.131.00 lakhs and CEMILAC has the smallest expenditure of Rs 2.60 lakhs. It is found that no specific criteria are followed for the allocation or expenditure of funds.

5.4.3. Item wise expenditure for the Year 2000/2001 in lakhs

Analysis of item wise expenditure of funds by the library reveals the importance of the items to the library. The librarians were asked to provide the details of distribution of funds to the important and major items like books & book like materials (which includes reports, standards and specifications), Journals, CD ROM databases, audio / video CDs, binding and equipments, for the last five years from 1996/97 to 2000/01. Only very few libraries provided the data for all five years. Accounts of item wise fund expenditure for the year 2000/2001 are given in table 5.16.

Table 5.16 Item wise expenditure of funds for the year 2000-2001 in lakhs

Name of Estt	Books & book like materials	%	Journals	%	CD ROM	Audio/Video Tapes & CDs	Binding	Equipments
ADE	05.09	14.14	23.02	63.94	06.72	-	00.25	-
ADRDE	02.15	26.88	05.60	70.00	-	-	-	-
ARDE	09.882	37.77	12.70	48.85	-	-	-	-
CABS	03.25	18.57	13.25	75.71	-	-	-	-
CAIR	05.50	23.91	17.50	76.09	-	-	-	-
CASSA	01.85	44.07	02.34	55.83	00.025	-	-	-
CEMILAC	01.79	68.92	00.81	31.07	00.50	-	-	-
CVRDE	09.31	65.43	04.64	32.60	-	-	00.15	10.00 Computers
DEAL	08.25	20.63	28.00	70.00	-	-	-	-
DEBEL	01.25	25.00	03.50	70.00	-	-	-	-
DFRL	00.80	05.20	12.93	84.07	01.65	-	00.15	-
DLJ	11.25	25.00	31.85	70.78	01.50	-	00.20	-
DMRL	15.00	20.00	56.25	75.00	-	-	-	-
DMSRDE	12.25	20.42	42.00	70.00	-	-	-	-
DRDE	03.17	21.13	10.50	70.00	-	-	-	-
DRDL	24.20	18.47	64.00	48.85	20.00	05.00	00.90	11.00
GTR	01.40	03.89	34.40	95.56	02.25	-	-	-
HEMRL	06.00	42.86	08.00	57.14	-	-	-	-
IAT	14.60	20.86	48.75	69.64	-	-	-	-
IRDE	05.40	20.00	18.90	70.00	-	-	-	-
ITM	03.75	23.44	11.40	71.25	-	-	00.10	-
LRDE	22.00	31.43	28.00	40.00	11.50	-	-	-
MTRDC	01.02	20.79	03.82	77.92	-	-	-	-
SSPL	05.40	20.00	18.75	69.44	-	-	-	-
TBRL	03.50	17.50	14.80	74.00	-	-	00.15	-
VRDE	02.25	22.50	06.90	69.00	-	-	-	-

5.4.3.1. Books, Reports, Standards & Specifications

Percentage of funds expended for books and book like materials ranged from approximately 3.89% to 68.92% of the total amount and are found to be in the second place in all libraries except in CEMILAC and CVRDE. Table 5.17 gives the break up of libraries based on the percentage of total funds used for books and book like materials.

Table 5.17 Distribution of libraries by expenditure on books and book like materials

Percentage slab	No. of libraries	Percentage
Less than 20 %	6	23.08
20-40%	16	61.54
Above 40%	4	15.38
Total	26	100.00

It is evident from table 5.17 that sixteen libraries are spending 20-40% of the total expenditure on books and book like materials. Six libraries spend less than 20%. It is also observed that four libraries spend more than 40% of the total expenditure for the same purpose. CEMILAC and CVRDE have the highest percentage of expenditure on books with 68.92% and 65.43% respectively. GTRE and DFRL have the lowest expenditure on books with 3.89% and 5.20% respectively.

5.4.3.2. Journals

It is observed from table 5.16 that all the libraries except two have spent the major share of funds for journals. Table 5.18 gives the distribution of libraries by percentage of total funds expended on journal subscription.

Table 5.18 Distribution of libraries by expenditure on journals

Percentage slab	No. of libraries	Percentage
Less than 40 %	2	07.69
40-60 %	5	19.23
61-80 %	17	65.39
Above 80	2	07.69
Total	26	100.00

It is found that seventeen libraries spend 61% to 80% of the annual library fund on subscription to journals while five libraries are found to spend 40% to 60%. GTRE and DFRL fall in the upper bracket having spent the highest percentage of 95.56% and 84.07% of funds respectively for journals. CVRDE and CEMILAC have spent the lowest percentage of 32.60% and 31.07% of funds respectively (table 5.16). It is observed from table 5.18 that the amount spent on journals is enormously high when compared to books and book like materials. Being special libraries serving special clientele who are engaged in research in specific programme of national defence, the procurement is more inclined towards journals.

Only six of the twenty-six laboratories have shown the amount spent separately for Indian and foreign journals as requested. The responses of these libraries reveal that Indian journals are procured for a very meagre amount ranging from Rs. 5,000/- to Rs. 50,000/-. It shows the importance of foreign journals to the defence scientists.

5.4.3.3. Compact Discs

It is observed from the table 5.16 that only eight out of the twenty-six libraries have expended funds on the purchase of CDs during 2000/2001.

Table 5.19 Expenditure on purchase of CDs

Library	Amount spent	Remarks
ADE	6,72,000.00	Database
CASSA	2500.00	Full text
CEMILAC	50,000.00	Standards
DFRL	1,65,000.00	Database & standards
DLJ	1,50,000.00	Database
DRDL	20,00,000.00	Database & Standards
GTRE	2,25,000.00	Database
LRDE	11,50,000.00	Data base & full text

Table 5.19 gives the details of the amount spent on CDs by the laboratories. It is found that DRDL and LRDE have spent twenty lakhs and eleven lakhs and fifty thousand rupees respectively for procurement of CDs, where as CASSA has purchased CDs worth Rs 2500/- only. Major share of the amount is spent on procurement of databases and standards on CDs. CASSA and LRDE have purchased full text CDs as well.

5.4.3.4. Binding

In most of the DRDO libraries binding is outsourced. Only seven libraries have responded to this question. It is observed that binding is not done on a regular basis. In most of the libraries it is done once in three to five years or as and when need arises. It is also seen that binding is carried out on an annual basis only by DFRL, spending around Rs. 10,000/- annually. Binding under library budget (under LP) should not exceed Rs.15,000/- at one time. However binders have to be registered as in the case of supply of books.

5.4.3.5. Equipments

Since equipments are procured from the General budget (under Build-Up) of the laboratory the library has no details about the expenditure on equipments. However CVRDE and DRDL are found to have spent Rs.10.00 lakhs and Rs.11.00 lakhs respectively for procurement of computers during 2000/01 from additional funds allotted to them by the laboratory for the purpose of library automation.

5.5. MANPOWER

The efficiency of a library largely depends upon the competence of its personnel. Well-motivated and qualified personnel with innovative capability and managerial ability working with a team spirit will contribute towards the success of the library. The erstwhile concept of viewing librarianship as a vocation requiring only vocational skills is no more valid. With the emergence of information technology and its applications in library operations like acquisition, storage, processing and dissemination of information, the library requires qualified and competent personnel with specialized knowledge of subject fields, capable of rendering various information services and managerial skills. The varied and complicated services of a modern research library need to be organized and collected by a person of competence and expertise, who has a sound knowledge of the tools and techniques of the library profession.

It is observed that the DRDO laboratories have well streamlined procedures for recruitment of required manpower. Recruitment and Assessment Centre (RAC) is responsible to recruit officers based on Defence Research and Development Service (DRDS) rules. In the case of non-officers

the Head of the Establishment is empowered to recruit the required staff as per Defence Research Training Centre (DRTC) procedures. The various means of publicity resorted to for recruitment are open advertisement, newspaper advertisement and through employment exchange.

5.5.1. DRDO Staff Formula

There are various staff formulae available for the calculation of the number of staff required for each library function. The DRDO has worked out standard library unit with the help of formulae derived for the various activities and functions performed by an information unit (Rangra 1986). For calculating performance a standard workload and manpower had been taken into consideration, which is considered adequate in quality and quantity on the basis of consensus and called it as Standard Library Unit (SLU). A SLU is defined to have the following manpower for completing a standard workload and functions.

Manpower	No. of persons
Officer in charge	1
Officer	1
Scientific/technical staff	1
Secretarial staff	1
Maintenance/operating staff	1

Total	5

The officers and scientific/technical staff are to be professionally qualified constituting two (2) professionals and two (2) non-professionals as secretarial and maintenance staff.

5.5.2. Manpower Details of DRDO Libraries

The question on manpower was designed with a view to extract maximum information like number of professionals, semi professionals and non- professionals, posted to the library, details of apprentice training, and refresher courses / CEP, etc. The librarians were also required to answer whether the existing staff was adequate enough. Twenty-four out of the twenty-six libraries responded to the question. Two libraries, DMSRDE and SSPL have left this part of the query blank. The manpower details of the twenty-four libraries are summarized in table 5.20.

Table 5.20 Manpower details of DRDO libraries

Library	Number of professionals	Number of Semi-professionals	Number of non- professionals
CAIR	0	0	1
CEMILAC	1	0	0
MTRDC	1	0	0
CASSA	1	1	1
DFRL	1	0	2
ITM	1	1	2
DEAL	1	2	4
DEBEL	2	0	1
CABS	2	0	2
VRDE	2	2	3
IRDE	2	2	5
ADRDE	2	2	5
LRDE	2	13	9
TBRL	3	2	3
DLJ	3	2	4
DMRL	3	5	4
HEMRL	5	0	3
DRDE	5	5	2
IAT	6	2	9
GTRE	7	0	2
ARDE	7	2	2
DRDL	9	7	14
CVRDE	10	0	2
ADE	10	2	2
TOTAL	86	50	82

Table 5.21 Distribution of libraries by total number of staff

Staff	Libraries	Percentage
5 and below	08	30.77
6 to 10	08	30.77
11 to 15	05	19.23
Above 15	03	11.54
Not responded	02	07.69
Total	26	100.00

It is found from tables 5.20 & 5.21 that there are three libraries, each of which is managed by a single staff. Five libraries have below five staff members while eight libraries have up to ten staff, where as another equal number of libraries have above ten staff. Minimum and maximum number of staff in the libraries surveyed were 1 and 30 respectively.

In the twenty-four libraries that responded, the total number of professionals, semi-professionals and non-professionals are found to be 86, 50 and 82 respectively (table 5.20). There is no professional or semi-professional in one library (CAIR) and the library is managed by a non-professional. A single professional without any other supporting staff manages CEMILAC and MTRDC. ADE and CVRDE have the highest number of 10 professionals each where as LRDE has the highest number of 13 semi-professionals. DRDE has the highest number of 14 non-professionals.

Table 5.22 Proportion of staff: Professional, Semi- professional and Non- professional

No.of staff	No.of libraries having			Total staff
	Professional	Semi-Professional	Non-Professional	
Nil	1	9	2	00
1	6	2	3	11
2	6	9	8	46
3	3	0	3	18
4	0	0	3	12
5	2	2	2	30
6	1	0	0	06
7	2	1	0	21
8	0	0	0	00
9	1	0	2	27
10	2*	0	0	20
Above 10	0	1**	1**	27
Total	24	24	24	218

* CVRDE&ADE have 10 professionals each

** LRDE has 13 semi-professionals and DRDE has 14 non-professionals

It is evident from table 5.22 that there is one library without any professional, nine libraries without any semi-professionals and two libraries with no non-professionals. Similarly there are six libraries with one professional, two libraries with one semi-professional and three libraries with one non-professional accounting for a total of 11 staff. Again there are six libraries posted with two professionals, nine libraries with two semi-professionals and eight libraries with two non-professionals each accounting for a total of 46 staff. The details in table 5.22 accounts for the 218 staff posted to the 24 libraries (table 5.20).

The ratio of qualified library professionals to scientists in the twenty-four libraries is presented in table 5.23.

Table 5.23 Ratio of library Professionals to Scientists

Library	No. of scientists	Ratio	Library	No. of scientists	Ratio
CAIR	58	0	LRDE	207	1:103
CEMILAC	19	1:19	TBRL	87	1:29
MTRDC	28	1:28	DLJ	74	1:25
CASSA	31	1:31	DMRL	157	1:52
DFRL	19	1:19	HEMRL	153	1:30
ITM	9	1:9	DRDE	60	1:12
DEAL	152	1:152	IAT	32	1:5
DEBEL	26	1:13	GTRE	291	1:41
CABS	34	1:17	ARDE	200	1:29
VRDE	31	1:16	DRDL	337	1:37
IRDE	144	1:72	CVRDE	162	1:16
ADRDE	31	1:16	ADE	292	1:29

The average ratio of library professional to scientists in the twenty-four DRDO establishments is 1: 35. CAIR does not have a professional. From table 5.23 it is found that that six libraries fall below the average proportion with DEAL and LRDE at the top with a low ratio of 1:152 and 1:103 respectively. IAT and ITM have a sound ratio of 1: 5 and 1: 9 respectively.

Qualified professionals, competent in computer applications are a basic requirement today, for the smooth functioning and efficient discharge of the library services to the fulfilment of its objectives. To the query on the adequacy of staff posted in the libraries, nine librarians (31.61%) have stated that the present strength is adequate where as fifteen librarians (57.69%) have stated that the existing staff strength is inadequate. It is observed from tables 5.20 to 5.23 that great disparity exists among the libraries, both in the

proportion of the professionals, semi professionals, and non-professionals and also in the ratio of qualified professionals to scientists.

5.5.3. Apprentice Training

Responses to the question regarding apprentice training revealed that this scheme is not very popular among DRDO, particularly in the field of Library and Information Science. It was found that the Head of the Laboratory could engage apprentices for a period of one year. The laboratories have to approach the concerned Regional Office of the Board of Apprentice Training for engaging apprentices. Only six libraries (23.08%) have engaged apprentices while eighteen libraries (69.23%) do not have apprentice-training schemes in their schedule.

5.5.4. In- Service Training

Twenty-one libraries have been found to depute their staff for refresher courses / CEP (Continuing Education Programme) and other various courses where as three libraries do not have such programmes in their schedule. Table 5.24 gives details of the library staff deputed for various courses during the last five years.

Table 5.24 Distribution of libraries by deputation of staff for courses

Courses	No. of libraries	Percentage
Below 5	7	26.92
5 to 10	7	26.92
11 to 20	6	23.08
Above 20	1	03.85
Nil	3	11.54
No response	2	07.69
Total	26	100.00

It is found that during the block period of five years from 1996/97-2000/01, seven libraries had sent up to ten staff members on various courses

while six libraries sent up to twenty staff. In seven libraries only below five staff members were deputed for courses. DRDL had sent twenty-five staff members on course during this period. Three libraries had not sent any staff on course.

5.6. MATERIALS (Equipments)

Equipments available in a library depend on the services offered and the type of resources held. In the modern IT environment state of the art equipments play a vital role in information transfer. With a view to assess the availability of these equipments and their use in DRDO libraries the data of the equipment holdings were obtained from the libraries. Equipments were grouped into two viz, computer equipments and others. Only nineteen librarians responded to this part of the question and that too partially. Table 5.25 presents the equipment holdings of these libraries.

Table 5.25 Equipment holdings of libraries

Name of laboratory	Computer equipments				Other equipments		
	Computers	Printers	CD writer	Scanner	Photo-copier	Microfiche Reader/Printer	Bar code Reader
ADE	6	7	1	1	1	2	2
ARDE	16	11	-	-	1	1	1
CABS	2	2	-	-	1	-	-
CAIR	2	2	-	-	1	-	-
CASSA	2	1	-	-	-	-	-
CEMILAC	2	2	1	1	1	-	-
CVRDE	6	5	1	1	1	-	1
DEBEL	4	-	-	-	1	-	-
DFRL	2	2	1	-	1	-	-
DLJ	4	4	-	-	1	1	-
DRDE	7	-	-	1	1	-	-
DRDL	11	6	1	1	2	2	1
GTRE	8	5	1	1	1	1	-
HEMRL	9	6	1	1	1	-	-
IAT	6	4	-	1	1	1	-
ITM	2	1	1	1	1	-	-
LRDE	8	9	1	2	4	-	2
MTRDC	4	1	-	-	1	-	-
TBRL	4	1	-	-	1	1	-

5.6.1. Computer Equipments

All the nineteen laboratories that responded hold computer systems of various configurations and other computer equipments, suiting to their requirements. It is found that ARDE has the maximum of sixteen systems followed by DRDL with eleven and HEMRL with nine systems. It has been observed that DRDE has seven systems with twenty-four nodes. ARDE holds the maximum of eleven printers, whereas LRDE has nine and ADE has seven printers.

LRDE has jukebox and tower of changers connected to LAN / Intranet for CD/DVD ROM search facility.

5.6.2. Other Equipments

General equipments like bookracks, reading tables, chairs, etc are found to be adequate. It is evident from the details that eighteen libraries have photocopiers and seven libraries have microfiche reader / printer. Only ADE, ARDE, CVRDE, DRDL and LRDE have Bar code readers. DRDL and LRDE also have DTP units. DRDL, LRDE and TBRL are the libraries with lamination facility.

5.7. READING MATERIALS

Planned and systematic development of a collection catering to the information requirements of the defence scientists of the parent laboratories is the prime responsibility of the DRDO libraries. The quality and variety of the collection and the subjects covered depend on the R&D activities undertaken by the parent laboratory. The quality of collection will earn respect for the library. The DRDO libraries, being special libraries, require comparatively less number of books and more emphasis is given for journals, reports and standards/specifications. Bound volumes of journals constitute a big collection of these libraries. Table 5.26 gives the details of the various collections of the DRDO libraries under study.

Table 5.26 Collection details of DRDO libraries under study

Name of Estt	Books	Reports	Standard/ Specifications	Bound Vol. of Journals	Micro-forms	Audio/ Video CD	CD ROM Database	Full text CD	Journals Subscribed for 2000-01
ADE	18081	3198	3000	11420	7000	115	03	0	200
ADRDE	3434	1602	3690	1027	0	0	0	0	60
ARDE	19000	15000	7000	5500	400	250	3	0	146
CABS	4200	626	496	600	0	0	0	0	70
CAIR	2300	300	300	100	0	0	0	0	100
CASSA	4532	659	500	1563	0	13	0	*	43
CEMILAC	3250	528	456+	200	0	0	1	*	40
CVRDE	9779	3676	11753	2991	0	0	6	4	90+5 on CD
DEAL	6000	6000	1000	8000	0	0	1	0	108
DEBEL	4150	725	800	3000	0	0	0	0	47
DFRL	5600	453	253+	5300	0	0	1	0	72
DLJ	15000	500	300	12000	200	0	2	10	114+5 on line
DMRL	32000	468	0	10000	0	100	3	0	130
DMSRDE	20600	320	3000	20000	0	0	1	0	129
DRDE	18266	215	0	11500	0	10	2	0	107
DRDL	25280	15404	12564+	11094	2703	1105	8	8	204
GTRE	7662	11184	3006	6034	771	15	1	4	143
HEMRL	8300	10000	5000	6000	0	0	1	150	90
IAT	43000	16467	1000	23400	4019	312	1	0	167
IRDE	1200	600	5000	8000	50	100	0	0	108
ITM	12918	345	0	1512	0	0	7	0	46
LRDE	17500	8500	2000	8000	0	0	3	85	235
MTRDC	2259	100	130	1508	0	70	0	0	31
SSPL	11000	300	50	12000	0	0	0	0	61
TBRL	5870	8300	1250	4648	212	30	55	0	91
VRDE	9800	161	0	1500	0	0	0	0	80

* Amount expended for procurement but holding not specified.

+ Standards and specifications in CDs are also held.

Item wise analysis of the data received from the librarians on collection is given in the succeeding paragraphs.

5.7.1. Books

The book collections of DRDO libraries are meant for the scientists working on R&D activities of the parent laboratory. Each laboratory has specific areas of subject specialisation and hence the collection of books is comparatively lower than other libraries. The libraries under survey are classified into six groups on the basis of collection of books, which is presented in table 5.27.

Table 5.27 Distribution of libraries by number of books

Books	No. of libraries	Percentage
Below 2000	01	03.85
2001-5000	07	26.92
5001- 10000	07	26.92
10001-15000	03	11.55
15001-20000	04	15.38
20000 and above	04	15.38
Total	26	100.00

From table 5.27 it is found that only one library has a collection of below 2000 books. More than 50% of libraries have collection between 2000 to 10000 books. Seven libraries have collection between 10000 to 20000 books and four libraries have more than 20000. Eighteen libraries (69.23%) have collection above 5000 books that can be accepted as reasonable holding for a research library. IRDE has the smallest collection of 1200 books. But it has a very good collection of standards and specifications (5000) and bound

volumes (8000). Being an instrument research and development laboratory it requires standards and specifications and journals more for their research activities than books. IAT has the largest collection of 43000 books. It is a training institute and conducts courses on basic science and technology and in advanced fields of specialization as approved by the government from time to time and undertakes basic and applied research in defence science. Hence it has a good collection of all kinds of resources for its clientele.

5.7.2. Reports

Reports can be categorized as sources of information for project works in progress or recently completed. The distribution of libraries by number of reports is presented in table 5.28.

Table 5.28 Distribution of libraries by number of reports

Reports	No. of libraries	Percentage
Below 1000	15	57.69
1001-5000	03	11.54
5001-10000	04	15.39
10001-15000	02	07.69
Above 15000	02	07.69
Total	26	100.00

From table 5.28 it is found that a greater percentage of 57.69% of the libraries are having less than 1000 reports, 26.92% are having between 1000 to 10000 reports and 15.39% are holding above 10000 reports. DRDE has the smallest collection of 215 reports and IAT has the largest collection of 16467 reports (table 5.27). The reasons for less number of reports in the collection in most of the libraries may be due to the fact that many reports are considered to be confidential documents and hence maintained by the concerned division for restricted use. However, it was also observed that some libraries have a collection of classified documents also.

5.7.3. Standards and Specifications

DRDO laboratories are committed to research in design and development of numerous equipments and gadgets to be inducted into the defence services. These items must be of a very high quality and must sustain the rough and tumble of war. Stringent measures of control and testing are ensured at every stage of design and development. Standards and specifications are set rules and regulations concerning testing, terminologies, definitions and symbols, performances and quality, etc required and used at every stage of design and development. They are also important in influencing and specifying degrees of quality and levels of safety. They include national and international standards. The distribution of libraries on the basis of collection of standards and specifications is given in table 5.29.

Table 5. 29 Distribution of libraries by number of standards & specifications

Standards & specifications	No. of libraries	Percentage
Below 2000	13	50.00
2001-5000	6	23.07
Above 5000	3	11.54
No response	4	15.39
Total	26	100.00

Table 5.29 reveals that 50% of the libraries have below 2000 standards / specifications. A smaller percentage of 23.07% of the libraries are found to have a collection of 2000 to 5000, while 11.54% of the libraries have a collection of above 5000. It has also been observed that DRDL, CVRDE, and ARDE have a collection of 12564, 11753 and 7000 standards & specification respectively. DMRL, DRDE, ITM and VRDE did not respond to this query.

CEMILAC, DFRL and DRDL have standards and specifications in CDs as well.

5.7.4. Bound Volumes of Journals

Journals as source of latest information on developments in every field assume much significance in research and development organisations. Bound volumes of journals form a major collection of DRDO libraries. The distribution of libraries by number of bound volumes is given in table 5.30.

Table 5.30 Distribution of libraries by number of bound volumes

Bound volumes	No. of libraries	Percentage
Below 2000	8	30.77
2001-5000	2	07.69
5001-10000	8	30.77
10001-20000	6	23.08
Above 20000	2	07.69
Total	26	100.00

The collections of bound volumes of journals in a particular laboratory are rich on its areas of specialization. Generally old libraries are found to have more bound volumes in their collection. Table 5.30 reveals that 30.77% of the libraries are having up to 2000 bound volumes where as another 30.77% of libraries have between 5000 to 10000 volumes. CVRDE, DMSRDE and IAT have more than 20000 bound volumes of journals (table 5.26).

5.7.5. Microforms

Microfilming of reports and back issues of journals in particular is undertaken mainly for convenience of storage, maintenance and ease of

transmission. Only eight libraries are found to have microform collection, which range from 50 to 7000. They are ADE - 7000, ARDE - 400, DLJ - 200, DRDL - 2703, GTRE - 771, IAT - 4019, IRDE - 50 and TBRL - 212 (table 5.26).

5.7.6. Audio / Video CDs

The collection of audio / video CDs by the libraries was found to be very negligible. Only ten libraries are having this collection. It is found that DRDL has the largest collection of 1105 audio / video CDs while CASSA has the smallest collection of 13 (table 5.26).

