# ELEMENTS OF RECORDS MANAGEMENT AND CONSERVATION

NATIONAL ARCHIVES OF INDIA
NEW DELHI
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Management and Conservation of Archival Records

School of Archival Studies

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## PREFACE

In recent years we have seen an unprecedented increase in Governmental work and the ever expanding development and welfare activities of the State. The industrial and business houses have also been pursuing their activities with greater vigour. Its all round effect has been the exponential growth of paper records. But unrestricted accumulation of records creates the problem of space and retrieval of documents and information at a short notice. It also results in exercising tremendous pressure on the available man-power and financial resources, not to say of the difficulties in locating the requisite accommodation for housing all such records. Recent technological advances like microfilms, magnetic tapes, sound records, motion picture films, photographs and other audio-visual records have even further aggravated the problem. It has therefore, called for an effective Records Management Programme which would prevent accumulation of documents of ephemeral value and facilitate easy retrieval of information. Besides, it should ensure better utilisation of resources for proper maintenance and preservation of records.

The present brochure "Elements of Records Management and Conservation", being brought out by this Department, is to provide necessary guidelines to the various records creating agencies for proper management, appraisal, care and conservation of records under their control. A few appendices have also been added to the text to provide useful information on the subject.

I am thankful to Shri V. V. Talwar, Senior Fellow, School of Archival Studies for his help in integrating, systematising and enlarging the reading material prepared earlier by Shri Ranbir Kishore, Former Senior Fellow, Shri C. L. Prajapati, Scientific Officer and Shri S. K. Khatri, Archivist as hand-outs for the workshops conducted by the Department.

New Delhi
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R. K. PERTI
Director General of Archives
Government of India.

# RECORDS MANAGEMENT

## I. A SYSTEMATIC RECORDS MANAGEMENT PROGRAMME FOR ADMINISTRATIVE EFFICIENCY :

Records Management is an important part of the administration in every organisation, be it a Government Department, a Public Sector Undertaking, a Business Establishment or an Industrial House and aims at formulation of a comprehensive programme for planning, controlling, directing and organising managerial activities pertaining to records creation, maintenance and their disposition. Records are valuable source of information and Records Management Programme ensures supply of requisite information and data relating to the concerned organisation, and does not allow accumulation of unimportant papers. It also helps the organisation to keep proper track of its past and present achievements besides recording its short-comings. It is, therefore, necessary for every organisation to introduce appropriate measures for proper planning and control of its records. The main objective of such a Records Management Programme could be summarised in two words i.e. less paper.

Before analysing various aspects of Records Management, it is essential to understand that papers relating to all transactions in a Government Department or a private firm have three stages as given below :

(i) Active or current stage in which papers or files are frequently or continuously required for taking action. Any delay in producing these papers, might result in shortfall of targets or achievements.

(ii) Semi-current|Dormant stage in which papers and files are not continuously needed, but may be needed at a short notice.

(iii) Non-current stage in which papers|documents|files have already ceased to be active instrument of planning and execution of tasks, but may be required for administrative, legal, statistical or historical reference in future.

Since the main objective of records management is quick and speedy retrieval of documents|files or information stored

therein what is important is a well conceived records management programme that aims at the following :—

**1. Control of Paper Work**

This is possible if concerted efforts are made to streamline the records creation process by adopting various methods like correspondence management, forms management, directive management, report management, mail management etc.

**2. Timely Recording and Proper Classification of Files**

Files are required to be closed and recorded after issues discussed or dealt with in them are settled. Care should be taken that files are not allowed to remain active beyond a specific period. Segregating files of house-keeping jobs and those of functional activity helps in recording and classification of files and in drawing retention schedule for records. It has to be kept in mind that separating records of ephemeral value takes within its purview the physical arrangement and assignment of symbols for identifying units of records.

**3. Periodic and regular Review and Appraisal**

The geometric growth of records puts a limitation on the space that could be provided for storing them, or the funds that could be made available for their maintenance in good physical condition, and on the servicing personnel who are required for the care and servicing of records. Hence, there is an imperative need to maintain a reasonable ratio between creation and destruction of records so that the bulk could be kept in manageable proportions. Timely review of files in keeping with retention schedules and disposal of files which are not of value for administration or have no intrinsic value for reference or research, is a vital requirement.

**4. Information Retrieval Tools**

Ease and speed with which the information required from the mass of records could be made available, determines the efficiency of administration. The basic tools which help in quick retrieval of information are : (i) Organisational History, (ii) File Registers and (iii) Indices.

## 5. Organising a Departmental Records Room

Maintenance and servicing of semi-current and non-current records till they are either ripe for weeding or for transfer to the Main|Central Archives for preservation on a permanent basis, needs a properly planned and well equipped Records Room. While providing proper accommodation for storage of records, arrangements are also to be made for their physical safety, security against environment, and biological agents of deterioration as well as from other calamities like fire and flood etc.

Minimum requirements for a Departmental Records Room have been worked out separately and it is expected that these details would serve a useful guide for establishing a Departmental Records Room (Appendix II).