5.7.7. CD-ROM products

Indices, abstracts and full text CDs including multi-volume reference works such as statistical information, almanac information, maps, pictures, etc. are now available in CD ROM format. The most significant advantage of CD-ROM is that it can contain huge volumes of digital information in one disc. It also has the advantage of being mounted on a local area network to serve a larger clientele. Most of the libraries are found to have a collection of CD ROM products.

The holding of CD-ROM databases is very meagre. It is observed that TBRL has the maximum of 55 CD ROM databases where as DRDL has 8 and ITM 7. CVRDE has 6, ADRDE, DMRL and LRDE have 3 each and DLJ has 2. CEMILAC, DEAL, DFRL, DMSRDE, GTRE, HEMRL and IAT have one each (table 5.26).

5.7.8. Full Text CDs

Only eight libraries are found to have full text CDs. HEMRL has maximum of 150 full text CDs, followed by LRDE with 85. DLJ has 10, DRDL 8 and CVRDE and GTRE have 4 each (table 5.26). CASSA and CEMILAC have expended on procurement of full text CDs but have not furnished the details of holdings.

5.7.9. Current Journals

Journals are more vital to the work of research organisations as they contain nascent information and research data on experiments. In the field of research in defence science the pace of obsolescence of knowledge is faster. Hence the periodicals containing recent and relevant information play a major role in satisfying the information needs of the defence scientists. Distribution of libraries by number of journals is given in table 5.31.

Table 5.31 Distribution of libraries by number of journals

Journals	No. of libraries	Percentage
01- 50	5	19.23
51 - 100	9	34.62
101 - 150	7	26.92
151-200	3	11.54
Above 200	2	07.69
Total	26	100.00

Table 5.31 reveals that twenty-one libraries (80.77%) subscribe to more than fifty journals. Twelve libraries (46.15%) subscribe to more than 100 journals. LRDE is found to subscribe to the largest number of 235 journals. It is observed that DLJ has five online journals. CVRDE, has five journals on CD format while ADE, has one journal on CD. The libraries that subscribe to below 50 journals are CASSA (43), CEMILAC (40), DEBEL (47), ITM (46) and MTRDC (31), all of which are comparatively smaller laboratories.

5.7.10. Collection and Year of Establishment

To ascertain whether there is any proportional relation between the age of the library and the net collection, the collection details of books, reports/standards/specifications, bound volumes of journals, and microforms as on 01.04.2001 were correlated with the year of establishment of the library, as in table 5.32.

Table 5.32 Year of establishment and collection of the library

Library	Year of Establishment	Books	Reports/standards/Specifications	Bound vols. of Journals	Microforms
DRDE	1947	18266	215	11500	0
ADE	1952	18081	6198	11420	7000
IAT	1952	43000	17467	23400	4019
DMRL	1958	32000	0	10000	0
ARDE	1958	19000	22000	5500	400
GTRE	1958	7662	14190	6034	771
LRDE	1958	17500	10500	8000	0
DLJ	1959	15000	800	12000	200
IRDE	1960	1200	5600	8000	50
SSPL	1961	11000	350	12000	0
DFRL	1962	5600	453	5300	0
DRDL	1962	25280	27968	11094	2703
HEMRL	1962	8300	15000	6000	0
ITM	1962	12918	0	1512	0
ADRDE	1965	3434	5292	1027	0
VRDE	1965	9800	0	1500	0
TBRL	1968	5870	9550	4648	212
CASSA	1972	4532	1159	1563	0
CVRDE	1975	9779	15429	2991	0
DEAL	1976	6000	7000	8000	0
DMSRDE	1976	20600	3320	20000	0
DEBEL	1982	4150	925	3000	0
CABS	1984	4200	1122	600	0
MTRDC	1985	2259	230	1508	0
CAIR	1986	2300	600	100	0
CEMILAC	1994	3250	928	200	0

A scrutiny of table 5.32 reveals that CABS established in 1984 has a collection of 4200 books while GTRE established in 1958 has a collection of only 7662 books. But GTRE has a very good collection of reports and standards (14190). DFRL established in 1962 has a book collection of 5600 and 453 reports.

It is observed that IAT, established in 1952, has the largest collection of 43000 books and 23400 bound volumes of journals. It has a very good collection of reports & standards and microforms as well. IAT is one of the oldest establishments under study and is also a training institute.

DRDL established in 1962 is found to have the largest collection of reports / standards & specifications (27968) followed by ARDE (22000) and GTRE (14190) both established in 1958.

It is observed that only the oldest establishments have a good collection of microforms. ADE, one of the oldest establishments under study, established in 1952 has the largest number of microforms - 7000 - followed by DRDL (1962), which has 2703 microforms. GTRE and ARDE established in 1958 have a collection of 771 and 400 respectively. Growth of the various collections is found to depend on the R&D activities undertaken by the laboratory than on the age of the libraries.

5.7.11. Growth Rate of Collection

With a view to assess the growth rate of collection the respondents were asked to furnish the number of the various items added to their collection during the last five years. Only twelve out of twenty-six libraries

responded and that too only details of books (including reports and standards) were furnished. The details are shown in table 5.33

Table 5.33 Growth rate of book collection

Library	1996/97	1997/98	1998/99	1999/00	2000/01	Average
ADE	221	262	264	338	345	286
ARDE	337	360	226	480	450	370
CASSA	233	241	313	282	324	276
CEMILAC	138	160	279	140	80	159
CVRDE	760	345	369	601	230	461
DEBEL	135	110	237	202	325	202
DLJ	328	351	334	369	362	348
GTRE	213	177	208	246	150	199
.ITM	235	412	654	850	1225	675
LRDE	457	594	720	880	965	723
MTRDC	55	122	115	80	90	92
TBRL	198	263	396	391	393	328

From table 5.33 it is observed that six out of the twelve libraries have an annual increase of less than 300 books in a year with MTRDC having the lowest average growth of 92 books. LRDE has the highest average addition of 723 books followed by ITM with 675 additions every year. Though very marginal, it is found that ADE has also shown sustained increase in its collection. All other libraries are found to have undulating figures. It may be because books are not bought in anticipation. Only when a particular book is demanded by the parent laboratory or the user scientist it is procured. Hence books added per year are comparatively less. The number of scientists in the laboratory may also play an important role, in the development of collections.

5.8. INFORMATION SERVICES

The quality and efficiency of a library can be gauged from the information services provided by the library. The growth of defence literature in all its diversity has necessitated the introduction of a number of services for the effective dissemination of information on defence science and technology to the scientists working on various projects in the DRDO laboratories. The extent of such services may vary from library to library depending upon the objectives of the library, its size, number of users to be served, availability of skilled and competent manpower and information resources. All employees of the laboratories have free access to the library by applying for membership.

5.8.1. Access to the Library

All the DRDO libraries follow open access system. However, classified documents of secret, confidential or restricted nature are kept under closed access.

5.8.2. Library Working Hours

The ideal frame of working hours for any library will be the one that spreads beyond the normal working hours of the establishment, which will enable the members to find adequate time to frequent the library. Librarians were asked to mention the working hours of the library as well as the laboratory so as to have comparison between them. It is noted that no uniform timings have been laid down for the functioning of the various DRDO libraries. The Directors are entrusted with the authority to decide the timings as per local requirements. It is observed that the DRDO libraries generally remain closed on all national holidays, Saturdays, Sundays and any other holidays declared by the central / state governments from time to time.

Responses reveal that the working hours of the DRDO laboratories span to eight hours plus a lunch break of fifteen to thirty minutes. It is found that the commencement of office hours of the laboratories is spread out from 07:30 to 09:00 AM in the various laboratories and end accordingly from 4:00 to 5:30 PM. The working time of the library and the laboratory are the same, which has been stated as inconvenient by many of the user scientists as they are unable to leave their normal work and spend time in the library. Data shows that even though Saturdays are holidays for the DRDO laboratories, nine out of the twenty-six libraries (34.62%) function on Saturdays, to allow time to the clientele to avail the services of the library without any hindrance. DRDL is found to be the only library that works two shifts, from 8:30 AM to 8:30 PM. All DRDO libraries are closed on Sundays.

5.8.3. Membership

Restricted membership restricts the number of users and thereby limits the use of the services of the library. In DRDO libraries membership is open to all the regular employees of the laboratory. It is observed that no membership fee is levied. Membership is also given at the discretion of the Head of the Laboratory to others as special cases for a specific period of time.

On enrolment as members, the identity card and the borrowers' tickets are issued to them. Librarians were requested to furnish details regarding the number of borrowers tickets issued to the various categories of employees of the laboratory viz, Scientists, Technical officers, Technical assistants and Technicians. Only seven libraries complied with this request, which is tabulated in table 5.34

Table 5.34 Number of borrower's tickets issued

DRDO laboratory	Scientists	Technical officers	Technical assistants	Technicians
ADE	10	10	6	2
DFRL	5	5	5	2
DLJ	6	6	6	6
DRDL	3	3	3	3
GTRE	10	10	5	5
ITM	10	10	0	0
LRDE	5	5	5	5

From table 5.34 it is observed that the number of borrower's tickets issued to the members differs in the various DRDO laboratories. It is also noted that the number of tickets issued to the different categories of employees of a laboratory also differs. Scientists and Technical Officers are given more number of borrowers' tickets. In ITM library technical assistants and technicians are not given borrowers tickets while in DLJ, DRDL and LRDE it is observed that all categories of employees are given equal number of tickets.

ADE librarian has mentioned that out of the ten tickets issued to scientists and technical officers four are book tickets, four report tickets and two journal tickets. Out of the six tickets issued to technical assistants four are for books and two for journals. Technicians are issued two book tickets only. It is also mentioned that different colours differentiate the different tickets.

It is found that visitors' register is maintained by twenty-three libraries (88.46%) while three libraries do not.

5.8.4. User Orientation

The best of services provided by a library will be of no use unless the users are aware of them and know how to avail them. User orientation is intended to familiarize users with the library and the availability of and procedures for using the library resources and services relevant to their requirements. Therefore, library orientation is an important factor in making the user-library interface more productive.

The librarians were asked to state whether orientation is given to the members of the library. Responses revealed that twelve libraries (46.15%) offer user orientation while the remaining fourteen do not. Librarians and many of the users have expressed the need for initiation to the library and library services.

5.8.5. Use Statistics

Statistics help in judging the progress or regress in the performance of a library when compared with the past. It also helps in comparing the library performance with other libraries having similar functions so that improvements can be made wherever deficiencies are identified. The use statistics of a library comprising of the number of users visiting the library per day and the number of issues and consultations per day gives a clear picture of the utilization of the resources of the library, which in turn reflects the quality of the resources and services provided by the library.

5.8.5.1. Average users per day

The number of regular users has a great influence on the quality of the resources and services of the library. The demands of these users help the

libraries to keep on improving. The data collected in this regard is presented in table 5.35.

Table: 5.35 Average users per day

Users per day	No. of libraries	Percentage
Below 25	3	11.54
25-50	9	34.62
51-75	8	30.77
76-100	2	07.69
Above 100	4	15.38
Total	26	100.00

It is found from table 5.35 that twelve libraries (46.16%) have up to fifty users on an average per day while the remaining fourteen libraries (53.84%) have above fifty. It is also observed that four libraries (15.38%) have more than hundred users per day. They are ADE, CVRDE, DRDL and LRDE. The variations in the average number of regular users may be due to factors like number of employees in the organisation, nature of work, facilities available in the library etc. Smaller laboratories have less number of scientists when compared to bigger laboratories.

5.8.5.2. Average issues per day

The use of libraries by scientists in terms of number of library materials borrowed was examined. Actual use made of the library collection and demand for different categories of documents can be known from the borrowing pattern of the scientists. Hence the librarians were asked to specify the number of materials borrowed on an average per day. Table 5.36 gives

data regarding the average number of items borrowed per day in the twenty-six libraries.

Table 5.36 Average issues per day

Issues per day	No. of libraries	Percentage
Below 25	10	38.46
25-50	08	30.77
Above 50	08	30.77
Total	26	100.00

It is observed from table 5.36 that sixteen libraries (61.54%) have more than twenty-five issues per day while ten libraries (38.46%) have less than twenty-five. Eight libraries (30.77%) have more than fifty issues per day.

5.8.5.3. Average consultations per day

The details of average consultation of reading materials per day is given in table 5.37

Table 5.37 Average consultations per day

Consultations	No. of libraries	Percentage
Below 25	07	26.92
25-50	15	57.69
51-75	03	11.54
Above 75	01	03.85
Total	26	100.00

From table 5.37 it is found that a greater percentage of libraries (57.69%) have between twenty-five to fifty consultations per day. A lesser percentage of seven libraries (26.92%) have an average of less than twenty-

five consultations, while four libraries (15.38%) have more than fifty consultations per day. CVRDE is the only library having more than seventy-five consultations on an average per day.

It is observed that the libraries that have less number of users / issues / consultations per day are comparatively the smaller libraries with smaller user population.

5.8.6. Circulation Service

The processes and services, which result in bringing users and the resources of the library into productive relationship is the most important function of the circulation system. Users often judge the library and its administration by the general atmosphere and level of service at the circulation desk. Circulation section is responsible for issue of membership, loan services, and public relation functions. Organisation of the section depends on the size of the library, scope of its work, and the degree of departmentalisation of the library. In small libraries with less number of staff most of the functions of the library are performed by this section.

5.8.6.1. Loan period

Responses to the question on the loan period of documents revealed that there is no set pattern or policy followed by the DRDO libraries in the period of loan for the issue of different materials of the library. All books, except confidential publications are issued. In most of the DRDO libraries even reference books and journals are issued for one day and one week respectively, to cater to the information requirements of the scientists. The data obtained from the librarians on the period of loan of the various categories of documents are presented in table 5.38.

Table 5.38 Loan period of different reading materials

Library	Books	Reference books	Theses/ Dissertations	Reports/ Standards/ Specifications	Loose Issue Journals	Bound Vol. Journals
ADE	30 days	01 day	01 day	30 days	01 day	01 day
ARDE	30	01	02	30	07	15
CAIR	15	Not Issued	Not Issued	Not Issued	03	03
CASSA	30	01	02	07	01	02
CEMILAC	15	Not Issued	03	03	07	15
CVRDE	30	03	03	30	07	30
DEBEL	30	01	01	02	01	07
DFRL	07	01	01	01	07	07
DLJ	30	01	01	30	Not Issued	Not Issued
DRDL	30	Not Issued	01	30	Not Issued	Not Issued
GTRE	30	01	30	30	07	07
HEMRL	30	Not Issued	Not Issued	30	03	03
IAT	30	01	01	15	07	30
ITM	15	01	01	--	01	15
LRDE	30	01	01	30	07	15
MTRDC	15	01	01	15	07	15
TBRL	30	01	01	30	07	30

Only seventeen libraries responded to this question. Detailed perusal of the data in table 5.38 reveals that books are lent for thirty days by twelve (46.15%) libraries and for fifteen days by four (15.38%) libraries. DFRL issues books only for a week. In most of the libraries reference books are also issued for one day. In CVRDE they are issued up to three days. Only four libraries out of the seventeen libraries that responded to the question do not issue reference books on loan. Theses and dissertations are normally issued for one day and in some libraries for two to three days, except in the case of GTRE where it is issued for thirty days. CAIR and HEMRL do not issue theses / dissertations. Nine libraries (34.62%) issue reports / standards /

specifications up to thirty days. In the rest of the libraries the loan period ranges from one to fifteen days, except CAIR, which do not issue them. Similarly loose issue of journals and bound volumes of journals are issued on loan for varying periods extending up to thirty days. DRDL and DLJ do not issue loose issues or bound volumes of journals.

5.8.6.2. Overdue charges

From the responses it is observed that as a matter of policy reminders are sent to the members for the return of overdue documents. List of overdue documents for a period more than six months is brought to the notice of the Head of the Laboratory. The members of this list are liable to be suspended from membership for a period of six months at the discretion of the Head of the Laboratory. During the period of suspension, the members are not given any library facility except reference.

Only eighteen libraries responded to the question on overdue charges. It is observed that fourteen of these libraries do not levy overdue charges while three libraries are found to collect over due charges. CVRDE collects Re 1/- per week, while ITM collects Re 1/- per day. In the case of GTRE 10 paise per day is collected as overdue charge. The fine amount to be collected is determined at the discretion of the Head of the Laboratory on the recommendation of the LC. Hence variations are found in the charges levied and the procedures followed by the different laboratories. The amount collected is deposited to the Public Fund Account at the end of every month.

5.8.7. Services

Providing various kinds of information products and services matching the information requirements of the users is the prime objective of any library. The DRDO libraries also provide a variety of services to fulfil the information requirements of the scientists. Out of these, ten most common and prominent services were listed out and the librarians were requested to confirm whether they provide these services. The responses of the librarians are given in table 5.39.

Table: 5.39 Provision of various information services

Services	No. of libraries	Percentage
OPAC	18	69.23
Internet	15	57.69
Indexing	14	53.85
SDI	13	50.00
Circulation of accession list	18	69.23
Content page	11	42.31
News clipping	14	53.85
Photocopy	25	96.15
ILL	26	100
CD ROM search service	16	61.54

5.8.7.1. OPAC

OPAC is the online index of the library holdings, which enables the user to locate the document or its whereabouts within seconds. It obviates the tardy process of sifting through the catalogue cards to locate a particular document which is time consuming and laborious. OPAC also furnishes additional information as to the holding and issue details of the document.

With the automation of library services OPAC has become more popular and widely accepted service. The data in table 5.39 reveals that eighteen libraries (69.23%) provide OPAC service. In the remaining libraries, it is observed that automation is in progress.

5.8.7.2. Internet

Internet is a worldwide collection of computer networks containing mines of information, which can be downloaded at any destination with the help of TCP / IP protocol. Internet connectivity is the backbone of a library because it caters to efficient and speedier ways of providing adequate reference services to the clientele. Electronic mail has crossed all barriers of space and time as one can communicate at an amazing speed through Internet, which is very effective in supporting reference service, document delivery and document acquisition. Therefore Internet is one of the most important and essential facilities of the modern library. It is observed from table 5.39 that only fifteen (57.69%) out of the twenty-six libraries provided this facility at the time of data collection.

5.8.7.3. Indexing

Indexing service is one of the most useful services of any library catering to the needs of researchers. But, only fourteen DRDO libraries (53.85%) are found to provide this service covering the articles in different journals (table 5.39). All articles under the purview of the subjects of interest of the parent laboratory are indexed.

5.8.7.4. Selective dissemination of information

DRDO libraries take the responsibility of providing selective information to project leaders and team members on a regular basis. Researchers always face the problem of retrieving relevant information

because of information explosion. It is a personalized current awareness service designed to keep the scientists up to date and alert to the emergence of new information and documents in the subject area, which is of interest to them in their work. It is observed from the table that out of the twenty-six libraries only thirteen libraries (50%) provided SDI service (table 5.39). Responses reveal that usually this service is offered to project leaders to assist them in their project work by matching the project profiles and the document or information profile. It was also noted that some libraries provide SDI service to individual scientists also.

5.8.7.5. Circulation of accession list

The list of new additions of the library is circulated periodically to the various sections / branches for the information of the scientists. From the response, eighteen libraries (69.23%) are seen to circulate accession lists of new additions (table 5.39).

5.8.7.6. Content page service

The Xerox copies of the content pages of the important periodicals, news letters etc, are circulated to the users with a view to inform them about the articles in the latest issues and promote the utilization of the journals in the library. Only eleven libraries (42.31%) are found to offer content page service (table 5.39).

5.8.7.7. News clippings service

News clippings form an important tool of information transfer. Relevant cuttings of important investigations or conclusions of interest to the research activities of the parent laboratory, from newspapers and magazines are filed for reference. Only fourteen libraries (53.85%) are found to offer this service (table 5.39).

5.8.7.8. Photocopy service

Photocopy facilities exist for providing hard copies of articles, reports, parts of books, etc. to the scientists and it is found to be the most popular service among the scientists. Except CASSA, all the twenty-five DRDO libraries provide this service (table 5.39). To the question on the number of pages translated during 2000-2001, the responses revealed that the number ranged from 3000 pages to 1,50,000 pages.

5.8.7.9. Inter library loan service

Today, no libraries can dream of acquiring all the literature published worldwide individually. ILL facility provides the best alternative to the libraries not to purchase all documents. Libraries have to share their resources so that every demand for documents of the users can be satisfied not only from the library's own collection but from the collections of other libraries also. It is revealed from table 5.39 that all the twenty-six libraries under survey provide ILL service.

To the question regarding the procedure of the ILL transaction only seventeen libraries responded. ILL is a transaction in which the document or the copy of a document is made available by one library to another upon request. The libraries in a particular station mutually willing to share their resources may enter into an agreement whereby effective resource sharing can be implemented. The type of document and the period of loan are to be decided by the lending library. As a matter of policy all DRDO libraries in a particular station or region fall within the ambit of ILL service. In addition, the DRDO libraries also enter into ILL agreement with other major libraries in the station like British council library, Indian Institute of Science Library, ISRO library, DESIDOC, INSDOC, etc. The libraries enter into a mutual

agreement based on which an equal number of borrowers tickets are exchanged by the libraries for issue to their members. Since mutual sharing of resources is the basic idea no charges are levied by the libraries on this account, except in the case of British Council Library that charges Rs. 3500/- for 20 cards and National Chemical Laboratory, Pune, that charges Rs.200/- per card. The procedure for availing ILL facility is simple. Responses reveal that member of a particular DRDO library desirous of availing the ILL facility with another library will first have to approach his librarian, deposit one of his borrowers ticket with the librarian in exchange of one borrowers ticket of the library from where the individual wishes to borrow the document. With this borrowers ticket the member can approach the concerned library for obtaining the requisite document. Generally only one card is issued at a time to a member for ILL facility. The ILL cards are issued for a period of one month. Members are not levied any charges for ILL facility. It is also observed that any overdue charges incurred will be paid by the individual responsible, at the rate fixed by the lending library.

It is observed that certain type of documents like rare or valuable documents, including manuscripts, reference documents, atlases and maps, bulky or fragile documents, documents in high demand at the lending library, any document marked restricted, confidential, secret, top secret etc. are not lent out. The safety of the borrowed document is the responsibility of the borrowing library from the time of its receipt at the borrowing library until it is received back by the lending library.

5.8.7.10. CD-ROM search service

The Compact Disc Read Only Memory is a high-density optical disc in which a large volume of data can be recorded. A good number of bibliographic as well as full-text databases are now available in CD-ROM format. Libraries have started to acquire CD ROM products in the library, which are searched using search software. Standards and specifications issued by various bodies are also available in full-text in CD-ROM format. A CD-ROM Network can be installed in the library for multi-user and multi-CD searching. Sixteen libraries (61.54%) are found to provide CD-ROM search service (table 5.39).

5.8.7.11. Translation services

It is estimated that forty eight percent of the world's total scientific literature is published in languages other than English. To the question on translation services, the responses revealed that DESIDOC is the supplier of required translations. To help DRDO scientists in overcoming the language barrier, DESIDOC provides translation services to them on demand, through a team of well-qualified and experienced translators. To avoid duplication in the translation effort, a translation bank has been set up. DESIDOC, being the apex body of the DRDO libraries has the responsibility of supplying translations required by any of the DRDO laboratories. Every request received for translation is checked for availability. If available, a copy of it is sent immediately and if not, the job of translation is taken up by it. The unclassified translations are announced periodically through various national and international publications. DESIDOC is in a position to handle translation jobs from fourteen foreign languages into English.

5.9. AUTOMATION

The advent and spread of computers and other IT gadgets in the library environment have given the library services quality, efficiency and speed. Whatever was done manually prior to the computer era, in the management of libraries, is done in a much better way now with the help of computer and communication technology.

5.9.1. Computer Applications

Due to information explosion computer applications in the field of library and information services became essential for effective information transfer. Availability of low cost microcomputers and facilities for training manpower coupled with development of new, user friendly, customized and affordable software packages have marked the metamorphosis in automation in this field. Today one can witness all libraries going in for full-scale automation. Adequate and additional finances towards this end have given added impetus to computer applications. This part of the questionnaire sought information on the details of the various services and functions that have been automated, the operating system used, and the library software. Eighteen libraries responded to this query. In the remaining eight libraries it is found that automation is in progress.

Responses received from the eighteen libraries that are already automated are tabulated in table 5.40.

Table 5.40 Automation of library functions

Computer application	No. of libraries	Percentage
Acquisition	09	34.62
Cataloguing	18	69.23
Serials control	14	53.85
Circulation	13	50.00
SDI	08	30.77
CAS	10	38.46
Stock verification	08	30.77

It is revealed from table 5.40 that eighteen libraries (69.23%) have automated cataloguing, fourteen libraries (53.85%) have serials control automated and thirteen libraries (50%) have computerized circulation service. Ten libraries (38.46%) have computerized CAS, eight libraries (30.77%) have both SDI and stock verification automated and only nine libraries (34.62%) have automated acquisition.

Windows is found to be the popular operating system with the DRDO libraries. MS DOS, D BASE III + and FOXPRO are also in use. Nine libraries have Suchika, library software developed exclusively for DRDO libraries. Two libraries have Libsys. Other software packages in use are Libris, Libsuit, LMS, Autolib, GLIMPS, Novell, SLIM and CDS / ISIS.

5.9.2. Computer Facilities

Provision of computer facilities in conformity with the latest technological developments, will enable the user community to have easy access to required information and reduce much of the stress and strain in tracing them out. It also enhances speedy dissemination of information. Librarians were requested to provide answers to whether their library has

computer facilities like LAN, campus network, access to library holding through CN, internet connection, library web page / site and DRDO library network. Only twenty-two out of the twenty-six libraries under survey responded to this part of the question. Responses on this account are tabulated in table 5.41.

Table 5.41 Computer facilities of libraries

Response	LAN	CN	Access to library holding through CN	Internet connection	Web page/site	DRDO network
Yes	09 (34.62)	09 (34.62)	06 (23.08)	15 (57.69)	05 (19.23)	00 (00)
No	13 (50.00)	13 (50.00)	16 (61.54)	07 (26.93)	17 (65.39)	22 (84.62)
Not responded	04 (15.38)	04 (15.38)	04 (15.38)	04 (15.38)	04 (15.38)	04 (15.38)
Total	26 (100)		26 (100)	26 (100)	26 (100)	26 (100)

The data reveals that only nine libraries (34.62%) have LAN and CN facilities. Six libraries (23.08%) provide access to library holdings through CN. Fifteen (57.69%) out of the twenty-two libraries are found to have Internet connection and only five libraries (19.23%) have library web page / site.

It has been observed that LRDE library has the facility of sharing CD/DVD-ROMs over a network through LAN / Intranet, with the aid of two novel devices viz, the jukebox and towers of changers. Jukebox is an excellent technology for accessing large number (over 200) of CD/DVD ROMs and can store up to 600 CDs in one enclosure. Jukebox is connected to the computer by special CD server software. A tower of changers is a device containing multiples of five changers with a reader, available in various configurations. A tower of changers with 280 disc capacity has 58 readers allowing 58 users to access simultaneously 58 unique disc titles.

5.10. PHYSICAL INFRASTRUCTURE

A spacious, preferably an independent building, properly lighted and ventilated with adequate seating capacity, clean and calm with provision for future expansion is the most ideal infrastructure facility for a library, to house the collection and to serve the clientele. A space forecast covering at least fifteen years' development has to be made, to accommodate the future additions without difficulty. Sufficient and separate accommodation should be provided for all the activities, which are administrative, organisational and informational in nature and at the same time all sections inter-connected. The librarians were requested to give details regarding the infrastructure facilities of their library with respect to the location of the library, plinth area of the building, seating capacity, provision for future expansion, etc. They were also asked to rate their library keeping these physical aspects in mind. The data collected from the librarians on the above aspects are tabulated in table 5.42. Four libraries did not respond to the question.

Table 5.42 Physical facilities of DRDO libraries

Name of Estt.	Independent building	Centrally placed	Total plinth area In Sq Ft	Seating capacity	Provision for Expansion	Rating
ADE	Yes	Yes	10000	75	Yes	V.G
ADRDE	Yes	Yes	7200	30	Yes	Good
ARDE	No	No	13000	50	No	Good
CABS	No	No	4000	25	No	N.I
CAIR	No	No	3500	25	Yes	N.I
CASSA	No	No	3800	25	Yes	N.I
CEMILAC	No	No	6750	16	No	N.I
CVRDE	No	No	2700	90	No	N.I
DEAL	Yes	Yes	10000	35	Yes	Good
DEBEL	No	No	6300	40	No	Good
DFRL	Yes	Yes	3300	35	Yes	N.I
DLJ	No	No	9632	50	Yes	V. G
DMRL	Yes	Yes	7500	50	Yes	V. G
DMSRDE	-	-	-	-	-	-
DRDE	-	-	-	-	-	-
DRDL	No	No	10000	65	Yes	S
GTRE	No	No	6900	35	No	N.I
HEMRL	No	No	9900	115	No	V.G
IAT	Yes	Yes	12150	120	Yes	V. G
IRDE	Yes	Yes	10500	50	Yes	V.G
ITM	No	No	4000	50	Yes	N.I
LRDE	No	No	7000	50	No	N.I
MTRDC	Yes	Yes	2800	25	Yes	N.I
SSPL	-	-	-	-	-	-
TBRL	No	No	15600	70	No	V.G
VRDE	-	-	-	-	-	-

Note: N.I = Needs Improvement; V.G = Very Good; S = Satisfactory

The detailed analysis of each item is dealt with under separate heading :

5.10.1. Location of the Library

The library should be located at a central place in respect to all the divisions of the laboratory and conveniently accessible to readers. Its location should be away from noise and bustle to ensure a peaceful atmosphere within. The general area should be simple and attractive enough to motivate the users to frequent the library.

Regarding the location of the library it is found that only eight libraries (30.77%) are centrally placed and easily accessible while fourteen libraries (53.85%) are not centrally placed in respect of other divisions of the laboratory.

5.10.2. Library Building

An independent building with adequate space, enough number of rooms for the various sections with provision for further expansion, is considered most ideal for a library. Table 5.43 gives the response of the librarians to the question on the status of the building.

Table 5.43 Status of library building

Status	No. of libraries	Percentage
Independent building	08	30.77
No independent building	14	53.85
No response	04	15.38
Total	26	100.00

It can be observed that only eight libraries (30.77%) have independent building and fourteen libraries (53.85%) do not have independent building. Being R&D establishments independent library buildings are more suitable.

5.10.3. Spatial distribution

Allocation of adequate space for the library plays an important role in serving the clientele effectively. Table 5.44 gives details about the distribution of libraries by plinth area.

Table 5.44 Plinth area of libraries

Plinth area in sq. ft	No. of libraries	Percentage
Below 3000	2	07.69
3001 - 6000	5	19.23
6001 - 9000	6	23.08
9001- 12000	6	23.08
Above 12000	3	11.54
No response	4	15.38
Total	26	100.00

The distribution of libraries by space shows that two libraries have floor area below 3000 sq ft. Eleven libraries (42.31%) are found to have space between 3000 to 9000 sq ft and nine libraries (34.61%) have more than 9000 sq ft. The average floor area of the DRDO libraries that responded to the question is 7120 sq. ft. Eleven out of these twenty-two libraries are found to have floor area below the average.

5.10.4. Provision for expansion

Provision for future expansion is one of the most important aspects in a library building. This information is tabulated as table 5.45

Table 5.45 Status of building & Provision for expansion

Status of building	Number of libraries	Provision for expansion		No Response	Total
		Yes	No		
Independent	8	8	-	-	8
Not independent	14	5	9		14
No response	-	-	-	4	4
Total	-	13	9	4	26

Table 5.45 reveals that all the independent libraries have provision for expansion. It is also observed from tables 5.43 and 5.45, that the libraries, which are part of other buildings, also have space equal to or in some cases more than that of independent libraries. Surprisingly it is also seen that out of the fourteen libraries that do not have independent buildings five have provision for future expansion. TBRL has the largest plinth area (15,600 sq. ft.) among DRDO libraries but it does not have an independent building.

5.10.5. Seating Capacity

Each DRDO Laboratory is unique in its research programme as is evident from the name of the laboratory. Hence the library attached to a particular laboratory has its own unique assortment of resources and services depending on the nature of the subject covered and the limited number of the user community. Table 5.46 gives the details of the seating capacity of the various libraries under study. Four libraries did not respond to this question.

Table 5.46 Seating capacity of libraries

Library	Seating capacity	Library	Seating capacity
ADE	75	DRDE	-
ADRDE	30	DRDL	65
ARDE	50	GTRE	35
CABS	25	HEMRL	150
CAIR	25	IAT	120
CASSA	25	IRDE	50
CEMILAC	16	ITM	50
CVRDE	90	LRDE	50
DEAL	35	MTRDC	25
DEBEL	40	SSPL	-
DFRL	35	TBRL	70
DLJ	50	VRDE	-
DMRL	50	Total	1161
DMSRDE	-	Average	52

Table 5.46 gives the seating capacity of the libraries. IAT and HEMRL have a seating capacity of 120 and 150 respectively. The average number of seats in DRDO libraries that responded to the question is calculated from the table as 52. The distribution of libraries by seating capacity is presented in table 5.47.

Table 5.47 Distribution of libraries by seating capacity

Seating capacity	No. of libraries	Percentage
Below 25	01	03.85
25 – 50	15	57.69
51 – 100	04	15.39
101 & above	02	07.69
No response	04	15.38
Total	26	100.00

It is observed that out of the 22 libraries that responded to the query sixteen libraries have seating capacity below average (table 5.46). It is observed that more than half of the libraries have seating capacity ranging from 25 to 50. Four libraries have between 51 to 100 seats. CEMILAC has provision for only 16 seats for the users. The library was established in 1994 and has a floor area of 6750 sq ft. The inadequacy of seating capacity is confirmed by the librarian's remark that the library needs improvement.

5.10.6. Remarks of the Librarians

An attempt was made to ascertain the views of the librarians about the physical facilities of their library. The librarians were requested to express their views from the four gradings listed. The responses are summarised in table 5.48

Table 5.48 Remarks of the librarians regarding physical infrastructure

Grading	No. of libraries	Percentage
Needs Improvement	10	38.46
Satisfactory	01	03.85
Good	04	15.38
Very Good	07	26.92
No response	04	15.38
Total	26	100.00

It is found from table 5.48 that ten librarians (38.46%) are not satisfied with the existing physical facilities and demanded improvement while twelve librarians (46.15%) are found to be satisfied.

5.11. OTHER INFORMATION

This part of the questionnaire was structured to obtain information on facets like membership of the library to other professional associations or

organisations, details of collection evaluation methods followed in their library, resource sharing, publicity aspects, communication facilities available, auditing and data on ISO certification.

5.11.1. Membership to Other Professional Organisations

Librarians were asked to mention the membership of their library to other professional associations or organisations with the membership fees involved. Only fifteen libraries responded to this question. Eight libraries are found to be members in professional organisations while seven libraries are not. CASSA has membership in Computer Society of India, Operational Society of India, and Aeronautical Society of India with a membership fee of Rs.3000/-, Rs.1500/- and Rs.10, 000/- respectively. CEMILAC has membership in Karnataka State Library Association (Rs.500/-), Bangalore Special Library Group (BSLG) and Aerospace Information Panel (AIP). CVRDE is a member of Institution of Mechanical Engineers (IMEchE), UK, IEEE USA, and SAE, USA with a membership fee of 485 pounds, US\$193 and Rs.2350/- respectively. DLJ is a member of ILA, IASLIC, AGLIS, and Pushtakalaya Parishad, Jodhpur. DEBEL, DRDL, HEMRL and IAT are life members of Current Science Association on payment of Rs.30,000/- each. HEMRL is also member of AIAA, USA (US \$ 375 for five years) and National Safety Council, Mumbai.

5.11.2. Collection Evaluation Methods

Collection evaluation is a process by which a library can build up a collection of resources in a qualitative manner for the use of its clientele. From the responses it is revealed that only fourteen libraries try to evaluate their collection while twelve libraries do not have any collection evaluation

methods. On the methods of evaluation it is observed from the responses that all the fourteen libraries resort to the utility or user survey method. Eleven libraries adopt direct observation while five libraries analyse the ILL statistics also. Three libraries have mentioned that they evaluate their collection based on compilation of statistics.

5.11.3. Resource Sharing

In this era of information explosion resource sharing has become a necessity. It is a way of library cooperation i.e., common work for a common cause. Resource sharing is a need-based concept on the principle of give and take policy for mutual benefit since libraries are always short of funds and resources. The major forms of resource sharing are cooperative acquisition, cooperative subscription, cooperative processing, cooperative storage, sharing manpower and Inter Library Loan. With due emphasis on resource sharing the librarians were asked to mention the various forms of resource sharing adopted by them. The responses revealed that three out of the twenty-six libraries resort to cooperative acquisition (ADE, GTRE and CEMILAC).

ADE, CASSA, CEMILAC, GTRE and DRDL have cooperative subscription. Since journals are very costly the libraries within close proximity work out an arrangement where by subscription of journals of common interest are shared on mutual agreement.

DFRL is observed to have cooperative processing with MCLC (Mysore City Librarians Consortium). All the twenty-six libraries are found to have ILL facility, the most common and popular resource sharing means. It is observed that no library has cooperative storage or sharing of manpower.

5.11.4. Publicity

Each DRDO library has a unique and special collection of resources in the field of S&T in which the parent laboratory is engaged in R&D work. Some libraries have emerged as important information resource centres in the regional and national level. Many of the scientists are unaware about the products and services of these libraries, which have to be publicised within and outside the library. Library publicity is the process of bringing the library resources and services to the notice of users. To the question on how the users are informed about the resources and services, only twenty libraries responded. Only five libraries (19.23%) are found to have publicity brochures for the purpose. Some libraries have mentioned about the circulation of Accession Lists of new additions regularly. Five libraries are found to publicise through Intranet. Other means of publicity adopted by the libraries are through library web page, fixograph boards, publishing in daily orders and through orientation. In few cases the users are personally informed as well.

5.11.5. Communication Facilities

Responses reveal that telephone, fax and e-mail are the prime means of communications available with the libraries. All laboratories have fax facility that can be accessed by the library as well. Fifteen libraries (57.70%) have Internet facility either by a dial-up connection or through leased line.

5.11.6. Auditing

Accounting and auditing form an important responsibility of the libraries. Seventeen libraries responded to the query on audit. The responses reveal that there exists a streamlined procedure of audit in the DRDO

libraries. The CDA (R&D) and its agencies like JCDA (Joint Controller of Defence Accounts) and AO (Accounts Officer) (R&D) carry out the auditing of the library documents. In most of the cases auditing is carried out every quarter. CAIR and CEMILAC have auditing every six months where as DFRL and MTRDC have annual audit. Libraries are found to adopt the pre-audit and post-audit systems. In the pre-audit system the bills are passed for payment only after detailed auditing of the documents are done by the competent authority. In this system, even the supply order gets concurred by the auditing authorities before placement of supply order. In the post-audit system the librarian carries an internal check of the entire bill processing steps and submits the same to CDA (R&D) through Finance and Accounts Department for payment action. At the end of the financial year the audit authorities take necessary steps to verify the documents. Documents like accession register, certified receipt vouchers, loss statement files, loss register, fine register and office copies of all documents dealing with financial matters are subjected to audit.

5.11.7. ISO Certification

Only fifteen DRDO laboratories have acquired ISO certification. Though presently the DRDO libraries have not attempted ISO certification independent of the host laboratory, in future such attempts may take place.

5.11.8. Future plans for the Library

R&D laboratories have to continuously update themselves with the latest developments in technology and cater for future plans for expansion and addition of services. To the question on the services to be introduced

within the next one year, some librarians have proposed to introduce OPAC as their first priority where OPAC is not available. Future plans of some include Intranet services and application of computers for providing various services like CAS on LAN. Few other librarians have proposed article indexing, full-fledged automation, online database searches and barcode technology. HEMRL has proposed independent library LAN connected to main LAN of the laboratory. DRDE is preparing keywords of books for retrieval through LAN. DRDL is planning to subscribe to e-journals. IAT has proposed computerized SDI.

5.12. CONCLUSION

The results of the data on the organisation and administration of the libraries presented in this chapter reveals to a great extent the strengths and weaknesses of these libraries. The resources of the library and the services offered by them were studied keeping in view the overall objectives of the establishment. It is pertinent to note that most of the libraries have proposed new plans and measures for implementation in future that will overcome the shortcomings observed and enable smoother and better service.

INFORMATION REQUIREMENTS OF DEFENCE SCIENTISTS AND UTILISATION OF DRDO LIBRARIES

M. Santha Kumari “Organisation, administration and utilisation of DRDO libraries ” Thesis. Department of Library and Information Science, University of Calicut, 2004

CHAPTER 6

INFORMATION REQUIREMENTS OF DEFENCE SCIENTISTS AND UTILISATION OF DRDO LIBRARIES

6.1. INTRODUCTION

The organisation and functioning of a library or Information Centre depends on the information services it desires to provide to its target groups of users. This necessitates the libraries to understand the specific requirements of their target groups so that their requirements are fulfilled to their satisfaction. In this chapter it is endeavoured to examine the information requirements of the defence scientists working in the various DRDO establishments and the degree of utilization of the resources and facilities of the DRDO libraries by them. "Information requirements of a user are specific to him. They depend on the 'function' of the user (scientist, manager, designer, technician, etc) on the 'level' of his knowledge and experience (beginner, experienced, professional), on his 'field of interest' (electronics, management, finance, inventory, etc.), on the breadth of his 'interest profile' (detailed information about a narrow field or general information about broad areas, etc.), and on the 'nature' of his immediate activity (doing research, preparing for a lecture, or writing a book, etc.). In a nutshell, the information needs of the users keep on changing, and depend on specific situations."¹ User studies are the vital means to trace out user requirements and user satisfaction. These studies will also unravel the prevailing scenario of the library and the efficacy of its resources and services.

The scientists working on various research projects of defence technology are the main users of the DRDO libraries. Analysis of data was mainly carried out taking into consideration the three categories of defence scientists namely the Junior Scientists (JS), Senior Scientists (SS) and Eminent Scientists (ES). This user survey intends to examine the information resources on which the scientists heavily depend for their information requirements and the extent of utilization of these resources, and the services offered by the library. Attempt is also made to ascertain the opinions of scientists about the

physical facilities and other aspects relating to their library. The data for analysis has been compiled from the questionnaires duly filled and returned by the three hundred and twenty two defence scientists who form the sample of the study. The data are analysed in terms of percentages and mean score. Further, to find out if any difference exists among the different categories of scientists in their preferences, statistical tools like the Chi-Square, One-way ANOVA and multiple range LSD tests were performed wherever it was appropriate and the calculated values given in support of the findings.

6.2. PROFILE OF RESPONDENTS

Personal data of the defence scientists were obtained from the answers to the questionnaire issued to them. Scientists were asked questions regarding the name of their establishment, their designation, educational qualifications, years of service and number of contributions like articles, books, patents etc. Number of participations in seminars, conferences, workshops and CEP (Continued Education Programme) during the last five years was also examined. The personal information about the defence scientists, thus obtained are dealt with in the following paragraphs

6.2.1. Status Profile of Scientists

In DRDO the hierarchy of designation of scientists starts from Scientist 'B', which is their first appointment. The subsequent grades awarded on promotion are Scientist C, D, E, F, G, H and Distinguished scientists. Scientist H and Distinguished Scientists are very few and are generally posted as Directors of the DRDO establishments and hence they are not included in the sample. Table 6.1 gives the grade wise break up of the sample scientist population.

Table 6.1 Status profile of scientists

Category	Junior Scientists		Senior Scientists		Eminent Scientists		Total
	Sc B	Sc C	Sc D	Sc E	Sc F	Sc G	
Number	74	70	78	61	30	9	322

The sample consists of 74, 70 and 78 scientists 'B', 'C', and 'D' respectively who form almost equal components. There are also 61, 30 and 9 scientists 'E', 'F' and 'G' respectively, forming part of the sample. For the purpose of analysis, the scientists were grouped into three categories namely Junior Scientists (JS) comprising of Scientists B&C, Senior Scientists (SS) comprising of Scientists D&E and Eminent Scientists (ES) comprising of Scientists F&G. The H category Scientists and Distinguished Scientists have not been included in the study.

Table 6.2 Categories of scientists

Categories of Scientists	Scientists	Percentage
Junior Scientists (JS)	144	44.72
Senior Scientists (SS)	139	43.17
Eminent Scientists (ES)	39	12.11
Total	322	100.00

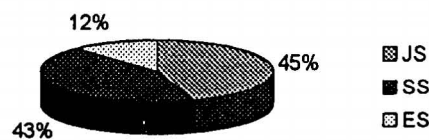


Fig. 6.1 Status profile

The sample of scientists includes 144 Junior Scientists, 139 Senior Scientists, and 39 Eminent Scientists (table 6.2). Out of a total of 322 sample scientists it can be seen that Junior and Senior Scientists form 44.72 and 43.17 percentage respectively, whereas Eminent Scientists form the remaining 12.11 percent of the sample.

6.2.2. Gender Profile of Scientists

The gender profile of the sample population is represented in table 6.3.

Table 6.3 Gender profile

Sex	Scientists	Percentage
Male	264	81.99
Female	58	18.01
Total	322	100.00

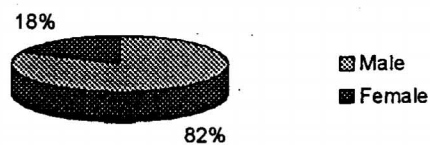


Fig.6.2. Gender profile

It is observed that the male gender comprises 81.99% of the population and the female gender form the remaining 18.01%. However since gender is not relevant to the nature of work involved, it is not considered as a variable for the present study.

6.2.3. Academic Profile of Scientists

On analysis of the educational qualifications of the scientists, it is observed that most of them are engineering/ software / technology graduates or post-graduates.

Table 6.4 Academic profile

Qualification	JS		SS		ES		Total	
	No.	%	No.	%	No.	%	No.	%
Degree	88	61.11	34	24.46	5	12.62	127	39.44
PG & above	56	38.89	105	75.54	34	87.18	195	60.56
Total	144	100.00	139	100.00	39	100.00	322	100.00

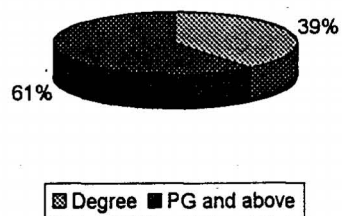


Fig. 6.3 Academic profile

Table 6.4 gives the academic profile of the three categories of the sample population. It can be seen that 39.44% of the user scientists are graduates who include 120 B. Tech. graduates and the remaining 60.66% are postgraduates including Ph.D degree holders. It is also noted that more than

87% of ES and 75% of SS are postgraduates. Only the JS have a lesser percentage of postgraduates. More than 60% of the JS are graduates.

6.2.4. Service Profile of Scientists

The service profile of the 322 sample scientists is tabulated in table 6.5.

Table 6.5 Service profile

	Service bracket	Scientists	Percentage
Service	0-5	73	22.67
	5-10	51	15.84
	10-20	113	35.09
	20+	85	26.40
	Total	322	100.00

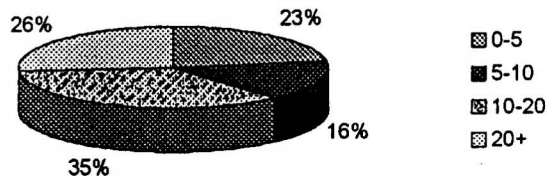


Fig. 6.4: Service Profile

Table 6.5 reveals that a greater percentage (38.51%) of the scientists under study have service below 10 years and 35.09% have service between 10 - 20 years while a lesser percentage of 26.40% have over 20 years of service.

6.2.5. Areas of Specialisation of Scientists

The DRDO scientists are engaged in research activities in a variety of fields, which range beyond forty specific fields. These specific areas of specialization have been grouped together under the major subject heads as given in table 6.6.

Table 6.6 Areas of specialization of scientists

Areas	Scientists	Percentage
Aeronautics (Aerodynamics, system integration etc)	72	22.36
Air borne mechanical Engineering (Structural analysis, aero propulsion, Instrumentation etc)	66	20.50
Avionics (Unmanned systems, flight mechanisms, flight simulators)	25	7.76
Chemical Engineering (to include physical chemistry)	12	3.73
Communications (Cryptography, Signal processing, Robotics and artificial intelligence)	19	5.90
Computer Science (to include real-time embedded systems)	62	19.25
Electronics (Microwave electronics, electronic systems design, electronic warfare etc)	38	11.80
Others (Food technology, metallurgy, bio medicine, etc)	28	8.70
Total	322	100.00

The major subject specializations are aeronautics, airborne mechanical engineering, avionics, chemical engineering, communications, computer

science, and electronics. A few other branches of specializations are put together under 'others' even though they are not related subjects, because the scientists representing those areas are very few in number.

6.2.6. Literary Contributions of Scientists

Scientists have different contributions to their credit during their professional service in the form of patents, books, articles published in various journals and papers presented in seminars and conferences. These contributions of scientists are directly related to their utilization of the library. The more number of contributions the better the utilization of the library.

Table 6.7 Literary contributions of scientists

Contributions	Mean Score			F	p value
	JS	SS	ES		
Articles/conf. papers	1.76	6.69	12.18	20.07**	0.000
Books	0.01	0.16	0.08	1.41	0.246
Patents	0.04	0.09	0.33	2.63	0.073

**Significant at 0.01 level

It is observed from table 6.7 that, in the case of articles and conference papers, the maximum contribution is by the ES with a mean score of 12.18 followed by SS with 6.69. The mean contribution of JS is found to be only 1.76, which is much lower than that of the other two categories of scientists.

To find out if any significant difference exists among the three categories of scientists in their contribution of articles and conference papers, One-way ANOVA was performed. The F-value of the difference in the mean score is 20.07, which is statistically significant at one percent level of significance. The result indicates that there is significant difference among the

three categories of scientists in the contribution of articles and conference papers. It is found to increase with the grade of the scientists. The contribution of SS is about four times higher than that of JS while the contribution of ES is about seven times higher than that of JS.

Table 6.8 Contribution of articles and conference papers: Difference among pairs of categories

Contributions	JS		SS		p value
	MS	SD	MS	SD	
Articles/ Conference Papers	1.7569	5.0038	6.6906	10.7399	P<. 05
	JS		ES		
	1.7569	5.0038	12.1795	17.4821	P<. 05
	SS		ES		
	6.6906	10.7399	12.1795	17.4821	P<. 05

The mean scores of the categories were further subjected to multiple range LSD test at 0.05 level of significance (table 6.8), to find out among which pair of categories i.e., JS & SS, JS & ES or SS & ES, the difference seen is statistically significant. On analysis it was found that among all the three pairs of categories of scientists the difference seen in their contribution to articles and papers is significant.

It is also found from table 6.7 that personal contributions by the scientists in the case of books and patents are negligible.

6.2.7. Participation of Scientists in Conferences / Seminars

Participation of scientists in conferences / seminars and workshops / Continued Education Programme (CEP) during the last five years was also examined. The mean scores of participation is tabulated in table 6.9.

Table 6.9 Participation of scientists in conferences / seminars

Participation	JS	SS	ES	F	p value
Conferences/Seminars	3.35	4.25	7.33	7.15**	0.001
Workshop/CEP	2.97	2.52	3.03	1.16	0.316

**Significant at 0.01 percent

The data in table 6.9 reveals that participation in conferences and seminars is higher in the case of ES, followed by SS and then JS. One valid reason might be that ES by virtue of their long service might have had more chances to attend conferences and seminars when compared to the SS and JS who have lesser period of service. A gradual increase in participation can be observed from JS to ES. One-way ANOVA was performed to find out if the difference seen in the mean scores of participation is statistically significant or not. The F-value of 7.15, which is significant at one percent level of significance, indicates that participation in conferences and seminars is dependent on the category of scientists, which is found to increase with the grade of the scientists.

Table 6.10 Participation in conferences / seminars: Difference among pairs of categories

Participation	JS		SS		p value
	MS	SD	MS	SD	
Conferences/ Seminars	3.3542	5.1338	4.2518	5.4308	Not Sig.
	JS		ES		
	3.3542	5.1338	7.3333	8.8981	P<. 05
	SS		ES		
	4.2518	5.4308	7.3333	8.8981	P<. 05

To ascertain among which pair of categories, significant difference exists, the mean scores of the pairs JS & SS, JS & ES and SS & ES, were further subjected to multiple range LSD test at .05 level of significance (table 6.10). On analysis it was found that JS & ES and SS & ES have significant difference in their participation in conferences and seminars while the difference seen among JS & SS is statistically insignificant.

In the case of attending workshops and CEP also, the ES have a slightly higher mean score of 3.03, followed by JS and SS having mean scores of 2.97 and 2.52 respectively. The difference is almost negligible. The F-value of the difference in the mean scores, which is 1.16, also confirms that the difference is statistically insignificant. This indicates that participation in workshops and CEP is not dependent on the category of scientists.

6.3. INFORMATION REQUIREMENTS OF SCIENTISTS

DRDO libraries are special libraries, primarily designed to serve the defence scientists of the parent establishment. Anticipation of user needs and quick response to their needs characterize the special library.

Information requirements of defence scientists were assessed by examining the purpose of their visits to the library and the purpose for which the information obtained from the library is used. Assessing the purpose for which information is sought is also a means by which the collection of the library can be evaluated and if necessary, changes in the collection development policy can be made.

6.3.1. Purpose of Visiting the Library

Library is the warehouse of information. The purpose of visiting the library by the scientists will vary depending on the information requirements

of the individual scientist. The diffusion of significant information in large number of interdisciplinary and peripheral sources lead to much information being missed unless effective and exhaustive information services are organized. The DRDO libraries offer various services to provide timely information to the scientists. The resources and services of the library largely dictate the purpose of visits to the library by the scientists.

6.3.1.1. Purpose of visiting the library for information resources

Scientists might visit the library to read or borrow books, journals, reports etc. or to consult reference books on a specific subject or any other such purposes. Accordingly, the purposes to use the various types of documents were made into six categories and scientists were asked to give marks on a scale of ten according to their preferences. Analysis of library visits to use these resources by the scientists will provide necessary information about the type of information required by the scientists. Mean scores of the marks given for each purpose by the scientists were estimated and the preferences ranked. The results are presented in table 6.11.

Table 6.11 Purpose of visiting the library for information resources

Purpose		Mean Score	Rank
Information Resources	To consult reference book	6.00	2
	To Read / borrow books on specific subject	6.82	1
	To Read current subject journals	5.97	3
	To Read/borrow back volumes of Journals	4.27	4
	To Read / borrow thesis/ Govt. pub. / Reports	2.45	6
	To Consult standards / specifications	3.66	5

It is evident from table 6.11 that in general, the first preference of the scientists is to visit the library to 'read or borrow books on specific subjects' which secured the highest mean score of 6.82. The second preference is to 'consult reference books' and the third to 'read current subject journals' with mean scores of 6.00 and 5.97 respectively. Reference books and current subject journals are found to share almost equal importance. This indicates that the scientists, engaged in very specialized projects on advanced defence technology, require consultation of books and current journals with the latest information on their subjects of specialization and related reference books more than the other categories of documents.

It is also revealed that to 'read or borrow thesis and government reports' with a mean score of 2.45 has the last preference of scientists. The reason for this may be that the result of the thesis must have already come in some journal and must have already been referred to because in most cases there is a time lag in documents reaching the library for general use. In the case of government reports too, if it is an important report relevant to defence research, the concerned project scientists might be getting it much before it becomes ready in the library for general use.

6.3.1.2. Purpose of visiting the library for information resources by different categories of scientists

The mean scores of the responses of the three different categories of scientists were also analysed to find out if any difference exists among them in their purpose for visiting the library.

Table 6.12 Visiting the library for information resources by different categories of scientists

	Purpose	JS		SS		ES		F	p Value
		Mean	Rank	Mean	Rank	Mean	Rank		
Information Resources	To consult referen book	6.31	2	6.01	3	4.82	3	4.589*	0.011
	To Read / borrow books on specific subject	7.02	1	6.87	1	5.90	1	2.511	0.083
	To Read / borrow current subject journals	5.94	3	6.07	2	5.67	2	0.294	0.745
	To Read / borrow back volumes of Journals	4.40	4	4.31	4	3.64	4	1.106	0.332
	To Read / borrow thesis / Govt. pub. / Reports	2.32	6	2.71	6	2.03	6	2.086	0.126
	To consult standards/ specifications	3.44	5	4.09	5	2.90	5	2.994	0.051

Table 6.12 reveals that the first preference of all the three categories of scientists is to 'read or borrow books on specific subjects'. The slight difference seen in decreasing order in the mean scores of JS, SS and ES (7.02, 6.87, and 5.90 respectively) was further subjected to one-way ANOVA test. The F-value, which is 2.511, indicates that the difference is statistically insignificant.

It is also found that the Junior Scientists visit the library more for consulting reference books, which secured a mean score of 6.31 followed by Senior Scientists with 6.01. The mean score of Eminent Scientists is 4.82, which is less when compared to the other two categories. The tendency to visit the library to consult reference books is found to decrease with the increase in the grade of the scientists. In other words, with increase in experience, the need to consult reference books is found to diminish. When tested statistically, the F

value of the difference in the mean scores of the three categories of scientists is found to be 4.589, which is significant at five percent level of significance. The result indicates that there is significant difference among the various categories of scientists as far as visiting the libraries for consulting reference books is concerned.

In order to ascertain among which pair of categories significant difference exists, the mean scores of the categories were further subjected to multiple range LSD test at 05 level of significance (table 6.13).

**Table 6.13 Visiting the library for reference books:
Difference among pairs of categories**

Purpose	JS		SS		p-value
	MS	SD	MS	SD	
To consult Reference books	6.31	2.66	6.01	2.76	Not Sig.
	JS		ES		p<.05
	6.31	2.66	4.82	2.78	
	SS		ES		P<.05
	6.01	2.76	4.82	2.78	

On analysis it is found that the mean scores of the groups JS and ES & the groups SS and ES are significantly different where as the mean scores of JS and SS are not significantly different. It can be concluded that JS use the library for consulting reference books more than SS and ES and SS use the library more than ES but less than JS.

It is also evident from table 6.12 that SS visit the library more 'to read current subject journals', which is their second preference. The ES with a mean score of 5.67 though less than that of JS, have 'read/ borrow current

subject journals' as their second preference. As far as JS is concerned it is their third preference. 'Reading and borrowing back volumes of journals' secured the fourth preference of all categories. Even though the mean scores show a gradual decrease from JS to ES, the F value indicates that the difference is statistically insignificant. 'To consult standards and specifications' and 'to read / borrow thesis / government reports' are fifth and sixth in preference among scientists. Since slight variations were seen in the mean scores, One way ANOVA was performed the results of which reveal that the difference in the mean scores for the purpose of visiting the library among scientists is statistically insignificant.

6.3.1.3. Purpose of visiting the library for services

The purpose of visiting the library for the services offered by it is related to the efficiency of the services and the information requirement of the clientele. Six important library services were specified and scientists were asked to give marks on a ten-point scale in the order of their preference, for which they visit the library. The analysis is presented in table 6.14.

Table 6.14 Purpose of visiting the library for services

	Purpose	Mean score	Rank
Services	To use OPAC / Intranet	3.67	1
	To use internet facility	2.62	3
	To avail SDI / CAS	2.06	5
	To obtain photocopies	3.13	2
	To avail ILL facility	2.41	4
	To avail news clipping service	1.87	6

Table 6.14 shows that, in general, the first priority with the highest mean score of 3.67 is to use the OPAC / Intranet services. Advances in information technology have changed the entire gamut of library services. The OPAC intimates the availability as well as the whereabouts of a document within seconds. The location of the document in the shelf, whether issued or not, to whom it is issued, the date of return etc. and the bibliographic details of the book, key words, and in some libraries the contents from the content page of the document are also displayed. Hence it is obvious to give OPAC / Intranet services the first preference.

'To obtain photocopies of documents' gets the second preference with a mean score of 3.13. It is so because, in DRDO libraries, the required pages of the document are photocopied and supplied on request, free of cost, to save the time of the scientist. The third priority is to use the Internet facility, followed by the ILL facility. To 'avail SDI / CAS' and 'news clippings service', were among the last priorities. May be these services are inadequate when compared to the requirements of the scientists or not available in at least some libraries.

6.3.1.4. Purpose of visiting the library for services by different categories of scientists

Analysis of the data, to examine if any difference exists in the purpose of visiting the library to avail the library services among the three categories of scientists is presented in table 6.15

Table 6.15 Purpose of visiting the library for services by the different categories of scientists

	Purpose	JS		SS		ES		F	p value
		Mean	Rank	Mean	Rank	Mean	Rank		
Services	To use OPAC / Intranet	3.66	1	3.66	1	3.77	1	0.016	0.985
	To use Internet facility	3.13	3	2.35	3	1.69	6	3.621*	0.028
	To avail SDI / CAS	1.94	5	2.14	5	2.18	4	0.208	0.812
	To obtain photocopies of documents	3.41	2	2.88	2	2.95	3	0.984	0.375
	To avail ILL facility	2.22	4	2.30	4	3.49	2	3.158*	0.044
	To avail news clipping service	1.76	6	2.02	6	1.72	5	0.161	0.851

* Significant at 0.05 level

It is found from table 6.15 that there is marked difference among the scientists in using Internet and ILL facility. Junior Scientists are in the forefront in using the Internet facility followed by the Senior Scientists with mean scores of 3.13 and 2.35 respectively. Eminent Scientists are found to be least interested in this facility with a mean score of 1.69 and it is their last preference among services. Further the mean scores reveal that there is a gradual decrease from JS to ES in visiting the library for this purpose. The F value of the difference in the mean scores is found to be 3.621, which is significant at five-percent level of significance. The result confirms that there is significant difference among the three categories of scientists in availing the Internet service. One of the reasons may be that the ES and many of the SS might be having Internet facility in their office. The data was further put

through multiple range LSD test at 0.05 level of significance to find out which pair of categories of scientists had significant difference (table 6.16).

Table 6.16 Visiting the library for Internet: Difference among pairs of categories

Purpose	JS		SS		p-value
	MS	SD	MS	SD	
Using Internet	3.13	3.5719	2.35	3.3772	Not Sig
	JS		ES		P<.05
	3.13	3.5719	1.69	2.4404	
	SS		ES		Not Sig
	2.35	3.3772	1.69	2.4404	

The analysis revealed that the difference is significant among JS and ES in using Internet facility while it is insignificant among JS and SS and SS and ES.

Scientists resort to ILL facility for their information requirements as no library is self-sufficient. DRDO libraries share their resources with other libraries by mutual agreement. It is evident from the table that ES with a mean score of 3.49 is far ahead in using this facility, which is also their second preference among services. One of the reasons might be that during the course of their long service they might have already gone through the books available in the library in their area of specialization. SS and JS with mean scores 2.30 and 2.22 respectively is found to give it almost equal importance and fourth rank in preference. The mean scores show a gradual increase from JS to ES in visiting the library for this purpose. The F value of the difference in the mean scores is 3.158. It indicates that the difference in visiting the library for ILL facility is statistically significant at five percent level. The data was

further subjected to multiple range LSD test at 05 level of significance to find out which pair of categories had significant difference. The result is presented in table 6.17.

**Table 6.17 Visiting the library for ILL services:
Difference among pairs of categories**

Purpose	JS		SS		p-value
	MS	SD	MS	SD	
Using ILL	2.22	2.83	2.30	2.86	Not Sig.
	JS		ES		
	2.22	2.83	3.49	3.02	p<.05
	SS		ES		
	2.30	2.86	3.49	3.02	p<.05

Analysis of the data reveals that while there is no significant difference between JS and SS in using the ILL service, there is significant difference between JS and ES and SS and ES confirming the finding that the ES use the ILL facility more than the SS and JS.

The difference in the mean scores seen in visiting the library for availing the 'OPAC/Intranet', 'SDI/CAS', 'obtaining photocopies' of documents and availing 'news clipping service', when subjected to F-test reveal that the difference is statistically insignificant indicating that visiting the libraries for these services by the different categories of scientists are identical.

6.3.2. Purpose of Seeking Information

Information requirements of the scientists are assessed by examining the purpose for which they seek information. The collection of the library is

evaluated on the basis of these requirements and if necessary, changes in the collection development policy can be made. Information sought by the scientists may be used for different purposes. In order to find out the nature of utilization of information obtained from the library, all possible intentions with which scientists seek information were categorized into six reasons. Respondents were asked to give marks on a ten-point scale according to their preference. The mean scores of the marks for each reason of seeking information were estimated and the preferences ranked. Results are presented in table 6.18

Table 6.18 Purpose of seeking information

Purpose	Mean Score	Rank
To keep up with the latest developments	6.29	2
To solve Immediate technical problems	6.46	1
To write articles / reports	3.43	5
For generating new ideas	4.53	4
For higher studies	3.34	6
For interviews / assessments	4.55	3

As is evident from table 6.18, seeking information 'to solve immediate technical problems', which has a mean score of 6.46, is the first preference of the scientists. In DRDO Establishments most of the scientists are engaged in various time bound projects where they face so many technical problems, which need to be sorted out immediately to proceed with the work further. This may be the reason why majority of scientists use information mostly for the above purpose. Some librarians (CVRDE, GTRE and TBRL) have mentioned that when new projects are initiated in the parent institution a part of the project budget is allotted to the library to procure documents related to

the specific subject area of the new project, in anticipation of the requirement of scientists working on it.

Many of the respondents have cited the reason 'to keep up with the latest developments' as the second preference which has a mean score of 6.29. It helps in updating knowledge in their area of specializations and research work. Among the purposes for which the scientists seek information, preparation for interviews and assessments has secured the third place. Seeking information for generating new ideas, writing articles / reports and higher studies are found to be having the fourth, fifth and sixth preferences, respectively.

The data was subjected to further analysis to find out whether any differences exist among the three categories of scientists for the purposes for which they seek information. The category-wise break up of the use of information sought from the library with corresponding mean scores and ranks are tabulated in table 6.19.

Table 6.19 Purpose of seeking information by the different categories of scientists

Purposes	JS		SS		ES		F	p-value
	Mean	Rank	Mean	Rank	Mean	Rank		
To keep up with the latest development	6.03	2	6.45	2	6.64	1	0.884	0.414
To solve Immediate technical problems	6.46	1	6.76	1	5.41	2	2.931	0.055
To write articles / reports	3.33	6	3.57	6	3.31	4	0.332	0.718
For generating new ideas	4.63	3	4.60	4	3.95	3	0.644	0.526
For higher studies	3.38	5	3.78	5	1.67	6	1.673	0.189
For Interviews / assessments	4.51	4	5.21	3	2.33	5	11.732**	0.001**

** Significant at 0.01 level

It is observed from table 6.19 that the first preference of ES is to use the information to 'keep up with the latest developments' which has a mean score of 6.64, while it is the second preference of JS and SS. The first preference of JS and SS with mean scores 6.46 and 6.76 respectively, is to use the information more 'to solve immediate technical problems' while it is the second preference of ES. The rationale is justifiable since ES are normally employed in the managerial and supervisory cadre or as project directors. The initial practical aspects of design and development on new projects are assigned to the Junior and Senior Scientists who have to confront technical problems that deserve immediate attention.

It is found that the third preference of JS and ES with mean scores 4.63 and 3.95 respectively, is to use the information obtained from the library for generating new ideas while this is ranked fourth by SS. Information is used to

write articles and reports more by ES than by JS and SS. Junior and Senior scientists are also found to be more interested in higher studies than the ES, probably due to their further promotion scope and or to enhance their academic qualification while it comes last in the order of preference of ES. The purposes 'writing articles and reports' has been ranked sixth by both JS and SS where as ES has given it the fourth rank.

One-way ANOVA was performed to find out if the difference seen among the scientists in using the information sought is statistically significant or not. The F-value of the difference in the mean scores of seeking information to 'keep up with the latest developments', 'solve immediate technical problems', 'write articles/reports', 'generate new ideas' and 'for higher studies' show that the slight variations visible, among the three categories of scientists, is statistically insignificant. This indicates that the information use pattern for the above purposes is not dependent on the categories of scientists.

Significant difference is found among the three categories of scientists in seeking information for 'interviews and assessments'. Senior and Junior Scientists have secured mean scores of 5.21 and 4.51 respectively for preparing themselves for interviews and assessments where as the Eminent Scientists have a mean score of only 2.33. The F value of the difference in the mean scores is 11.732, which is significant at 1 percent level of significance indicating that seeking information for 'interviews and assessments' is dependent on the category of the scientists. The data was further subjected to multiple range LSD test at .05 level of significance to find out which pair of categories had significant difference. The result is presented in table 6.20.

**Table 6.20 Seeking information for interviews / assessments:
Difference among pairs of categories**

Purpose	JS		SS		p-value
	MS	SD	MS	SD	
For interviews / assessments	4.51	3.32	5.21	3.24	Not Sig
	JS		ES		
	4.51	3.32	2.33	3.28	p<.05
	SS		ES		p<.05
	5.21	3.24	2.33	3.28	

The analysis in table 6.20 shows that there is significant difference between JS and ES and SS and ES. It can be confirmed that JS and SS seek information to prepare themselves for interviews and assessments also more when compared to ES.

The reason for the above mentioned difference is the promotion policy of DRDO which takes utmost care of the career-advancement of its scientists and operates a fully Flexible Complementing Scheme (FCS) which means that with each promotion, based purely on merit, the post is upgraded automatically up to the grade of Scientist 'G'. FCS operates on the basis of evaluation of Confidential Performance Appraisal Reports (CPARs) and interviews of Scientists in grades 'B' to 'E' by the Assessment Board at the Head Quarters in Delhi. The Peer Committee does the assessment of scientists in higher grades. Scientists 'B' & 'C' and 'D' & 'E' who secure less than 60%, 65% and 70% CPARs marks on an average, respectively, are not eligible for assessment. Hence it is natural that the Junior and Senior scientists seek information keeping in mind the interview and assessment boards they have to face and fare well enough while the Eminent Scientists are not so much

worried about the boards as they have already passed through the boards and reached the top level of their promotions. ES attend interviews for selection to new and special projects, appointments to new posts or designations, for foreign assignments etc. The statistical test confirms that seeking information for interviews and assessments depend on the category of the scientists.

6.4. UTILISATION OF DRDO LIBRARIES

DRDO libraries are nerve centres providing up to date information to the defence scientists on various fields of research activities undertaken by the laboratory. Effective dissemination of information through all possible means for optimum utilisation is the final objective of these libraries. The defence scientists make extensive use of the resources and services of the libraries. The utilization of the DRDO libraries by the defence scientists is studied by examining their frequency of library visits, duration of the time spent in the library, and use of library resources and services.

6.4.1. Frequency of Library Visits

The frequency of visits of the scientists to the library is directly related to how well the library is equipped to cater to their information requirements and their information seeking nature. Frequencies of visits were classified into five intervals and the scientists were asked to indicate the frequency of their library visits from these five intervals. The response data is presented in table 6.21.

Table 6.21 Frequency of library visits

Frequency	Scientists	Percentage
Daily	33	10.25
Twice or more	163	50.62
Once a week	118	36.65
Once/twice a month	8	02.48
Rarely or never	-	-
Total	322	100.00

From table 6.21 it can be noticed that a little more than half i.e. 50.62% of scientists visit the library twice or more a week and 36.65% of scientists visit the library once a week only. It is also found that only 10.25% of scientists visit the library daily. A much lesser percentage (2.48%) visit the library once or twice a month.

It may be noted that majority of scientists (97.52%) visit the library every week - once, or twice and more. The less number of library visits by scientists on a daily basis may be due to their preoccupation. Only a meagre percentage of scientists visit the library on a monthly basis. It is also observed that none of the scientists fall in the category of visiting the library 'rarely or never'. Therefore it can be inferred that the defence scientists are using the library facilities well enough.

Table 6.22 gives the detailed break up of the frequency of visits by the three categories of scientists.

Table 6.22 Frequency of library visits by different categories of scientists

Frequency	JS		SS		ES		Chi-square	p-value
	No.	%	No.	%	No.	%		
Daily	14	9.72	13	9.35	6	15.39	6.46	.3738
Twice or more	71	49.31	70	50.36	22	56.41		
Once a Week	53	36.81	55	39.57	10	25.64		
Once/ Twice a Month	6	4.17	1	0.72	1	2.56		
Rarely or never	-	-	-	-	-	-		
Total	144	100.00	139	100.00	39	100.00		

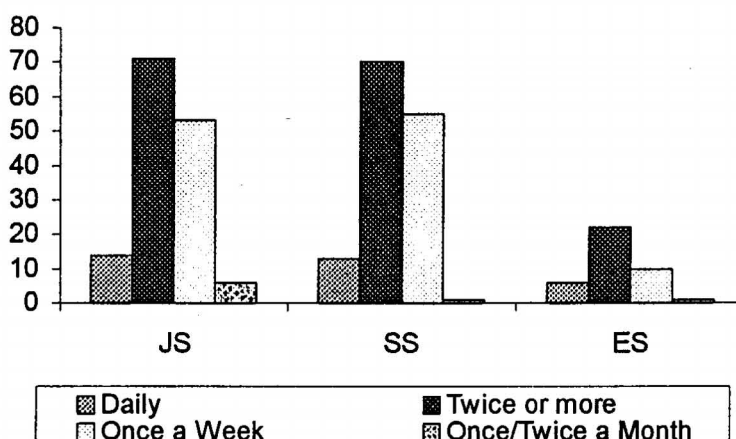


Fig 6.5 – Frequency of visit

Frequency of visits to the library by the three categories of scientists also was examined. It is found that 9.72% of JS and 9.35% of SS visit the library daily while a greater percentage (15.39%) of ES fall in this category. Highest percentage of all the three categories of scientists (49.31%, 50.36% & 56.41%) visit the library twice or more, a week. 36.81% of JS, 39.57% of SS and 25.64% of ES visit the library once in a week whereas 4.17% of JS, 0.72% of SS and 2.56% of ES visit the library once or twice a month.

Since majority of scientists are found to make weekly visits to the library, the percentages of the same was calculated by adding the two weekly frequencies. It shows that the highest percentage (86.12%) of weekly visits to the library is made by the JS followed by SS (85.61%) and ES (82.05%). Even though there is a gradual decrease in the percentages from JS to ES, which is negligible, it can be noticed that weekly visits to the library are almost equal among the categories ranging between 82% and 86%. In the case of visiting the library daily, a greater percentage of 15.39 of ES top the frequency whereas only a lesser percentage of 9.72% of JS and 9.35% of SS visit the library daily.

Chi-square test was applied to find out whether the differences seen in the frequency of library visits among the three categories of scientists are significant. The Chi-square value of 6.46, which is statistically insignificant, indicates that the frequency of library visits is not dependent on the categories of scientists. It can be concluded that no specific pattern of library visits is seen among a particular category of scientists.

6.4.2. Duration of Library Visits

The scientists were asked to specify the duration of time spent in the library from the three alternatives provided. The responses are tabulated in table 6.23.

Table 6.23 Duration of time spent in the library

Duration in hours per week	Scientists	Percentage
1 to 2	167	51.87
2 to 4	98	30.43
More than 4	57	17.70
Total	322	100.00

The data presented in table 6.23 shows the duration of time spent by the scientists in the library. More than half of the scientists (51.87%) spend only 1-2 hours a week in the library while 30.43% respondents spend an average of 2-4 hours a week, i.e. 82.30% of the scientists use the library for less than 4 hours in a week. One reason may be that in many cases they must be visiting the library for some specific information or they must be working against a deadline of time. Another reason may be the availability of free photocopy facility in these libraries, which is specially meant to save the time of the scientists. It is seen that only 17.70% respondents spend more than four hours a week in the library.

Table 6.24 Duration of time spent by different categories of scientists

Duration in hours per week	JS		SS		ES		Chi-square	p-value
	No.	%	No.	%	No.	%		
1 to 2	80	55.56	66	47.48	21	53.85	3.04	0.55
2 to 4	43	29.86	43	30.94	12	30.77		
More than 4	21	14.58	30	21.58	6	15.38		
Total	144	100.00	139	100.00	39	100.00		

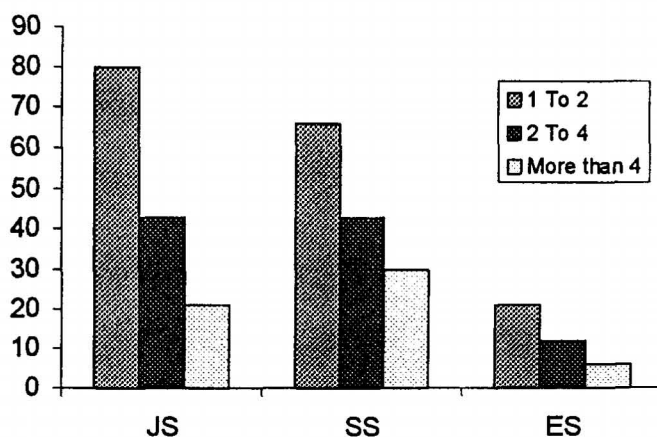


Fig. 6.6 Duration of library use

Duration of library use by the different categories of scientists was also analysed. Table 6.24 presents the percentage of different categories of library users and time spent by them in the library in a week. Greater percentages of all categories of scientists spend 1 to 2 hours weekly in the library for reading and reference. More than half of the JS (55.56%) and ES (53.85%) spend only 1 to 2 hours in the library in a week. A lesser percentage of SS (47.48%) fall in this category. About 30% of all categories of scientists spend 2 to 4 hours a week in the library. It is also revealed that in using the library for more than 4 hours a week the SS (21.58%) form a larger percentage while 14.58% of JS and 15.38% of ES fall in this category. The percentage of those who use 2 to 4 hours is 21.44 percent less than that of users of 1 to 2 hours.

The result indicates that the pattern of weekly use of library is almost identical among the three categories of scientists except in the case of SS. In the 1-2 hours block the SS form the lowest (47.48%) among the three categories. In the more than four hours block the SS form the highest of 21.58%.

In order to verify whether the variations have any significance statistically, the data were put through the Chi-square test. The Chi-square value, which is statistically insignificant, indicates that the duration of time spent in the library is not dependent on the category of scientists.

6.4.3. Usefulness of Information

The extent of utilisation of any information resource or service mostly depends upon its ability to match the information requirements of the user. Usefulness of the resources and services of the library, as rated in the

feedback of the clientele is the most effective tool for evaluating the utility of the library. Based on the feedback, the collection and the services can be improved upon, for maximum user satisfaction.

6.4.3.1. Usefulness of the resources of the library

The utilisation of a library can be determined only by ascertaining its use. To obtain the views of the scientists on the usefulness of the different kinds of information resources of the library, the important resources were grouped into six categories and scientists were asked to give marks on a ten point scale according to their preference, in terms of the usefulness of the resources. The mean scores of the marks assigned to each category of resource by the scientists were estimated and the preferences ranked. The results are presented in the table 6.25

Table 6.25 Usefulness of information resources

Information Resources	Mean score	Rank
Reference books	6.48	3
Books on specific subject	6.93	1
Current subjects journals	6.50	2
Back volumes of subject journal	5.55	4
Theses/reports/Govt. publications	3.02	6
Standards / specifications	4.17	5

It is evident from table 6.25 that among the different library resources the first preference of scientists is for 'books on specific subjects' that has a mean score of 6.93 followed by 'current subject journals' and 'reference books' with mean scores of 6.50 and 6.48 respectively. Current journals and reference books are found to be almost equally useful to the scientists. The table reveals that 'back volumes of journals', 'Standards/specifications' and 'thesis/reports/govt. publications' are low in priorities coming fourth, fifth and sixth in preference with mean scores 5.55, 4.17 and 3.02 respectively. But, it is also evident from the mean scores that these resources are also well used by the scientists.

The data was further analysed to find out if any difference exists among the three categories of scientists in their preferences for various library resources in terms of their usefulness.

Table 6.26 Usefulness of information resources to the different categories of scientists

Information Resources	JS		SS		ES		F	p value
	M	R	M	R	M	R		
Reference books	6.47	2	6.76	2	5.56	3	2.534	0.081
Books on specific subject	6.97	1	7.11	1	6.18	2	1.767	0.173
Current subjects journals	6.45	3	6.63	3	6.21	1	0.352	0.704
Back volumes of subject journal	5.41	4	5.83	4	5.08	4	1.215	0.298
Theses / reports / Govt. publications	2.91	6	3.06	6	3.27	6	0.399	0.671
Standards / specifications	4.18	5	4.23	5	3.92	5	0.14	0.869

M = Mean , R= Rank

Table 6.26 reveals that 'books on specific subject' is the first preference of JS and SS with mean scores of 6.97 and 7.11 respectively while the first preference of ES is 'current subject journals' which has a mean score of 6.21. Similarly 'reference books' are the second preference of JS and SS with mean scores of 6.47 and 6.76 while 'books on specific subject' are the second preference of ES with a mean score of 6.18. By virtue of their long service and knowledge of the subject the ES generally prefer to update themselves with current subject journals and hence the shift in preferences. The preferences for other resources namely 'back volumes of journals', 'Standards/ specifications' and 'thesis / reports / govt. publications' are found to be the same for the three categories of scientists as is evident from the table 6.26.

One-way ANOVA test was performed to find out if the difference seen is statistically significant. The F value of the difference in the mean scores shows that the difference is statistically insignificant. It can therefore be deduced that the preferences with regard to the usefulness of the resources is not dependent on the category of scientists.

6.4.3.2. Usefulness of the services of the library

All the services provided by the library may not be useful for all the users. To ascertain the usefulness of services rendered, the services common to and most important to the DRDO libraries were categorized into seven groups and the scientists were asked to give marks on a ten point scale in terms of their usefulness to them. The mean scores of the marks obtained were estimated and preferences were ranked. The results are presented in table 6.27

Table 6.27 Usefulness of services

Services	Mean score	Rank
OPAC / Intranet	2.75	3
Indexing / abstracting	2.88	2
Internet facility	2.75	3
Photocopy service	3.87	1
ILL facility	2.60	4
SDI / CAS	1.82	5
News clippings service	1.34	6

The photocopy service with a mean score of 3.87 is found to be the first preference of scientists in general, followed by Indexing / abstracting service with 2.88. Library OPAC / Intranet and the Internet facility - both having the same mean score of 2.75 come in the third place. ILL service is found to be the fourth preference. SDI/CAS and news clippings service are found to be lower in the order of preferences of the scientists. This may be due to the inadequacy or the absence of these facilities.

The preferences for various services with regard to their usefulness by the different categories of scientists were also examined, the details of which are furnished in table 6.28

Table 6.28 Usefulness of services to the different categories of scientists

Services	JS		SS		ES		F	p- value
	M	R	M	R	M	R		
OPAC / Intranet	2.77	3	2.79	4	2.53	4	0.147	0.863
Indexing / abstracting	2.59	5	3.27	2	2.54	3	2.057	0.129
Internet facility	2.94	2	2.86	3	1.64	6	2.272	0.105
Photocopy service	3.95	1	3.87	1	3.59	1	0.168	0.846
ILL facility	2.65	4	2.40	5	3.10	2	0.891	0.411
SDI / CAS	1.69	6	1.85	6	2.18	5	0.437	0.646
News clippings service	1.19	7	1.48	7	1.44	7	0.674	0.510

M = Mean, R=Rank

The first preference of all the scientists irrespective of their grade is found to be the photocopy facility. This facility is provided free of charge in all DRDO libraries with the aim of saving the time of the scientists engaged in serious research work.

The second preference of JS is found to be the Internet facility with a mean score of 2.94 while it is the 'indexing / abstracting' services for SS and 'ILL facility' for ES with mean scores of 3.27 and 3.10 respectively. The Internet facility offered by the library is not used much by the ES. It is their last preference - may be because they might be having Internet facility in their office. The third preference of JS is 'library OPAC and intranet' services while it is the 'Internet facility' for the SS and 'indexing / abstracting' for the ES. ILL facility is the fourth preference of JS while it is the OPAC / Intranet services for the SS and ES. Last preference of all the categories of scientists is found to be the 'news clipping service', which may be so perhaps due to its inadequacy to meet the requirements of the scientists.

The slight variations seen in the mean scores were tested statistically to find out whether the differences are significant. The F values of the differences in the mean scores with regard to the usefulness of the library services among the different categories of scientists reveal that statistically the differences are insignificant.

6.4.4. Adequacy of Information Resources

An attempt was made to find out to what extent the collection in the library meets the research requirements of the user scientists. The scientists were asked to specify from a list of three alternatives - 'fully adequate', 'partially adequate' and 'inadequate' - regarding the adequacy of the important resources of the library, namely reference books, books on specific subject, current subject journals, back volumes of subject journals, theses / reports / govt. publications and standards / specifications. Their responses are summarized in table 6.29 duly supplemented with pie chart.

Table 6.29 Adequacy of information resources of the library

Resources	Adequacy	Total	<input type="checkbox"/> Fully Adequate <input type="checkbox"/> Partially Adequate <input type="checkbox"/> Inadequate
		No.	
Reference books	Fully Adequate	151	
	Partially Adequate	152	
	Inadequate	19	
	Total	322	
Books on specific subject	Fully Adequate	115	
	Partially Adequate	165	
	Inadequate	42	
	Total	322	
Current subject journals	Fully Adequate	149	
	Partially Adequate	146	
	Inadequate	27	
	Total	322	
Back volumes of subject journal	Fully Adequate	128	
	Partially Adequate	158	
	Inadequate	36	
	Total	322	
Theses/ Reports/Govt. Publication	Fully Adequate	90	
	Partially Adequate	189	
	Inadequate	43	
	Total	322	
Standards/ specifications	Fully Adequate	107	
	Partially Adequate	143	
	Inadequate	72	
	Total	322	

6.4.4.1. Reference Books

The reference section is the hub of all activities of a library and this section can make or mar the reputation of a library. The value of a reference book lies in the authenticity of information contained in it. Selection of planned, adequate and suitable collection of reference books, relevant to the research requirements of the parent laboratory should be the aim of the section.

From table 6.29 it is found that only 47% of the scientists have stated that the collection of reference books is adequate while an equal percentage have stated that it is only partially adequate. The remaining 6% of the scientists have rated the collection as inadequate. Therefore, it can be concluded that the collection of reference books needs to be further built up or updated.

Absence of proper weeding out programme can impair the efficiency of the reference collection and services. Weeding keeps the collection from becoming a depository of out of date materials and reduces the danger of giving incorrect information from non-current sources. Records of unanswered questions are one means of identifying deficiencies in the existing collection. Reference collection needs to be constantly updated and equipped with standard reference books in the areas of interest. Necessary measures should be taken to improve the adequacy and efficiency of the reference collection, to the satisfaction of the scientists.

6.4.4.2. Books on specific subjects

Each DRDO laboratory has a different area of specialization. The collection of the library is based on the specific area of research programmes being undertaken by the parent laboratory. The scientists have to be provided with adequate books on the subjects on which research is going on because it has been already observed that most of the scientists engaged in research require books on the specific subject and related reference books more to solve the technical problems they have to face during their work. It has also been noted that these technical problems have to be solved immediately to proceed with the work further. Hence for uninterrupted research work and to save the time of the scientists it is necessary to have adequate collection of books on the subject areas of specialization of the laboratory. It has been found from the responses that only 36% of the scientists have rated the collection of books on specific subjects as adequate where as 51% have rated it as partially adequate. Another 13% of the users have stated that it is inadequate. Therefore it can be presumed that the collection of books on specific subjects is not sufficient.

6.4.4.3. Current subject journals

Among the library collection, current subject journals constitute an important segment in DRDO libraries. They are essential for R&D work as the articles published in them are the primary means of communication for the exchange of scientific information. As sources of latest information, they assume much significance in these organisations where research is the major activity. It is, therefore, imperative that all such journals containing information relevant to the research projects undertaken by the laboratory

should be subscribed to by the library. These journals can be indexing / abstracting journals, journals containing news items and journals with full-text research articles and technical papers. The response table reveals that 47% of the scientists have stated that the journal collection is adequate and another 45% has rated it as partially adequate. The remaining 8% of the scientists have rated the collection as inadequate. It can be found that a greater percentage of scientists are satisfied with the collection of current journals. With the vast capabilities of IT, effective resource sharing by the libraries can provide the necessary articles required by the scientists without any time lag, which will certainly contribute to the satisfaction of the scientists.

6.4.4.4. Back volumes of subject journals

Back volumes of subject journals form a formidable segment of reference material to the scientists. The various stages of development of a particular invention or research work are published in series in successive issues as the work progresses and form valuable information for the scientists in their research work. Bound volumes of journals are often procured if they are relevant to the research activities of the parent organisation. From the table it is revealed that 40% of the scientists are satisfied with the collection of back volumes and rated it as adequate, while 49% have rated it as only partially adequate. At the same time 11% of the scientists have rated it as inadequate. It can therefore be deduced that the collection of back volumes of subject journals is not fully sufficient to meet the requirements of the scientists. Back volumes of journals are available now in CD ROM format, which are easy to search and retrieve the required information.

6.4.4.5. Theses / Reports / Govt. Publications

Academic and research institutions, commercial organisations and govt. departments publish theses, reports and govt. publications. These form an important source of information to the scientists who are engaged in research activities, because they contain the results of a particular research or investigations made. Libraries on the basis of requirements of parent laboratories, acquire feasibility reports, progress reports, final or closing reports, annual reports, state-of-the-art reports, and security classified reports. The response table reveals that only 28% of the scientists have stated the collection of reports / theses / government publications as adequate. It can be found that 59% of the scientists have rated it as partially adequate and 13% have stated that the collection is inadequate.

6.4.4.6. Standards and Specifications

Standards and specifications are formal rules designed to cover such topics as testing, terminology, definitions and symbols, construction and performances and codes of practice. They are important in influencing and specifying degrees of quality and levels of safety. Technical specifications accepted by recognized standardizing bodies become standards. The collection includes dimensional standards, performance or quality standards, standard test methods, terminological standards, codes of practice and physical and scientific standards. These form a valuable source of information to the defence scientists. It is revealed from the response table that 33% of the scientists are satisfied with the collection of standards and specifications while

45% have stated that it is only partially adequate. The remaining 22% of the user scientists have rated the collection as inadequate. It can therefore be presumed that the collection of standards and specifications is not sufficient to meet the information requirements of the scientists.

The average percentage of the three levels of adequacy of the various resources on the basis of the responses of the scientists is presented in table 6.30. The percentage rating by the scientists for each item has been added up separately for each level of adequacy and the average worked out to arrive at a mean cut off level of adequacy.

Table 6.30 Average percentage of adequacy of information resources

Level of adequacy	Fully adequate	Partially adequate	Inadequate	Total
Percentage	38.50	49.33	12.17	100.00
(Number)	(124)	(159)	(39)	(322)

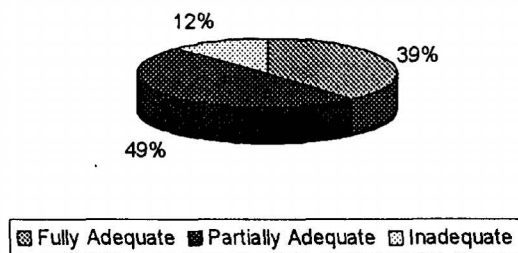


Fig. 6.7 Average adequacy of resources

Table 6.30 reveals that in all the DRDO libraries under study only 38.50% of the scientists have graded the resources of their library as adequate.

A greater percentage (49.33%) of the scientists have rated the resources as partially adequate while a lesser percentage of 12.17% of the scientists have expressed the opinion that the resources are inadequate. Hence, it can be inferred that the resources of the DRDO libraries are not sufficient enough or only partially adequate to meet the requirements of the scientists.

6.4.5. Adequacy of services

Libraries acquire and organize their resources to meet the knowledge and information requirements of their users. Once the information has been acquired in the library, its' availability is to be brought to the attention of appropriate users so that it can be utilized productively. The development of resources has value only if it is used to meet the requirements of the scientists. A number of services are offered by the library to disseminate the information to the user scientists. To assess the adequacy of these services scientists were asked to rate the services as adequate, partially adequate or inadequate. The various important services common to the DRDO libraries and covered in the study, are the OPAC / Intranet, Internet, SDI / CAS, photocopy, ILL and news clipping service.

Table 6.31 Adequacy of services offered by the library

Services	Adequacy	Total	<input type="checkbox"/> Fully Adequate <input checked="" type="checkbox"/> Partially Adequate <input type="checkbox"/> Inadequate
	Adequacy level	No.	
OPAC / Intranet	Fully Adequate	132	
	Partially Adequate	129	
	Inadequate	61	
	Total	322	
Internet facility	Fully Adequate	72	
	Partially Adequate	99	
	Inadequate	151	
	Total	322	
SDI / CAS	Fully Adequate	62	
	Partially Adequate	99	
	Inadequate	161	
	Total	322	
Photocopy service	Fully Adequate	88	
	Partially Adequate	104	
	Inadequate	130	
	Total	322	
Inter Library Loan facility	Fully Adequate	112	
	Partially Adequate	141	
	Inadequate	69	
	Total	322	
News clipping service	Fully Adequate	44	
	Partially Adequate	139	
	Inadequate	139	
	Total	322	

6.4.5.1. OPAC / Intranet

The revolutionary improvements in retrieval, made possible by the computer, like its incomparable swiftness, ability to store and organise large amount of information, to carryout rapid searches, to provide display and printouts, its versatility and flexibility that allows an inquiry to be defined in many variants, its ability to combine keywords and to adopt the layout of output in many forms are decisive advantages to identify and retrieve pertinent information as fast as possible. OPAC is the online index of the library holdings, which enables the user to locate the document or its whereabouts within a few seconds.

Intranet is the network of computers within the same organisation, which can communicate with one another for information transfer. It can be observed from Table 6.31 that 41% of the scientists are of the opinion that the OPAC/Intranet service is adequate where as 40% say that it is partially adequate. The remaining 19% of the scientists opined that the service is inadequate. It can be therefore stated that the scientists are not satisfied with this service. The dissatisfaction may be due to the lack of adequate number of terminals or the inadequacy of services on the Intranet.

6.4.5.2. Internet facility

Internet contains a hidden treasure of information and it is one of the most popular and sought after service by information seekers. There are divergent services on the Internet, which include direct communication, online conferencing, remote log in and file transfer etc. An information resource of the entire world is now available in electronic form through Internet. Regarding adequacy of Internet services in DRDO libraries, it has been found that only 21% of the scientists are satisfied with this service

whereas 32% are of the opinion that the service is only partially adequate. The major block of 47% of scientists has rated the service as inadequate. It is thus observed that this popular service is not sufficient enough to meet the requirements of the scientists.

6.4.5.3. SDI / CAS

SDI / CAS are important alerting services. SDI aims at the provision of material or information on a particular topic at regular intervals in a format specified by the user in advance. Through Selective Dissemination of Information (SDI) the scientists receive regular notifications of new literature in their area of interest. This service is offered by matching scientist profiles with the profiles of the documents added recently. Retrospective searches are also made on the entire database maintained in the library on request.

Current Awareness Service (CAS) is also an equally important service in promoting the use of information resources. Some times the reading materials are available in the library but the users are not aware of it. List of new arrivals, current contents list etc are circulated to inform the clientele about their availability. CAS is designed to provide information regarding the current literature generated through different sources, received in the library. Regarding the adequacy of these two services the responses reveal that only 19% of the scientists are satisfied with the service and 31% are only partially satisfied. The fact that 50% of the scientists are not satisfied with these services and consider it as inadequate is reason enough to state that SDI/CAS service in DRDO libraries are not sufficient to meet the requirements of the scientists.

6.4.5.4. Photocopy Service

Photocopy service is another important tool of information transfer, which is well utilised by the scientists. It is observed from table 6.31 that only 27% of the scientists expressed satisfaction on the service and 32% are partially satisfied with the service. Expressing their dissatisfaction 41% of the scientists has graded this service as inadequate. This service is one of the most popular and common services available free of charge in all DRDO libraries. The photocopy service is so much in demand that the dissatisfaction must be due to the lack of sufficient number of photocopying machines to meet the requirements of the user scientists. Efforts to provide the service with minimum lead-time and quality copy might satisfy the scientific community.

6.4.5.5. Inter library loan facility (ILL)

ILL is a major and common resource sharing means available to DRDO scientists. Generally libraries satisfy the information requirements of the scientists from the sources and services available in the library. However it is not possible for the library to acquire all documents demanded by the scientists. The DRDO libraries share their resources with their sister libraries as well as other libraries on mutual agreement. Thus the demands of scientists can be fulfilled up to some extent by availing the ILL facility. Regarding the adequacy of the facility, it has been found from the responses that 35% of the scientists are satisfied with this service. While 44% of the scientists have rated the service as partially adequate the remaining 21% are of the opinion that the service is inadequate. It can thus be seen that this service is again not sufficient to meet the requirements of the scientists.

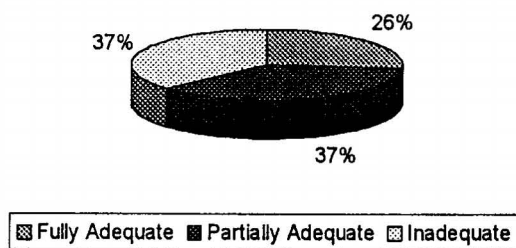
6.4.5.6. News clippings service

The news clipping service forms another important tool of information transfer. In special libraries like DRDO libraries, relevant cuttings from newspapers and magazines are filed for reference. Sometimes research studies and investigations are reported in the newspapers. They also have feature articles at times on important conclusions brought to light. It is extremely worthwhile to record such investigations by their subjects, either in the catalogue or in the reference cabinet, so as to file with the same subject. It is highly useful if done on the first announcement of a project. There after, it is often possible to obtain some desired information, even during the progress of investigation. This requires scanning of both newspapers and magazines. Such a scanning is essential for useful, intelligent and long-range reference service. They also are classified and catalogued in some libraries and the list circulated. From the Table it is revealed that while 14% of the scientists are satisfied with the service, 43% of the scientists have graded the service as partially adequate and an equal percentage as inadequate. Obviously the service is not adequate meet the requirements of the scientists. This may be due to the fact that the libraries neglect taking news clippings regularly to keep it up-to-date.

Average percentage of level of adequacy of various services was calculated and presented in table 6.32.

Table 6.32 Average percentage of adequacy of services

Level of adequacy	Fully adequate	Partially adequate	Inadequate	Total
Percentage	26.40	36.80	36.80	100.00
(Number)	(86)	(118)	(118)	(322)

**Fig. 6.8 Average adequacy of services**

A glance at the average percentage of the level of adequacy of various services given in table 6.32 reveals that only 26.40% of the scientists have stated that the services of the library are adequate and 36.80% of the scientists have rated the service as partially adequate. Expressing their dissatisfaction 36.80% of the scientists has reported that the services are inadequate. It can therefore be inferred that the services being offered by the DRDO libraries are not sufficient enough to meet the requirements of the scientists.

6.4.5.7. Reasons for not availing the services

The DRDO libraries provide a number of services to their defence scientists. Most of the scientists make full and proper use of these services where as some, do not. In order to find out the various reasons for not availing the services the scientists were asked to specify the reasons. They were given a choice of five reasons. The reasons were 'not aware', 'not

available', 'no need', 'time consuming' and 'do not know how to use'. Table 6.33 gives the percentage break up of the responses to the various services from the users.

Table 6.33 Reasons for not availing the services of the library

Services	Not aware	Not available	No need	Time consuming	Do not know how to use
Library database/OPAC	9.63	00	00	3.42	1.55
Indexing services	19.25	13.05	00	7.76	0.93
Compilation of bibliographies	6.52	8.07	13.04	8.71	1.55
New additions list	5.90	3.73	8.70	6.83	1.55
SDI / CAS	23.91	14.29	9.32	1.24	1.24
News clippings	8.70	20.81	19.88	2.48	0.30
Contents page service	20.81	12.42	13.98	1.86	0.62
Photocopy service	00	00	12.42	3.11	00
Inter Library Loan facility	7.45	6.21	12.73	4.04	1.24
Audio/Video facility	11.49	38.20	14.91	0.93	1.24
Microforms reader / printer	16.15	23.60	15.53	3.42	1.86
Internet facility	4.66	17.08	9.94	11.18	0.93
Library services on Intranet	9.94	28.88	6.52	4.35	1.86

The average percentage of the various reasons for not availing the services as given by the scientists were worked out and is given in table 6.34

Table 6.34 Average percentage of reasons for not availing services

Reasons	Not aware	Not available	No need	Time consuming	Do not know how to use
Average Percentage (No of Users)	11.11 (36)	14.33 (46)	10.54 (34)	4.57 (15)	1.14 (04)

It is a matter of concern that few scientists are not aware of the various services that are available in their libraries. It is observed from table 6.33 and 6.34 that an average of 11.11% (36 out of 322) scientists are not aware of the availability of the different services in the library. 23.91% of the scientists are not aware of the availability of SDI / CAS service in their library. Content page service (20.81%) and microform reading and printing facility (16.15%) follow this. It is surprising that 4.66% of the scientists are not aware of the availability of Internet services in their library. This definitely shows a lack of interest on the part of the scientists as well as the library staff in using the facilities as well as providing the facilities respectively. Suitable measures must be taken by the librarians to enhance the state of awareness among the scientists regarding the services of the library, preferably by emphasizing orientation to the library on induction and also organizing frequent awareness programmes on introduction of new services.

Whereas it is ideal for a library to have all the services, often it may not be possible. It has been found that an average of 14.33% (46 out of 322) scientists have stated that some of the services are not available in their library. The break up reveals that 38.20% of the scientists have stated that their libraries do not have audio / video facility. According to 28.88% of the scientists, their libraries do not have services on Intranet while 3.73% of scientists have stated the same about new additions list. It is evident from

table 6.33 that the scientist community needs these services. Irrespective of whether the establishment is small or otherwise, endeavour must be made to provide all the library services to the defence scientists.

Any service provided by the library is need based. An average of 10.54% (34 out of 322) of the scientists have stated that they do not need some of the listed services. All the users may not require all the services or it may be because they are not aware of the usefulness of certain services. It is found that the scientists do need OPAC and indexing services to easily locate required information. They may not need the other few services, which are not relevant to them. It is further found that 6.52% of the scientists do not need library services on the Intranet. This report may be because they are unaware of the capabilities of this service where as 19.88% do not need the news clippings service. Scientists, who are in the administrative or managerial cadre, also may not require some of the services and form part of the 'no need' category.

Time consumption is an inherent factor in getting access to information. It takes time depending upon the type of information, from where it is to be retrieved, the availability of proper tool of retrieval etc. There may also be delay in accessing information depending on the number of users waiting to avail a particular information retrieval tool. An average of 4.57% (15 out of 322) of the scientists are not availing the services of the library because it is time consuming. It is found that 11.18% (table 6.33) of the users are not availing the Internet facility due to the same reason. A variety of factors like the working hours of the library, which coincides with the office working hours of the scientists, limited number of computer terminals, lack of

expertise in handling the tools of information retrieval etc. are found to be the basic reasons for not availing these services by the scientists.

While majority of the scientists are availing all the available services, there is one category, though very small, who form the “do not know how to use” category. An average of 1.14% (5 out of 322) scientists have been found not knowing how to use certain services. It has been found that 0.93% (3 out of 322) of the scientists do not know how to use Internet service where as 1.86% (6 out of 322) do not know how to use microforms and Intranet services. Not knowing how to use an available service reflects the lack of interest on the part of the users. It may also be possible that they do not require the particular service and hence have made no efforts to learn how to use it. However the library staff and the management must put in concerted efforts to single out scientists belonging to this group and educate them to use these services.

6.4.5.8. Library orientation

Library orientation is an important aspect of librarianship in creating awareness about the library and its services among the users. It is “a process whereby the library user is firstly made aware of the extent and the number of the library resources available to him or her, and secondly to teach how to use these resources, and services” (2).

In any establishment newly recruited personnel are generally given orientation that covers all the major sections of the organisation. The advantage of initiation is that the new recruits get acquainted with the organization and procedures right at the beginning, which puts them at ease and enables them to utilize the facilities without hesitation. Reasons for not

availing various services offered by the library can be cut down to a great extent. To ascertain whether libraries are giving due importance to library orientation, the scientists were asked whether they were put through any orientation programme on the services and facilities of the library on their induction into service. The results are tabulated in table 6.35.

Table 6.35 Library orientation received or not

Response	Scientists	Percentage
Yes	135	41.93
No	187	58.07
Total	322	100.00

Table 6.35 reveals that more than half (58.07%) of the scientists were not given any orientation on the activities and services of the library. 41.93% reported as having got orientation which means that at least in some libraries orientation programmes are conducted. The category wise break up of the response on orientation was also examined, the details of which are given in table 6.36

Table 6.36 Category wise break up of responses on orientation

Response	JS		SS		ES		Chi-square	p-value
	No.	%	No.	%	No.	%		
Yes	49	34.03	65	46.76	21	53.85	7.301*	0.026
No	95	65.97	74	53.24	18	46.15		
Total	144	100.00	139	100.00	39	100.00		

* Significant at 0.05 level

Table 6.36 shows that while 53.85% of the ES got initiation, 46.76 % of SS and only 34.03% of JS were initiated. Analysis reveals that there is a steady,

gradual decline in the orientation given to scientists, on induction. 65.97% of JS did not get any initiation to the library and its services. The Chi-square value, 7.301, of the variation in the responses on orientation among the three categories of scientists indicates that the difference is statistically significant at five percent level of significance. It can be inferred that the practice of initiation to the library seems to have been diminishing over a period of time.

As per table 6.35 it can be seen that 187 scientists were not given orientation to the library. In order to probe further, the scientists who were not given orientation to the library were again asked whether they preferred to have orientation. The responses are summarised in table 6.37.

Table 6.37 Response of users whether orientation is required

Response	JS		SS		ES		Total		Chi-Square	p- value
	No.	%	No.	%	No.	%	No.	%		
Yes	57	60.00	45	60.81	13	72.22	115	61.50	0.979	0.613
No	38	40.00	29	39.19	5	27.78	72	38.50		
Total	95	100.00	74	100.00	18	100.00	187	100.00		

The table 6.37 shows that among the three categories of scientists, 61.50% responded in the affirmative indicating that they need orientation while 38.50% stated that initiation is not necessary. It may be assumed that those scientists who opted out for orientation are already conversant with the facilities of libraries in general. The Chi-square value 0.979 is statistically insignificant showing that the opinion on the requirement of library orientation is more or less identical among the different categories of scientists.

6.5. EFFICACY OF LIBRARY SERVICES

The efficacy of library services is determined primarily by the level of user satisfaction which in turn depends on various factors like the availability and quality of various resources, the efficiency of classification, cataloguing, and arrangement of the documents, quality and capability of the various services of the library in retrieving and providing timely information, the quality and convenience of the physical facilities etc of the library.

6.5.1. Technical Organization

Optimum utilization of the resources is facilitated not by the good number of documents alone, but more by their proper classification, cataloguing and systematic stack arrangement. It is important because it saves avoidable loss of time in locating a particular document. With the emergence of new and diversified subjects and their interdisciplinary nature, classification and cataloguing have certainly assumed great significance. A good number of documents are added every year to the library collection. Classification brings to order this vast collection of literature and makes it user friendly. It aims to help the scientists find out all the documents on a subject, together. A dedicated classification system will enable easily retrievable arrangement and display of documents. Catalogue is the index of the holdings of the library and the guide to the identification and location of the document. Cataloguing should describe a document in such a way that the scientists are able to visualize the volume, its' size, date of publication, publisher and other relevant details which go into its' composition. To assess the efficacy of classification, cataloguing and the arrangement of the documents the scientists were asked to record whether they were satisfied

with the above technical aspects of the library or not. Summary of responses are tabulated in table 6.38.

Table 6.38 Satisfaction on technical organisation

Aspects	Satisfaction	Scientists	Percentage
Classification system	Yes	260	80.75
	No	62	19.25
Cataloguing system	Yes	251	77.95
	No	71	22.05
Arrangement of documents	Yes	247	76.71
	No	75	23.29

Table 6.38 reveals that a greater percentage of the scientists are satisfied with the technical organisation of the library. 80.75% and 77.95% of the scientists are found to be satisfied with the classification and cataloguing system respectively. It is also observed that 76.71% of scientists are satisfied with the arrangement of the documents on the shelves. Classification and Cataloguing are technical processes through which a document passes after acquisition, and before it finally reaches the shelves for the use of the clientele. Arrangement on the other hand not only includes the shelving of the documents on arrival from the technical section, but also the careful and proper replacement of the documents returned and consulted on a regular basis.

Due to the interdisciplinary nature of newly emerging subjects, classification poses a challenge to the library professionals. Often doubts arise as to under which subject the document is to be classified. Hence there is chance for dissatisfaction among the clientele because a document of interdisciplinary nature can be kept under any one subject only. 19.25% of scientists have reported their dissatisfaction about the classification system of the library.

It is observed that 22.05% of scientists have dissatisfaction about the cataloguing system also. It could be due to the inadequate rendering of necessary details desired by the scientists or the improper arrangement of the cards in case of a card catalogue system. Eighteen out of the twenty-six libraries under study have computerized their catalogue as revealed by the librarians. The OPAC has enormous possibilities. Any number of details can be given like key words, contents of the document, abstract etc. The catalogue can be improved upon to the satisfaction of the scientists.

Replacement and shelf rectification if not done systematically, the arrangement of documents will be in chaos. Without proper and correct arrangement of documents on the shelves according to their call numbers, it is very difficult for the clientele to trace them out. This results in the dissatisfaction of the clientele. It can be noticed that more than one fifth (23.29%) of the scientists are not satisfied with the arrangement of documents. This could be due to the careless replacements of used and consulted documents on shelves and also the lack of shelf rectification on a regular basis.

The difference seen in the level of satisfaction for classification, cataloguing and arrangement of documents, among the three categories of scientists, are tabulated in table 6.39

Table 6.39 Satisfaction of the different categories of scientists on technical organisation

Aspect	Satisfaction	JS		SS		ES		Chi - Square	p-value
		No.	%	No.	%	No.	%		
Classification	Yes	109	75.69	118	84.89	33	84.62	4.28	0.118
	No	35	24.31	21	15.11	6	15.38		
Cataloguing system	Yes	104	72.22	113	81.29	34	87.18	5.59	0.061
	No	40	27.78	26	18.71	5	12.82		
Arrangement of documents	Yes	108	75.00	115	82.73	24	61.54	8.08*	0.175
	No	36	25.00	24	17.27	15	38.46		

* Significant at 0.05 level

Table 6.39 reveals that 24.31% of JS are dissatisfied with the classification system while 15.38% of ES and 15.11% of SS also fall in this category. The cataloguing system is not up to the satisfaction of 27.78% of JS, 18.71% of SS and 12.82% of ES. JS are dissatisfied with the cataloguing system more when compared to SS and ES. It can also be observed that 38.46% ES are dissatisfied with the arrangement of the documents in the library, followed by 25% of JS and 17.27% of SS.

The difference seen in the level of satisfaction on the technical organisation of the collection among the three categories of scientists was tested using Chi-square distribution. The Chi-square values of the difference in the satisfaction on classification and cataloguing are found to be insignificant while that on the arrangement of documents (8.08) is statistically significant at five percent level showing that it is dependent on the categories of scientists.

6.5.2. Provision of Timely Information

What a user needs may be contained in a document in the library or another Information Centre or a database located far away. It should be possible for the library staff to help the user obtain such information in the minimum possible time. The clientele should be able to develop an attitude of viewing their library as an institution that will meet all their information requirements either directly or by drawing on the resources of other libraries, or databases. To assess the capability of the library in providing timely information the scientists were asked to specify whether the library could provide them with the required information in time. The summary of the responses is tabulated in table 6.40.

Table 6.40 Provision of timely information by the library

Response	JS		SS		ES		Total		Chi-Square	p-value
	No.	%	No.	%	No.	%	No.	%		
Yes	133	92.36	127	91.37	34	87.18	294	91.30	1.039	0.595
No	11	7.64	12	8.63	5	12.82	28	8.70		
Total	144	100.00	139	100.00	39	100.00	322	100.00		

It is observed from the table that 91.30% of the scientists responded positively where as 8.70% stated that they could not get the information in time. The reason for not providing the required information to this small percentage of scientists may be that the library is not holding the requisite information.

From the break up of the responses by the three categories of scientists it is observed that the maximum satisfaction (92.36%) is reported by the JS followed by SS and ES and the maximum dissatisfaction (12.82%) is by ES. Since the estimated Chi- square value is less than the tabled value, it can be concluded that provision of timely information and different categories of scientists are independent.

6.5.2.1. Lack / delay of information

Acquisition and provision of required information in time is the primary responsibility of a library. In the case of R&D laboratories it cannot be further stressed. Keeping this aspect in view the scientists were asked whether their project work had ever been affected due to the lack of or delay in getting the required information from the library. The results are tabulated in table 6.41.

Table 6.41 Whether project work had been affected by lack / delayed information

Response	JS		SS		ES		Total		Chi-Square	p- value
	No.	%	No.	%	No.	%	No.	%		
Yes	29	20.14	16	11.51	5	12.82	50	15.53	4.262	0.119
No	115	79.86	123	88.49	34	87.18	272	84.47		
Total	144	100.00	139	100.00	39	100.00	322	100.00		

It can be observed from table 6.41 that a total of 15.53% of the entire scientists community were affected by the lack of timely information where as the remaining 84.47% were not affected. It is also observed that the JS (20.14%) were affected the most due to lack or delayed information where as 12.82% of

ES and 11.51% of SS fall in this category. The Chi-square value is found to be statistically insignificant. It can be inferred that the absence of timely library service affects the work of the scientists in general. The lack of or delay in providing information could be due to library not holding the information, time taken in getting the information from other sources or the procedural time lag in procurement. However it is mandatory on the part of the authorities and library staff to ensure that all possible measures are taken to curtail avoidable delays in the provision of information to the scientists.

6.5.2.2. Frequency of visiting other libraries for required information

Each DRDO establishment is unique in its research programme as is evident from the name of the establishment. Hence the library attached to the particular establishment has its own unique collection and services depending on the subject of specialization, number and needs of the user scientists etc. Scientists engaged in research activity require a lot of current information to aid their research work. No library is self sufficient to meet all the requirements of their clientele. Hence scientists of one library often make use of the resources of other libraries too. The frequency of their visit to other libraries is an index to the extent of inadequacy of the collection and services of their own libraries. Hence an attempt was made to ascertain the frequency of their visit to other libraries for their information requirements. Scientists were asked to opt for one of the four alternatives listed, as applicable. The results are given in the table 6.42

Table 6.42 Frequency of visit to other libraries for required information in a month

Frequency	JS		SS		ES		Total		Chi-square	p-value
	No.	%	No.	%	No.	%	No.	%		
Ten or more times	10	6.94	14	10.07	5	12.82	28	8.70	10.704	0.098
Five or more times	30	20.83	37	26.62	14	35.90	82	25.47		
Rarely	90	62.50	81	58.27	15	38.46	187	58.07		
Never	14	9.72	7	5.04	5	12.82	25	7.76		
Total	144	100.00	139	100.00	39	100.00	322	100.00		

It is evident from table 6.42 that 34.17% of scientists visit other libraries five or more times in a month to obtain the required information. A greater percentage of 58.07 of scientists rarely visit other libraries whereas 7.76% never had to visit other libraries for required information.

The category wise break up shows that 9.72% of JS, 5.04% of SS and 12.82% of ES never had to visit any other library for information. Another 62.50% of JS, 58.27% of SS and 38.46% of ES rarely visited other libraries. The remaining, 27.77% of JS, 36.69% of SS and 48.72% of ES had occasion to visit other libraries five or more times to obtain the required information. It would be pertinent to remember that each laboratory has an area of specialization of its own. Since research work is inter-related, occasionally one might have to visit other libraries for obtaining specific information. It has been observed that DRDO libraries do encourage Inter Library Loan services. However the availability and easy access to the required information in the parent library itself will enable the scientists to save a lot of valuable time.

Since the tabled Chi-square value is greater than the estimated value, it is concluded that visiting other libraries for required information does not depend on the category of scientists.

6.5.2.3. CD / Internet searches

Providing the right information to the right user at the right time is the call of the day. To ascertain as to how quick the scientists got the required information in case of CD-ROM / Internet searches, they were asked to respond to the four intervals specified in the questionnaire. The results are tabulated in table 6.43.

Table 6.43 How quick CD / Internet searches give required information

Period	JS		SS		ES		Total		Chi-Square	p-value
	No.	%	No.	%	No.	%	No.	%		
Immediate	43	29.86	19	13.67	7	17.95	69	21.43	18.353**	0.005**
Same day	58	40.28	72	51.80	22	56.41	154	47.83		
2-3 days	24	16.67	37	26.62	5	12.82	66	20.50		
Week	19	13.19	11	7.91	5	12.82	33	10.25		
Total	144	100.00	139	100.00	39	100.00	322	100.00		

** Significant at 0.01 level

As is evident from the table while 21.43% of the scientists got the information immediately, 47.83% got it the same day. Another 20.50% got the information within 2-3 days where as it took one week for the remaining 10.25% of the scientists to get the information. It is found that more than 30% of the scientists had to wait for more than two days to get the required information from CD / Internet searches.

In addition to the above analysis, the category wise analysis was also done. It was observed that 29.86% of the JS got the information required immediately whereas only 13.67% of the SS and 17.95% of the ES got the required information in the same way. 40.28% of the JS, 51.80% of the SS and 56.41% of the ES got the required information on the same day though not immediately. It is noted that 29.86% of the JS, 34.53% of the SS and 25.64% of the ES did not get the required information on the same day.

The Chi-square value 18.353, which is statistically significant at one percent level of significance, indicates that the time taken to get information from CD/Internet searches depends on the categories of scientists.

6.5.2.4. Method of locating information

Easy access to the required information greatly influences the use of the library. Familiarity with the catalogue or OPAC, collection and its organisation in the library, attitude of the library staff and the nature of the user community are all factors influencing the utilization of the resources and services of the library. The user himself can locate the information required if the information resources are properly organised and arranged or the librarian can be requested to locate the same for him. In some cases the users locate the information with the help of the librarian. Regarding searching out the required information from the library the scientists were asked to specify one among the three options, whether they were able to search out the information themselves, or the librarian retrieved it for them or they sought the help of the librarian to locate the information. The results are displayed in table 6.44.

Table 6.44 Method of locating information

Method	JS		SS		ES		Total		Chi-Square	p-value
	No.	%	No.	%	No.	%	No.	%		
Self	47	32.64	42	30.22	10	25.64	99	30.75	4.69	0.321
Librarian	0	0.00	4	2.88	1	2.56	5	1.55		
Both	97	67.36	93	66.91	28	71.79	218	67.70		
Total	144	100.00	139	100.00	39	100.00	322	100.00		

Table 6.44 shows that an approximate 30% from each category totalling to 30.75% could find the information all by themselves. Only a meagre 1.55% comprising of four SS and one ES retrieved it through the librarian. These five scientists obviously might be belonging to the senior echelon in the hierarchy and due to preoccupations might have had to depend on the librarian to get the required information. It is also seen that 67.70% scientists took the help of the librarian to search out the information, which shows that the arrangement on shelves of used books or shelving should be improved and made more systematic, regular and efficient to help the scientists to locate the information by themselves easily and faster.

Since the Chi-square value 4.69, is found to be statistically insignificant it is concluded that the method of locating information is independent of the different categories of scientists.

6.5.3. User Feedback

User feedback can bring quality into the library development process. Suggestions put forth by the clientele, however simple they may appear, can make useful contributions if carefully implemented, in the overall development of the library, it's resources, facilities, and services. Keeping in

view of the objectives of the parent institution, the library provides various types of facilities suitable for its clientele. To assess the effectiveness of the services, regular formal feedback, in addition to informal feedback, should be obtained through a structured questionnaire, based on the analysis of which the library resources and services can be improved. With this point in view the scientists were asked whether the libraries insisted for any feedback from them. The results are presented in table 6.45.

Table 6.45 User feedback

Response	JS		SS		ES		Total		Chi-square	p-value
	No.	%	No.	%	No.	%	No.	%		
Yes	21	14.58	32	23.02	15	38.46	68	21.12	11.036**	0.004
No	123	85.42	107	76.98	24	61.54	254	78.88		
Total	144	100.00	139	100.00	39	100.00	322	100.00		

** Significant at 0.01level

According to the table 6.45, 254 (78.88%) out of the 322 respondents have stated that they have not been asked for a feedback. Only 68 respondents stated that their library insisted for a feedback. This means that most of the libraries are not keen on getting the feedback from its clientele, which is an unhealthy attitude on the part of the library. Feedback is one of the most important tools to assess user satisfaction and evaluate the library collection and services. It not only helps in enriching the library from the user point of view, but also in influencing the authorities on various policy parameters and decisions related to the growth and development of the library. The category wise break up shows that 85% of JS, 77% of SS and 62% of ES have reported that their library does not insist on feedback from them. It is noted that SS and ES are consulted more about the facilities of the library as feedback for improvement.

The Chi-square value 11.036, which is found to be statistically significant at one percent level of significance confirms that user feedback depend on the different categories of scientists.

6.6. PHYSICAL INFRASTRUCTURE

Even though the physical facilities of a library do not have any role in providing services to its users, it definitely has a great impact on the use of the library. An ideally located, spacious, properly ventilated, well lit, adequately furnished and preferably independent buildings are the basic tenets of a good library - to house the collection and to serve the users. It should have adequate seating capacity and should be devoid of dust and must be spotlessly clean. To assess the above aspects, the scientists were asked to give their statement of satisfaction about the physical facilities of their library. The category wise break up of the level of satisfaction among the scientists regarding the physical infrastructure was also examined. Chi-square test was applied to study the difference among the various categories of scientists in their satisfaction about the physical facilities.

6.6.1. Location

The library building should be centrally located and easily accessible to the users. The premises should be calm, serene and attractive. It should be devoid of industrial noise and disturbances. The features of the location should add to the concentration of the users and instigate them to visit the library more frequently.

Table 6.46 Location of the library

Aspect	Satisfaction	JS		SS		ES		Total		Chi-Square	P-value
		No.	%	No.	%	No.	%	No.	%		
Location	Yes	133	92.36	130	93.53	35	89.74	298	92.55	0.644	0.725
	No	11	7.64	9	6.47	4	10.26	24	7.45		

The responses in table 6.46 reveal that majority (92.55%) of the scientists are satisfied with the location and only 7.45% were not satisfied. This low percentage of dissatisfaction may be due to individual liking, choice and preferences and is negligible.

6.6.2. Space

A functionally effective and aesthetically pleasing layout for the library, with optimum utilisation of space should be planned. Internal planning of the library has to be done systematically so that the final lay out arrived at will not hamper in any manner the operational activities of the system.

Table 6.47 Space

Aspect	Satisfaction	JS		SS		ES		Total		Chi-Square	P-value
		No.	%	No.	%	No.	%	No.	%		
Space	Yes	120	83.33	107	76.98	30	76.92	257	79.81	2.003	0.367
	No	24	16.67	32	23.02	9	23.08	65	20.19		

The library should have adequate space for the reading room, reference hall, periodical wing, and stack room. It should have enough space for the clientele to move around without being a hindrance to others. Table 6.47

above shows that 79.81% of the user community are satisfied with the library space where as 20.19% are not. None of the scientists who were not satisfied with the available space have given any specific reason for the dissatisfaction or any suggestion for improvement.

6.6.3. Furniture

While a good collection and effective service are hallmarks of good library, a well-planned building with well-designed furniture and fittings is equally important. Adequate furniture for seating, stacking of books, bound volumes of journals, non-book materials, microforms, display of periodicals and new additions, and the like are necessary depending on the structure of the library and the services it provides.

Table 6.48 Furniture

Aspect	Satisfaction	JS		SS		ES		Total		Chi-Square	p-value
		No.	%	No.	%	No.	%	No.	%		
Furniture	Yes	109	75.69	108	77.70	29	74.36	246	76.40	0.26	0.878
	No	35	24.31	31	22.30	10	25.64	76	23.60		

The furniture provided should be comfortable and ergonomically designed and bug free. Table 6.48 shows that a greater percentage of the scientists (76.40%) are satisfied with the furniture while the remaining 23.60% are not, which constitutes more than one fifth of the user population. Attempt should be made to find out the cause for dissatisfaction by obtaining feedback from the scientists or through personal interactions and remedial measures should be planned.

6.6.4 Seating capacity

The seating capacity and layout should be such that there is no congestion. It should be well spread out and be adequate enough to take on additional flow of users. Separate seating provisions must be made in the different sections of the library.

Table 6.49 Seating capacity

Aspect	Satisfaction	JS		SS		ES		Total		Chi-Square	p-value
		No.	%	No.	%	No.	%	No.	%		
Seating capacity/arrangement	Yes	109	75.69	108	77.70	29	74.36	246	76.40	0.26	0.878
	No	35	24.31	31	22.30	10	25.64	76	23.60		

The entire seating area should be adequately lit and have enough ventilation. The responses in table 6.49 shows that 76.40% of the users are satisfied with the seating capacity and seating arrangements where as 23.60% of the user scientists are not satisfied.

6.6.5. Lighting and Ventilation

The various sections of the library should have proper lighting arrangement and adequate ventilation. If too much of light is injurious to eyesight, the dim light is not less harmful. It is desirable to have natural light available through the windows. Where the design and the structure of the building do not provide natural light, then arrangement should be made for artificial light. Similarly adequate ventilation must be provided to ensure continuous air circulation. The responses of the scientists are displayed in table 6.50

Table 6.50 Lighting and ventilation

Aspect	Satisfaction	JS		SS		ES		Total		Chi-Square	P-value
		No.	%	No.	%	No.	%	No.	%		
Lighting/ Ventilation	Yes	111	77.08	108	77.70	29	74.36	248	77.02	0.19	0.908
	No	33	22.92	31	22.30	10	25.64	74	22.98		

It has been observed from table 6.50 that 77.02% of the scientists are satisfied with the lighting and ventilation of the library while 22.98% are not satisfied.

6.6.6. Cleanliness

Cleanliness forms an integral part of any organization. Regular dusting, sweeping and keeping the lavatories clean alone does not make cleanliness. It involves regular shelving of consulted or returned reading materials, regular disposal of waste materials of the library and the nearby premises etc. Normally too much dust is found in the bookracks and cobwebs found in generally less used areas. There is a general tendency to accept it as a matter of routine. The dust and cobwebs are to be removed periodically. The floor of the halls and the seating area should be cleaned with wet cloth at least once in a fortnight. Responses of the scientists on cleanliness are tabulated in table 6.51.

Table 6.51 Cleanliness

Aspect	Satisfaction	JS		SS		ES		Total		Chi-Square	P-value
		No.	%	No.	%	No.	%	No.	%		
Cleanliness	Yes	115	79.86	119	85.61	30	76.92	264	81.99	2.35	0.308
	No	29	20.14	20	14.39	9	23.08	58	18.01		

Table 6.51 shows that with cleanliness 81.99% of the users are satisfied while 18.01% are not.

The Chi-values obtained for the various aspects of physical infrastructure are found to be statistically insignificant indicating that the level of satisfaction regarding the physical infrastructure is not dependent on the category of scientists.

6.7. GENERAL REMARKS OF THE USER SCIENTISTS

The questionnaire formulated by the researcher, provided full opportunity to the user scientists to express their opinions / remarks / views on the various resources and services as well as any other aspects concerned with the library. Some of the valid opinions expressed by the users have been grouped and are presented in the following paragraphs.

The general opinions put forth by the scientists regarding resources were to procure more number of books and journals in the specific subject areas of the present research activities undertaken by the establishment, to procure reports of all national and international seminars, to update the existing database on a regular basis and make it available on the Intranet and

to obtain the latest versions of standards and specifications regularly in the library and circulate lists periodically to all the divisions of the laboratory and to provide easy access to patent information on topics related to the field of their work.

Many of the scientists were of the view that the facilities available in the library should be brought to the notice of the scientist community by conducting periodic awareness programmes. They opined that periodical talks by library staff on the services offered, new services introduced, how to use the various facilities available etc. and regarding latest acquisitions would be of immense help to the scientists for optimum utilization of the library. Publicity should be given to certain important services like Content Page Service, SDI and CAS. There is a need to organize orientation programmes for the newly inducted scientists.

It is the opinion of many that resource-sharing programmes must be given due importance and the ILL facility must be made easier to avail and the number of ILL tickets must be increased. Resource sharing would be easier if all major libraries in a station are connected through computer network. Inter connectivity among the various DRDO libraries and other major libraries in a station and DRDO libraries in India, as a whole, has also been projected by some scientists. The opinion of the users also include the concept of virtual library to meet the requirements of the scientists, provision of knowledge management cells in the library for extending consultancy, bibliography service for current projects and obtaining feedback from the users.

Scientists of some laboratories have demanded for extension of the library working hours up to 9 PM and keep the library open during holidays.

Another major observation is that many useful books are made reference books because of which accessing information from them becomes time consuming. Scientists suggest that one more copy of the same must be procured and made available for circulation.

OPAC should be made available to the users, which should include issue related information also. Number of terminals for the users should be increased. Internet services, microform reader/printer, audio/video facility etc should be made more efficient and easily accessible. There is a popular demand for a dedicated Internet connection and provision of online reservation and provision of technical news bulletins/ newspaper clippings/ latest publications through Intranet.

Working space, more furniture, lighting / ventilation, provision of casual labourers on a daily basis to maintain the cleanliness of the whole library and provision of clean drinking water etc. are some of the points projected.

6.8. CONCLUSION

With the tremendous advance of technology, information is within the easy reach of almost everyone. However library professionals play and will continue to play the role of mediators by systematic acquiring, processing, retrieving, packaging and delivering the appropriate information to its user groups.

It is important for the librarian to understand the specific needs of the users based on which appropriate information procurement can be made,

processed and packaged so that right information reaches to the right user at the right time. Libraries should redesign their services incorporating new technologies, upgrade information resources, train people and concentrate on effective information delivery to satisfy the changing information needs of the users who want information tailor made to their requirements. The convictions that 'information is for use' and 'every information has its user' have obliged libraries to mould themselves to cater to the requirements of the users. Libraries went through the various stages of computerization and now digitilisation so that virtual libraries can be made accessible. However the ultimate aim of libraries remain the same ie to serve and reach the user faster.

It was attempted in this chapter to have an in-depth study of the information requirements of the defence scientists and the utilization of the DRDO libraries. The analysis of the responses of the user community to include the frequency and purpose of their visit to the library, time spent in the library, the adequacy of the library resources, services and physical infrastructure etc. were covered. The analysis has brought out certain findings, which pinpoint the areas that require the immediate attention of the authorities.

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FINDINGS AND SUGGESTIONS

M. Santha Kumari “Organisation, administration and utilisation of DRDO libraries ” Thesis. Department of Library and Information Science, University of Calicut, 2004

CHAPTER 7

FINDINGS AND SUGGESTIONS

7.1. INTRODUCTION

The survey of available literature on DRDO libraries had revealed that no comprehensive attempt had been made earlier to study and evaluate the organisation, administration and utilization of resources and services of DRDO libraries. This survey, designed and executed as a descriptive and evaluative study of these aspects, analysed the data collected from the responses of the librarians of DRDO libraries and the user scientists working in the various DRDO laboratories, through the questionnaires sent to them. The analysis of the responses of the twenty-six librarians provided details of the organizational set up and administrative procedures of these libraries, while the analysis of the responses from the three hundred and twenty two user scientists provided details regarding their utilization of resources and services of DRDO libraries. The survey helped to identify the strengths and weaknesses of these libraries. It also revealed the views of the scientists regarding the various procedures followed in the libraries and pointed out wherever improvement is necessary. The information requirements of the scientists were also examined. The three categories of scientists namely the Junior Scientists, Senior Scientists and Eminent Scientists, selected by proportionate stratified random sampling, formed the sample of this study. Statistical tools were applied to study the difference among the three categories of scientists in utilizing the various resources and services of the library. The results were then subjected to inter group analysis wherever required to find out, among which categories the differences seen were statistically significant.

7.2. INFERENCES

The findings drawn from the analysis of the responses of the librarians in respect of the organisation, administration and physical infrastructure of the libraries and of the defence scientists in respect of their information requirements and utilization of DRDO libraries are summarized under the following heads.

7.2.1. Organisation and Administration of DRDO Libraries

- There are fifty-two (52) DRDO laboratories scattered through out the country, out of which eleven (11) laboratories have no library. DESIDOC is the apex body of the DRDO library system.
- Ten (10) DRDO libraries are located in North and thirty (30) in South India.
- The State of Karnataka has ten (10), the highest number of DRDO libraries in a State followed by Delhi, Maharashtra and Uttar Pradesh having six (6) each while Andhra Pradesh has five (5).
- Each DRDO laboratory has a unique area of specialization.
- Out of the twenty six (26) libraries covered in the study 96% of them were established prior to 1990 and one in 1994.
- The organizational structure of the library varies depending upon the services offered by the library and the strength of the manpower in them.

- In all DRDO libraries the Director of the laboratory is the supreme authority. He is assisted by an Associate Director (AD), Group Director (GD) and Coordinator (Coord) in organising, coordinating and supervising the library activities.
- Even though the Librarian practically directs the various activities of the library in his capacity as the Head of the library, the librarian is accountable to the Director through the AD / GD / Coordinator for all the activities of the library.
- All DRDO libraries have a Library Committee (LC) appointed by the Director of the laboratory. LC has a major role in the development of the library.
- The periodicity of LC meetings varies among the laboratories. Most of them convene meetings on requirement basis. Emergency meetings are also held.
- Books and book like materials, journals, CD-ROM products etc. are procured from vendors who are registered with DRDO libraries.
- UDC is used for classification by 88% of DRDO libraries while the rest use DDC.
- In most of the libraries, technical reports and standards & specifications are not classified. 77% of the libraries classify only books.
- Loose journal issues and bound volumes of journals are arranged alphabetically and within the alphabetical arrangement, they are stacked in a chronological order.

- All documents are catalogued using AACR in 92% of libraries, while the rest use CCC.
- Stock verification is done annually by the Stock Verification Board in 81% of libraries. Large libraries conduct stock verification within a gap of two to five years.
- The mode of recovery and the rate of the handling charges vary among the different DRDO libraries in the case of loss of documents from user. Replacement of the lost book is the usual practice.
- The Head of the laboratory has the power to write off lost documents up to a total value of Rs.5, 000/- per year.
- Weeding out is resorted to by 77% of libraries. A Weeding Out Board is constituted for this purpose. The list of weeded out documents not mutilated or damaged is circulated among other DRDO establishments so that they can select required documents from this list. Documents not demanded, are sold at a price as fixed by the Weeding out Board to employees of the DRDO laboratories. The remaining documents are donated to social organisations / trusts / public libraries etc. in the best interest of the utilization of such weeded out documents.
- Binding is outsourced, as most of the DRDO libraries do not have a binding section. Tendering is resorted to for getting the documents bound.
- The range of expenditure of funds varied from Rs.2.60 lakhs to Rs.1.31 crores among the various DRDO libraries for the year 2000/2001. No specific criteria were followed for budgetary sanctions.

- The amount spent on journals is enormously high when compared to books and book like materials. More than 65% of the libraries spend 60% to 80% of the annual library fund on subscription of journals.
- Indian Journals are procured for a very meagre amount ranging from Rs 5000/- to Rs 50,000/-.
- No library under study is found to subscribe journals by consortia.
- Manpower of the library depends on the size of the various collections and the services offered by it.
- Inadequacy of staff is reported in 58% libraries.
- Great disparity is observed both in the proportion of professionals, semiprofessionals and non-professionals and also in the ratio of qualified professionals to scientists among the various DRDO libraries.
- Staff are deputed for refresher courses / Continuing Education Programme (CEP) and other various courses by 81% libraries.
- Equipments available in the library depend on the services offered and the type of resources held.
- Quantum of reports, standards and specifications, bound volumes of journals; current journals and books on the subject of specialization of the parent laboratory are large in all DRDO libraries.
- Full text CDs are held by 31% of libraries.
- Growth of various collections is found to depend on the R&D activities undertaken by the laboratories than on the age of the libraries.

- Steady annual increase in the collection of books during the last five years was recorded in only 12% of libraries. Rest of the libraries showed undulating figures.
- The journal subscription for the year 2000/01, ranged from 31 to 235. Around 50% of the libraries were subscribing to up to 100 journals and the remaining subscribed to more than 100 journals. 12% libraries subscribe to more than 200 journals.
- All the DRDO libraries follow open access. Only classified documents are kept under closed access.
- The working hours span to eight hours plus a lunch break of 15-30 minutes. The working time of the library and the laboratory are the same, which is inconvenient and insufficient for the scientist community. 35% of libraries function on Saturdays to allow enough time to the defence scientists to frequent the library.
- Membership is open to all regular employees of the laboratory without any membership fee. Membership is given at the discretion of the Head of the Laboratory to others as special cases for a specific period of time.
- The loan period for the various reading materials are at variance among different DRDO libraries and are decided by the LC with the approval of the Director.
- Inter Library Loan (ILL) facility is available in all the DRDO libraries.
- Majority of libraries (96%) have photocopy service.
- OPAC, circulation of accession list and CD-ROM search services are available in more than 60% of the libraries.

- More than 50% of the libraries have Internet services, indexing, preparation of bibliographies, Selective Dissemination of Information and News Clipping service in their libraries.
- Translation requirements of all DRDO laboratories are supported by DESIDOC.
- Most of the libraries use Utility & User Survey and direct observation as their main collection evaluation methods. Very few libraries analyse the ILL statistics while some evaluate their collection based on compilation of statistics.
- Only few libraries have designed publicity brochures. Others publicise their services through Intranet, web page, fixograph boards etc.
- Primary means of communication are available with all the libraries.
- Only 35% of the libraries are using Suchika, the integrated library management software developed exclusively for DRDO libraries. Rest of the libraries are found to use different software packages.
- The library web page is available only for 19% libraries.
- The LAN within library is available in more than half of the libraries.
- The user orientation programme is offered by 46% of libraries only.
- Many librarians (54%) are not satisfied with the location of the library.

- Only 31% libraries have independent building. The rest are housed along with other divisions of the laboratory sharing the building. Many libraries do not have the provision for future expansion.
- The average plinth area of the libraries under study is calculated as 7120 sq.ft. 42 % of libraries have space below the average.
- The average number of seats available in DRDO libraries covered in the study is 52. Many of the libraries (62%) have seating capacity below the average.
- Only 46% of the librarians are satisfied with the physical infrastructure of their libraries. 38% of the librarians stated that the physical facilities need improvement.

7.2.2. Utilisation of DRDO Libraries

- Scientists in general visit the library for books on specific subjects of interest to them and their parent organization, followed by reference books and current subject journals.
- The Junior Scientists visit libraries more to consult reference books than the Senior and Eminent Scientists. The tendency to visit libraries to consult reference books is found to decrease with the increase in the grade or experience of the scientists.
- Scientists visit the library to use the OPAC or Intranet, or to obtain photocopies of documents, or to avail the Internet facility more, when compared to the other services.

- Junior Scientists tend to avail the Internet service more than the Senior and Eminent Scientists.
- The Eminent Scientists use the Inter Library Loan service much more than the other two categories of scientists.
- The information obtained from the library is used more to solve immediate technical problems, to keep abreast with the latest developments and to prepare for interviews and assessments, than for other purposes.
- Junior and Senior Scientists seek information more to solve immediate technical problems while Eminent Scientists seek information mostly to keep up with the latest developments.
- Junior and Senior Scientists seek information, also to prepare themselves for interviews and assessments.
- Majority of scientists (98%) visit the library for information every week. More than 61% visit twice or more while 37% visit once a week. The pattern of weekly use of the library is almost identical by the three categories of scientists.
- Daily visits by individual scientists are comparatively less (10%).
- There are more than fifty users per day in 54% of libraries while 15% have more than hundred users. 46% of libraries have only below fifty users per day.

- More than twenty-five issues per day are reported in 62% of libraries. 58% of the libraries have up to fifty consultations per day.
- Greater percentage (52%) of scientists spend one to two hours a week in the library while 30% spend two to four hours. Senior Scientists spend more time in the library compared to Junior and Eminent Scientists.
- With regard to the usefulness of the different reading materials scientists prefer books on specific subject, current subject journals and reference books, more.
- With regard to usefulness among the services, the photocopy, indexing, OPAC / Intranet and the Internet services are preferred more than the rest of the services offered.
- In the case of contributions of articles and conference papers during the period from 1996-2001 the maximum contribution is by the Eminent Scientists followed by the Senior Scientists. The contribution of Junior Scientists is much lower.
- Personal contributions of scientists in the case of books and patents are negligible.
- Participations in conferences and seminars are higher in the case of Eminent Scientists when compared to Senior and Junior Scientists.
- The various reading materials of the library collection have been graded on an average as adequate by 39% of the scientist community.

49% has reported them as only partially adequate while 12% of the user community rated the reading materials as inadequate.

- Reference books and current subject journals were graded as adequate by 47% of the scientists. 40% graded back volumes of journals as adequate while 36% rated books on specific subject as adequate. Only 28% of the scientists graded theses / reports / govt. publications as adequate. Standards and specifications were rated as adequate by 33% of the scientists.
- Services like OPAC / Intranet, Internet, SDI / CAS, photocopy, inter library loan and news clippings service offered by the library were rated on an average as adequate by 26% of the user scientists only. 37% has rated the services as partially adequate while an equal percentage of scientists regarded the services of the library as inadequate.
- OPAC & Intranet facilities were graded as adequate by 41% of the scientists while the Internet facility was graded as adequate by only 22% of the scientists. Photocopy and Inter library loan service were stated as adequate by 27% and 35% respectively, while SDI / CAS and News clipping service were graded as adequate by only a meager 19% and 14% of the scientists respectively.
- Libraries other than parent libraries are visited by 34% of scientists for required information more than five times in a month.
- Majority of the scientists (92%) got information available in the library in time.
- More than 30% of scientists had to wait for more than two days to get the required information from CD and Internet searches.

- More than 30% of scientists had to wait for more than two days to get the required information from CD and Internet searches.
- Most of the libraries are not keen on getting the feedback from its clientele.
- Reasons for not availing the various services were given by some of the scientists as 'not aware', 'do not know how to use', 'time consuming', 'no need' and 'not available'.
- Many of the scientists do not receive initiation to the library activities and services.
- More than 20% of the user scientists are not satisfied with the physical infrastructure of the libraries.

7.3. TENABILITY OF HYPOTHESES

Data collected through the questionnaire from the librarians as well as the defence scientists were analysed with appropriate statistical tools and the results were drawn out which were summarized as the findings of the study. In the light of the major findings the tenability of the hypothesis framed for the study were tested. The following statements are the outcome of testing the hypothesis.

1. Analysis of the adequacy of resources of DRDO libraries namely, the collection of reading materials, finance, manpower and equipments, elaborately dealt with in chapter five, reveals that the resources are not sufficient. Analysis of the responses of user scientists in chapter six also confirms the finding and reveals their dissatisfaction with the

existing resources in the DRDO libraries are inadequate to meet the information needs of the scientists' is substantiated.

2. Analysis of data in chapter five and six reveals that the services of the DRDO libraries are not sufficient enough to meet the requirements and expectation of the defence scientists. The library working hours and many of the information services offered by the library are found to be inadequate. The user satisfaction regarding the adequacy of information services is found to be negative substantiating the second hypothesis that 'the services of the DRDO libraries are not satisfactory'.
3. Analysis of the data on the physical infrastructure of the DRDO libraries obtained from the librarians as well as the user scientists dealt with in chapter five and six respectively, has revealed that it needs improvement. More than half of the libraries do not have independent buildings and many of them do not have provision for future expansion. Many of the librarians and users are not satisfied with the physical facilities of the libraries substantiating the third hypothesis also that the 'physical infrastructure available in DRDO libraries is not adequate'.

7.4. SUGGESTIONS

The survey helped to identify some of the drawbacks in the various aspects of functioning of the DRDO libraries, which need improvement. On examining the findings and the requirements put forward by the librarians and users, a few points could be singled out which need the attention of the authorities. They are presented in the following paragraphs.

- The reference collection should be kept up-to-date by adding the latest editions of the most frequently used reference books and by weeding out obsolete reference books. One extra copy of the books on high demand must be procured and made available in the reference collection.
- Reports of all national and international organisations and seminars of science and technology should be procured.
- Latest versions of standards and specifications should be obtained regularly in the library and lists of the same should be circulated periodically to all the divisions of the laboratory.
- Easy access to patent information on topics related to the research work of the parent laboratory should be provided.
- DRDO library collection should be networked to enable all the defence scientists to access the resources of all the DRDO libraries.
- CD-ROM products should be given more importance and developed into a good collection in view of its tremendous advantages.
- Prompt replacement of returned and consulted books and periodic shelf rectification as well as proper labeling of the shelves and racks should be ensured to allow easy location of the information required.
- Overdue charge should be levied so that books are returned in time.
- Libraries should have their own binding section.

- Irrespective of whether the establishment is small or otherwise, endeavour must be made to provide all the library services to the scientists, in an efficient way.
- The facilities available in the library should be brought to the notice of the scientist community by conducting periodic awareness programmes. Periodical talks by library staff on the services offered, new services introduced, how to use the various facilities available etc. and regarding latest acquisitions should be conducted for optimum utilization of the library.
- Publicity should be given to certain important services like SDI and CAS. The services not provided so far should be introduced without delay.
- User orientation programmes for the newly inducted scientists should be arranged.
- Working hours of the library should extend beyond the working hours of the laboratory and should function twelve hours a day so that scientists can utilise the library without any hindrance to their routine work. It is ideal if the service sections of the library functions for one shift during holidays.
- It is necessary to use a standard library software package by all DRDO libraries, which would assist in networking of the DRDO libraries.
- The existing database of the library should be updated on a regular basis and made available on the Intranet and on CD ROM if necessary.

- Provision of online reservation and provision of technical news bulletins / newspaper clippings / latest publications should be made available through Intranet.
- Adequate number of terminals should be provided for the users. OPAC should include information on issue status of books, like to whom the book is issued, its due date etc. also.
- A dedicated Internet connection for the library with adequate computer terminals would enable the scientists to get the required information from Internet and CD searches without any time lag.
- Microform reader / printer, audio / video facility etc should be made more efficient and easily accessible.
- Feedback should be insisted, as it may contain fruitful suggestions which if implemented would lead to the overall development of the library and to the satisfaction of the clientele. The library should make deliberate efforts to obtain feedback from the user community through a structured questionnaire at regular intervals regarding the resources and services as well as other aspects of the library and endeavour to do the needful accordingly.
- DRDO should have consortium approach for on-line journal subscription.
- Library staff should be in proportion to the strength of the users, services provided and the working hours of the library. Qualified professionals supported by adequate staff should man all libraries.

- All efforts must be made to fill up the shortage of manpower as per the DRDO staff formula. Additional staff must be provided for each new service added.
- Library staff should be regularly detailed for in-service training and to attend various courses and education programmes to enable them to keep pace with the latest trends in the field.
- The librarian with the consent of the management should organize periodic visits of the library staff in rotation, to the other major libraries in the region, which will enable mutual exchange of ideas and innovations on the resources and services of the libraries.
- The DRDO libraries being special libraries of R&D establishments should have independent library buildings for their efficient functioning.
- Libraries should have a modular structure in view of future expansions.
- Libraries should be provided with ergonomically designed furniture.
- Scientists should be provided with cubicles for reference without any hindrance.
- Adequate space should be catered for the various sections of the library right in the planning stage itself anticipating its growth and development.

- Library should have separate sections for bound volumes of journals, Internet / CD-ROM searches, reference services, reprography etc to enhance the functionality of the library.
- Cleanliness cannot be compromised and necessary and stringent measures must be taken to ensure total cleanliness and provide a hygienic atmosphere.

7.5. AREAS FOR FURTHER RESEARCH

This research work, which endeavoured to study the organisation, administration and utilisation of DRDO Libraries, has identified a few areas for further research in future.

1. A comparative study of the organisation, administration and utilization of the services of the DRDO libraries with other R&D establishments in the country.
2. An in depth study of the resource sharing means of the DRDO libraries and other major libraries in a region to enhance the rate of information transfer.
3. A study on the standardisation of library software for DRDO libraries.
4. A study on consortium approach for on-line journal subscription for DRDO libraries.

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APPENDICES

QUESTIONNAIRE

(To the Head of the Library)

INSTITUTION/ESTABLISHMENT

1. Name of the Institution/Estt. : _____
2. Address of the Institution/Estt. : _____
3. Area of Specialisation : _____
4. Major fields/subjects of R&D : _____
5. Year of establishment : _____
6. Total strength of the Institution/Estt.: _____

LIBRARY

1. GENERAL INFORMATION

- 1.1. Name of the Library : _____
- 1.2. Year of establishment : _____
- 1.3 E-mail address of the Library : _____
- 1.4 Name & Designation of the
Head of the Library : _____
- 1.5 Please give the Organizational chart of the library.(Attach separate sheet)*

2. INFRASTRUCTURAL FACILITIES

- 2.1 Is the library building independent? Yes / No
- 2.2 Location of the library? Centrally located/Convenient/Inconvenient
- 2.3 Please give approximately the total area of your library in sq mtr. _____
- 2.4 What is the total seating capacity for library users? _____
- 2.5 Do you have provision for future expansion of the library building? Yes / No
- 2.6 Do you have separate binding section? Yes / No
- 2.7 Do you have separate computer section? Yes / No

- 2.8 Do you have separate section for bound volumes? Yes / No
- 2.9 How do you rate physical facilities of the library?
(Please ✓ mark the appropriate)

Excellent	Very Good	Good	Satisfactory	Needs improvement

3. LIBRARY COMMITTEE

- 3.1 Is there a Library Committee (LC)? Yes / No
- 3.2 Is the library governed by the LC? Yes / No
- 3.3 Please specify the composition of the LC:
- 3.3.1 Who is the Chairman of the LC? _____
- 3.3.2 Who is the Convener of LC? _____
- 3.3.3 Number of Subject Experts in the LC _____
- 3.3.4 Number of Library Professionals in the LC _____
- 3.3.5 Others (Pl. specify) _____
- 3.4 What role does the Head of the library have in the LC?
- 3.5 How often does the Committee meet? _____
- 3.6 Please specify the functions of the LC:

4. LIBRARY BUDGET AND FINANCIAL REQUIREMENT

- 4.1 Please mention the sources of finance for the library
(Please ✓ mark the appropriate)

Library Budget	General Budget of the lab./estt.	Project Budget of the lab./estt.	Any other (Specify)

4.2 Please specify the type of budget used for the following items
(Please ✓ mark the appropriate)

No.	Items	Library Budget	General Budget	Project Budget
4.2.1.	Books/Reprints			
4.2.2	Journals			
4.2.3	Microforms			
4.2.4	Online database			
4.2.5	Library equipment/ AMC for Equipments			
4.2.6	Binding			
4.2.7	Institutional membership			
4.2.8	Furniture			
4.2.9	Computer System/ AMC/ /Accessories			
4.2.10	Library automation software/ AMC			
4.2.11	Subscription for Internet Connection			

4.3. Please specify the total budget for the following, for the last five years

Sl. No.	Items	1996/97	1997/98	1998\99	1999/\00	2000/01
4.3.1	Books / Book like materials					
4.3.2	CD-ROM Database					
4.3.3	Audio/video tapes/CD					
4.3.4	Journals	Indian				
		Foreign				
4.3.5	Binding					
4.3.6	Equipments					

5. SELECTION AND ACQUISITION

5.1 What are your major selection tools (Please ✓ mark the appropriate)

User Demands/ Indents	Publishers / Book sellers catalogue	Subject Bibliography	Reviews	Fairs/ Exhibitions	Internet	Approval basis

Any others (Please specify)

5.2 Please give the number of demands / indents received for procurement of publications for the year 2000-01: _____

5.3 Who is the sanctioning authority for the selection & acquisition of publications? _____

5.4 Do you appoint vendors for procurement of publications? Yes / No
 If yes, how is the vendor selected ? (Please ✓ mark the appropriate)

Past performance	Distributorship of publishers	Reputation and recognition	Discount offered	Limited tender	Open tender

Any other (Please specify) _____

5.5 Do you register vendors / suppliers? Yes / No
 If yes, please give in brief the registration procedure

5.6 Who is the payment sanctioning authority for library bills? _____

5.7 Who is the payment authority for library bills? _____

BOOKS AND REPORTS

5.8 What is the currency conversion used for payments? GOC / RBI

5.9 Do you insist for the price proof for the document supplied along with the bill? Yes / No
 If no, how is publisher's price verified?

5.10 Do you maintain one accession register for all types of documents procured? Yes / No
 If no, please specify the various Accession Registers:

JOURNAL SUBSCRIPTION

5.11 On what criteria do you select / renew journals?
 (Please ✓ mark the appropriate)

User request	Utility survey	For new projects

If on utility survey, how do you conduct it? Please explain.

5.12 Who decides the mode of subscription and physical format of the journals? _____

5.13 Mode of journal subscription (Please ✓ mark the appropriate)

Direct from publishers	Through vendors	Membership	Exchange	On gratis

5.14 Do you subscribe journals by consortia? Yes / No

5.15 Do you maintain subscription register (giving subscription details)? Yes / No

5.16 How are the periodicals recorded in your Library?
(Please ✓ mark the appropriate)

Register method	Kardex	Three card system	Using Library Software

5.17 Do you subscribe to e-journals? Yes/No

ONLINE DATABASE / CD-ROM DATABASE / SEARCH SERVICES

5.18 On what criteria do you select/renew online database/CD-ROM database?
(Please ✓ mark the appropriate)

User request	Utility survey	For new projects

5.19 Do you subscribe to online database? Yes / No

5.20 Do you maintain a logbook of usage for online database? Yes / No

5.21 Do you procure CD-ROM database? Yes / No

5.22 How are the CD-ROM Databases recorded in your Library?

5.23 Do you keep an account of usage of database on CD? Yes / No

5.24 Do you subscribe to any online search service offered by publishers/
Aggregators? Yes / No

6. LIBRARY COLLECTION

6.1 Please specify the total library collection as on 1.4.2001 & the collection added during the last five financial years.

SNo	Items	Total collection as on 1.4.2001	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001
6.1.1	Books						
6.1.2	Reports						
6.1.3	Standards/Specifications						
6.1.4	Bound volumes of journals						
6.1.5	Microforms						
6.1.6	Audio/video CD						
6.1.7	CD-ROM Database						
6.1.8	Full text CD						
6.1.9	Journals (Print version)						
6.1.10	Journals (Online)						
6.1.11	Journals (On CD)						

7. TECHNICAL ORGANIZATION AND MAINTENANCE OF RESOURCES

7.1 Do you classify all the documents? Yes / No
If no, please specify the type of documents not classified and why?

7.2 Please ✓ mark the classification scheme used to classify the documents.

UDC	DDC	CC	LC	Any other (Please specify)

7.3 Are all the documents arranged on shelves class number wise? Yes / No
If no, how are they arranged? _____

7.4 Do you catalogue all the documents? Yes / No
If no, please specify the type of documents not catalogued and why?

7.5 Please ✓ mark the catalogue code used for cataloguing the documents.

AACR	CCC	Any other (Please specify)

7.6 Do you maintain shelf list cards?

Yes / No

7.7 Please ✓ mark the physical form of your catalogue?

Printed book form	Card form	OPAC	Any other (Please specify)

7.8 Please ✓ mark the type of catalogue used in your library?

Dictionary	Classified	Both	Any other (Please specify)

7.9 Please ✓ mark the indexing system used in the library?

Chain indexing	Uniterm	PRECIS	POPSI	Any other (Please specify)

7.10 Do you maintain journals holdings of your library?

Yes / No

If yes, please ✓ mark the form in which it is available

Printed book form	Card form	OPAC	Any other (Please specify)

Stock Verification

7.11 How often stock verification is done usually?

7.12 Who conducts the stock verification? _____

7.13 Do you close the library for stock verification?

Yes / No

If yes, for how long? _____

7.14 Have you implemented barcode technology for stock verification?

Yes / No

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7.15 How do you conduct stock verification? Random Sampling/ All documents

7.16. Does Head of the Library have any write off limit for the loss of documents?

Yes / No

If no, please specify who has the write off authority? _____

7.17 What is the procedure you follow to regularise the loss?

7.18 Please explain the procedure followed in your library for loss of documents by users

7.19 Do you follow any weeding out programmes to make your collections up to date?

Yes / No

If yes, please explain the procedure followed.

7.20 Do you have binding facility in your library?

Yes / No

If no, please mention the method adopted for binding _____

8. LIBRARY AND INFORMATION SERVICES

8.1 Please specify the working hours of the Library:

Days	Week days	Saturdays	Sundays	Other holidays
From-----to-----				

8.2 Do you have library user / visitor register at the entrance?

Yes / No

8.3 Do you offer user orientation or guidance programmes to your clientele? Yes/No

8.4 Please specify the details regarding the following

Category of members	Scientists	Technical Officers	Technical Assistants	Technicians	Others
Number of members					

8.5 Please specify membership categories

Category of members	Scientists	Technical Officers	Technical Assistants	Technicians	Others
Number of borrowers cards					

8.6 Please state the number of Library users per day.
(Please ✓ mark the appropriate)

Below 25	25 - 50	50 - 75	75 - 100	100 - 200	200 and above

8.7 Please state the number of documents issued per day
(Please ✓ mark the appropriate)

Below 25	25 - 50	50 - 75	75 - 100	100 - 200	200 and above

8.8 Please mention the number of books consulted on an average per day _____

8.9 Please specify the loan period (duration of issue) for the following:

No	Material	Period	No	Material	Period
8.9.1	Books		8.9.6	Bound volumes of journals	
8.9.2	Reference books / Theses/dissertations		8.9.7	Audio/Video tapes/CDs	
8.9.3	Reports, patents, proceedings, standards, etc.		8.9.8	Floppies and CDs that accompany books & journals	
8.9.4	Microforms		8.9.9	Full text CDs / CD-ROM Databases	
8.9.5	Loose issues of journals		8.9.10	ILL CARD	

8.10 Do you send reminders for overdue documents? Yes/No

8.11 Do you collect fine for overdue documents? Yes/No
 If yes, how much per day? _____

8.12 How is the fine collection utilised / regularised?

8.13 Please ✓ mark the access system followed in your Library

Open access system	Closed access system	Both

8.14 Please ✓ mark the circulation system followed in your Library:

Register	Two card system	Three card system	Barcode	Any other (Please specify)

8.15 Please specify whether your Library provides the following services.
 (Please ✓ mark the appropriate)

No	Service	✓	No	Service	✓
8.15.1	Library database/OPAC		8.15.9	Translation services	
8.15.2	Internet service		8.15.10	Reprographic services	
8.15.3	Indexing		8.15.11	Inter Library Loan service	
8.15.4	Circulation of accession lists		8.15.12	Audio/Video facility	
8.15.5	Selective Dissemination of Information (SDI) Service		8.15.13	Microforms Reader/ Printer service	
8.15.6	Newspaper Clipping service		8.15.14	Access to CD-ROM databases	
8.15.7	Contents page service		8.15.15	Compilation of bibliographies	
8.15.8	Reservation facility		8.15.16	Library services on Intranet	

Any other information service (please specify) _____

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8.16 Please give the total no of documents translated during April 2000- Mar 2001 ___

8.17 Please give the total no of pages photocopied during April 2000-

Mar 2001 _____

8.18 Please give the total number of abstracts prepared during April 2000 - Mar

2001 _____

8.19 How many search requests do you get on an average in a month? _____

INTER LIBRARY LOAN (ILL)

8.20 Please furnish the procedure of ILL transactions.

8.21 Do you charge fee for ILL services? Yes / No

8.22 Does your library pay fine to other institutions for overdue documents on ILL? Yes / No

9. COMPUTER APPLICATIONS

9.1 Which of the following housekeeping operations / services have been fully computerised?

Operations	Acquisition	Cataloguing	Serials control	Circulation	SDI	CAS	Stock Verification
Please ✓							

Others, please specify. _____

9.2 Please specify the Operating System (OS) used:

Name of OS	MS-DOS	UNIX	LINUX	Windows (Specify)
Please ✓				

Others (please specify) _____

9.3 Please specify the Library Software (LS) used:

Name of LS	Suchika	Libsys	Minisys	CDS-ISIS	WINISIS	SLIM	Libris
Please ✓							

Others (please specify) _____

9.4 Does your library have a Network (LAN within Library)(LN)? Yes / No

- 9.5 Is your library connected to the Campus Network (CN)/Intranet? Yes / No
- 9.6 Can the library holdings be accessed through the Campus Network (CN)/Intranet? Yes / No
- 9.7 Does your library have Internet connection? Yes / No
- 9.8 Do you have Library Web Page / Site Yes / No
If yes, specify. Intranet / Internet / both
- 9.9 Can the library holdings be accessed through the Internet? Yes / No
- 9.10 Is there any DRDO network or DRDO Libraries Net work? Yes / No
If yes, can your library access other DRDO library database? Yes / No

10. MANPOWER

10.1 Please specify the following details of the staff in the Library:

Sl. No.	Section	Designation	No. of Qualified Library Professionals	No. of Semi Professionals	No. of Non Professionals
10.1.1					
10.1.2					
10.1.3					
10.1.4					
10.1.5					
10.1.6					
10.1.7					
10.1.8					

- 10.2 Is the existing manpower sufficient? Yes / No
- 10.3 How is the library staff recruited by DRDO? (Please explain in brief)
- 10.4 Please explain the promotion procedures for library staff.
- 10.5 Do you have provision to engage apprentice trainees with library science background? Yes / No

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10.6 Is there provision for refresher / continuing education programmes for the staff?

Yes / No

If yes, how many staff members were deputed during the last five years? _____

11. EQUIPMENTS

11.1 Please mention the number of following items held in the Library:

No	Items	Qty	No	Items	Qty
11.1.1	PC 286/386		11.1.8	Ink jet printer	
11.1.2	PC 486		11.1.9	Laser Printer	
11.1.3	Pentium-I		11.1.10	CD Writer	
11.1.4	Pentium-II		11.1.11	Scanner	
11.1.5	Pentium-III		11.1.12	Modem	
11.1.6	Pentium-IV		11.1.13	UPS	
11.1.7	Dot matrix Printer		11.1.14	Others (specify)	

11.2 Please specify the availability of the following equipments in the Library
(Please ✓ mark the appropriate)

Sl. No.	Equipment	Nos.	Sl.No.	Equipment	Nos.
11.2.1	Photocopier		11.2.7	Cutting machine	
11.2.2	Microfilming unit		11.2.8	Binding machines	
11.2.3	Microfiche reader/printer		11.2.9	Bar code reader	
11.2.4	VCR		11.2.10	Lamination machine	
11.2.5	TV		11.2.11	DTP Unit	
11.2.6	Tape recorder		11.2.12	Others (specify)	

12. AUDITING

12.1 Who is the auditing authority? _____

12.2 How frequently is auditing done? _____

12.3 Please give the list of documents being audited.

13. OTHER INFORMATION

13.1 Please give the names of professional Associations/Organisations to which your Library is an institutional member. Specify the annual membership fees.

Sl. No.	Name of the professional Association / Organisation	Annual fee in rupees

13.2 Do you insist on feedback from user? Yes / No

13.3 Do you practice and participate in any resource sharing scheme? If yes, please explain Yes / No

13.4 Do you follow any collection evaluation method through which you can assess whether the existing collection in the Library is sufficient to meet the requirements of the readers? Yes / No

If yes, then which methods do you follow? (Please ✓ mark the appropriate)

Sl.No.	Method	✓
13.4.1	Through compilation of statistics	
13.4.2	By application of formulae and standards	
13.4.3	Through Inter Library Loan (ILL) analysis	
13.4.4	Through direct observation	
13.4.5	Through User survey	

Others (Please specify) _____

13.5 Do you have publicity brochure for your library? Yes / No
If no, how do you intimate the user for various services?

13.6 Please ✓ mark the Communication facilities available

Telephone	Fax	E-mail	Any other (specify)

413.7 Have you acquired ISO Certification for your library?

Yes / No

13.8 Do you plan to introduce any other service(s) in the next one year? If yes, please specify the service(s)

Yes/No

Date:

Signature

N.B

* Please attach Organisational chart of the Library

QUESTIONNAIRE
(To the Users of the DRDO Libraries)

A. PERSONAL DATA

1. Name of the Establishment:
2. Designation :
3. Qualification :
4. Area of Specialization/
Discipline working :
5. Years of service :
6. Sex :
7. Number of contributions to the following during 1996 to 2001

CONTRIBUTIONS	ARTICLES/CONFERENCE PAPERS	BOOKS	PATENTS
Numbers			

8. Number of participation in the following during 1996 to 2001

PARTICIPATION	CONFERENCES/SEMINARS	WORKSHOPS/CEP
Numbers		

B. LIBRARY VISITS AND USE

1. How OFTEN do you VISIT the library?

DURATION	DAILY	TWICE/THRICE A WEEK	ONCE A WEEK	ONCE/TWICE A MONTH	RARELY
Please tick					

2. How much TIME on an average do you spend in the library per WEEK?

DURATION IN HOURS	1 to 2	2 to 4	MORE THAN 4
Please tick			

3. For which of the following PURPOSE do you mainly visit the library? According to priority give marks on a scale of ten.

S.No.	RESOURCES	MARKS	S.No.	RESOURCES	MARKS
3.1	To consult reference book		3.4	To Read/borrow back volumes of journals	
3.2	To Read/borrow books on specific subject		3.5	To Read/borrow thesis /Govt. pub./Reports	
3.3	To Read/borrow current subject journals		3.6	To consult standards/specifications	

Sl.No.	SERVICES	MARKS	S.No.	SERVICES	MARKS
3.7	Use OPAC/Intranet		3.10	To obtain photocopies of documents	
3.8	Use Internet facility		3.11	To avail Inter Library Loan facility	
3.9	Avail SDI/CAS		3.12	News clipping service	

4. For what purpose the information obtained from the library is USED? According to priority give marks on a scale of ten.

S.No.	USAGE	MARKS	S.No.	USAGE	MARKS
4.1	Keep up with the latest development		4.4	Generating new ideas	
4.2	Solve immediate technical problems		4.5	Higher studies	
4.3	Write articles/reports		4.6	Interviews/assessment	

C. LIBRARY RESOURCES AND SERVICES

1. According to priority give *marks on a scale of ten*, for the following RESOURCES/ SERVICES of the library in terms of their USEFULNESS to you.

S.No.	RESOURCES	MARKS	S.No.	RESOURCES	MARKS
1.1	Reference Books		1.4	Back volumes of subject journals	
1.2	Books on specific subjects		1.5	Theses/Govt.Pubs/ Reports	
1.3	Current Subject Journals		1.6	Standards/Specifi- cations	

S.No.	SERVICES	MARKS	S.No.	SERVICES	MARKS
1.7	OPAC/Intranet		1.11	ILL Service	
1.8	Indexing/ Abstracting		1.12	SDI/CAS	
1.9	Internet Facility		1.13	News Clipping Service	
1.10	Photocopy Service				

2. Please *tick mark* the REASON/REASONS if any, for not availing the following services.

S.No.	SERVICES	Not Aware of	Not Available	No Need	Time Consuming	Do not know how to use
2.1	Library database/ OPAC					
2.2	Indexing services					
2.3	Compilation of bibliographies					
2.4	New additions list					
2.5	SDI/CAS					
2.6	News clipping					
2.7	Contents page service					
2.8	Photocopy service					
2.9	Inter Library Loan					
2.10	Audio/Video facility					
2.11	Microforms Readers /Printer service					
2.12	Internet access					
2.13	Library services on Intranet					

2. Do you consider the following resources/services of the library ADEQUATE ? Please *tick mark* the appropriate.

S.No.	RESOURCES	Fully Adequate	Partly Adequate	Inadequate
3.1	Reference books			
3.2	Books on specific subjects			
3.3	Current subject journals			
3.4	Back issues of subject journals			
3.5	Theses/reports/govt. pub			
3.6	Standards/specifications			

S.No.	SERVICES	Fully adequate	Partly adequate	Inadequate
3.7	OPAC/Intranet			
3.8	Internet facility			
3.9	SDI/CAS			
3.10	Photocopy service			
3.11	Inter Library Loan facility			
3.12	News Clippings Service			

4. Are you satisfied with the following ASPECTS of the library? Please *tick mark*.

S.No.	ASPECTS OF THE LIBRARY	Yes	No
4.1	Location		
4.2	Space		
4.3	Furniture		
4.4	Seating capacity		
4.5	Lighting/Ventilation		
4.6	Classification system		
4.7	Cataloguing system		
4.8	Arrangement of documents on the shelves		
4.9	Cleanliness		

5. Do you search out the information yourself or approach the Librarian to find the information? Please *tick mark* the appropriate.

SELF	LIBRARIAN	BOTH

6. Does the library provide the required information in time? Yes / No
7. How often do you have to go to other libraries for your required information, in a month on an average? Please tick mark the appropriate.

FIVE OR MORE TIMES	RARELY	NEVER

8. How quick do you get the required information in case of CD-ROM database/ Internet searches? Please tick mark the appropriate.

IMMEDIATE	SAME DAY	2-3 DAYS	WEEK

If not quick enough, please offer your suggestions for improving the service.

9. Do you think your project/research work has been affected by the lack/delayed library services? Yes / No
10. Does your library request for feedback for the services rendered? Yes/ No

D. LIBRARY ORIENTATION

1. Do you get any initiation on the services of the library? Yes / No
2. If no, is it necessary to have some kind of initiation? Yes / No

E. SUGGESTIONS

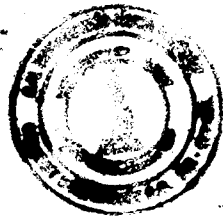
Kindly offer your suggestions for improving the resources, the facilities and the services of the library

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Address of DRDO libraries under study

S. No.	Name of Laboratory	Address	e-mail id
1	ADE	C.V. Raman Nagar Bangalore -560093 Karnataka	libra@ade.ernet.in
2	ADRDE	Station Road Agra Cantt, 282001 Uttar Pradesh	root@dradrd.ren.nic.in
3	ARDE	Dr: Homibaba Road, Pashan, Pune-411021 Maharashtra	tirearde@vsnl.com
4	CABS	Belur, Behind Airport, Bangalore-560037	root@cabs.ernet.in
5	CAIR	Rajbhavan Circle, Bangalore-560001	root@cair.ernet.in
6	CASSA	C.V. Raman Nagar Bangalore -560093 Karnataka	root@chanakya.csa.iisc.ernet.in
7	CEMILAC	Vibhuthipura Bangalore	
8	CVRDE	Avadi, Chennai-600054	cvrde@vsnl.com
9	DEAL	Dehradun, Uttar Pradesh	root@drdeal.ren.nic.in
10	DEBEL	C.V. Raman Nagar Bangalore -560093 Karnataka	root@drdbe.ren.nic.in
11	DFRL	Sidhartha Nagar, Mysore-570011 Karnataka	dfoodlab@sancharnet.in
12	DLJ	Ratanada Palace Jodhpur-342001 Rajasthan	root@drdl.ren.nic.in
13	DMRL	Kanchanbagh PO Hyderabad-500058 Andhra Pradesh	db@dmrl.ernet.in
14	DMSRDE	PB No 320, GT Road, Kanpur-208013 Uttar Pradesh	root@drdmsr.ren.nic.in

15	DRDE	Jansee Road, Gwalior-474002 Madhya Pradesh	drde@gwrl.dot.net.in
16	DRDL	Kanchanbagh PO Hyderabad-500058 Andhra Pradesh	root@drdl.ernet.in
17	GTRE	C.V. Raman Nagar Bangalore -560093 Karnataka	lib@gtre.org
18	HEMRL	Sutarvadi, Pune-411021	hemrl@hotmail.com
19	IAT	Girinagar, Pune-411025 Maharashtra	iatlib@yahoo.com
20	IRDE	Raipur Road, Dehradun-248008 Uttar Pradesh	root@drirde.ren.nic.in
21	ITM	Landour Cantt, Mussoorie Uttaranchal	itmdir@sancharnet.in
22	LRDE	C.V. Raman Nagar Bangalore -560093 Karnataka	lrde@vsnl.com
23	MTRDC	BEL Complex Jalahalli-PO Bangalore-560013	mtrdc@vsnl.com
24	SSPL	Lucknow Road New Delhi-110007	root@drsspl.ernet.in
25	TBRL	Sector-30, Chandigarh-160020	tire_tbrl@hotmail.com
26	VRDE	East Ridge, Ahamed Nagar-414006 Maharashtra	root@drvvrde.ren.nic.in



NB 4529

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