## II. RETENTION SCHEDULE AND APPRAISAL TECHNIQUES

The day-to-day increase in creation of records has become a challenging task before the creators and the users. In the present context of a social welfare state as envisaged by our constitution, the activities of various organisations have greatly expanded not only to carry on the traditional functions of a State, like internal and external security, maintenance of law and order etc., but also to provide the daily needs to a common man. For record creators and users, this is an important phenomenon which directly multiplies the creation of records beyond one's imagination. To mention here, the total record holdings of the Government of India in a modest calculation, run into approximately 550 kms. of linear shelf space. This shows the magnitude of the problem to manage such voluminous records and above all to provide space to accommodate them, and the man-power required to handle and arrange for their up-keep in a scientific manner. No organisation is in a position to keep all the records which it creates after the records have fulfilled the desired objectives. Hence, it is considered important to dispose of papers of trivial nature with a view to reducing expenditure on their maintenance, to create space for fresh accruals, and to facilitate retrieval of information. In order to achieve these objectives, what is required is a properly drawn records retention schedule since such a schedule is a basic tool to an orderly records management programme.

The availability of records in different types and forms and their varied nature makes the task of selecting them much more complicated and could confuse the creators unless proper guidelines are laid down.

As already emphasized in the preceding paragraph, adoption of an adequate records retention schedule is of vital importance for this purpose. In a real sense, the records retention schedule is an inventory, a list, a chart of all continuing regular record series and these could be clearly identified and labelled. It also allocates to each series an appropriate life span. Once this work is completed, it should be possible to arrange for the automatic implementation of the terms of the schedule and no individual consideration is necessary for records.

Drawing up of a Retention Schedule will demand professional competence. There are problems both in drafting and also in its implemention. The first requirement of a useful schedule is that it should set out under recognisable headings the records which

are being created in the Department. For compiling the retention schedule of an agency|organisation, the following points are to be kept in mind :

(i) Study of the structure and functions of the creating agency, which will provide a frame work to the schedule.

(ii) Study of the current records series for a physical study of records holdings.

(iii) Study of the retention period of parallel records series which will lead to standardisation of nomenclature, lay-out and period of retention.

Schedule should be arranged under the 'Main-Headings' of the creating agency. While compiling the schedule, all subjects should be given on one side and the period of retention may be mentioned on the opposite side as per example given below :

---

Name of the Department

Section|Division

| Subject | Retention |
|---|---|
| Main heading | periods |
| Subsidiary subjects | |

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The Records Retention Schedule may be divided into three broad categories :—

(i) Retention Schedule for House-Keeping jobs;

(ii) Retention Schedule for Substantive Functions; and

(iii) Retention Schedule for Financial Records.

Schedule (ii) mentioned above may be drawn by the records creating agencies in consultation with the National Archives of India and be reviewed after a period of 5 years by the creating agency.

The second vital aspect of Records Management Programme relates to the "appraisal techniques". This applies to final disposition of records. The appraisal of records is conducted in order to retain information of vital importance which might be useful for legal, administrative, historical, research purposes etc.

Sound appraisal techniques are required to be followed for proper tracking of files. These files are to be identified for appraisal, preparing an inventory thereof, timely recording and reviewing of records and actual weeding of records. If the records do not serve any purpose, the better course would be to weed them out in time. This is possible only if a file is recorded and a decision for its retention is taken. So, practically the entire process of disposition of records remains at a stand-still for want of recording which lays down period of retention, classification, year of review etc.

A timely recording is a pre-requisite for a sound appraisal policy. If the records creating agency fails to discharge this important function, it might result in many more complicated problems at a later date. Unless the files are recorded at the appropriate time, it may lead to :—

(i) A new lease of life to the file in excess of its predetermined period;

(ii) An increase in the number of records already accumulated thus requiring more space, man-power and funds for their maintenance.

The question arises as to at what cost and for what purpose. It is important to note that the records creating agency should ensure that the work of recording of files is attended to in time.

It is once again reiterated here that a properly drawn records Retention Schedule is a basic administrative tool which helps in proper evaluation of records. Hence, the records creating agency must draw the schedule for its records on priority basis. One of the main reasons for huge accumulation of records in a number of records creating agencies is the absence of Records Retention Schedule. If the schedule is prepared in time, it would prevent the accumulation of records. On the same analogy, a proper classification technique helps in appraising records. If a file is properly 'Classified', it would be easy to identify its life span, the period of review etc. While recording the file, it is necessary to indicate "Classification" for future course of action.

It has also been observed that thousands of files remain in the custody of records creating agencies in spite of the expiry of their life period because the required action has not been initiated for their 'actual destruction'. The failure to comply with this aspect of records management nullifies the whole records management programme.

## III. RETRIEVAL OF RECORDS—METHODS AND TECHNIQUES

Records are preserved as they constitute the memory of an organisation. Their utility to an organisation depends upon as to how best and how quickly the information could be retrieved from them. The abounding information which is received, created, processed, communicated, used and stored for eventual reuse in an organisation, is not only increasing but also undergoing unprecedented and dynamic changes. A major challenge for small and big organisations, both in private and public sectors, is that of managing, controlling and retrieval of information. The very purpose of preserving records will be defeated if the information is not retrieved from its records.

The method for retrieving information may be broadly divided into two categories viz. (i) Manual and (ii) Mechanical. The better example of manual retrieval of information is an 'Index' to records wherein index slips are prepared in the first instance under the subject i.e. standard heads which may serve as catch-word or by name, place etc. giving cross references. Thereafter, these index slips have to be arranged alphabetically. An example given below will explain the method.

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Report

of the Fourth Pay Commission

F. No. 1-5|85 PC

See under Pay Commission

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Pay Commission,

Report of the———

F. No. 1-5|85 PC

See under Report

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In the recent period, computers are used in retrieving information and this new device is quickly replacing the age-old

method of preparing indices to records. Computer operation is very quick for supply of desired information and it would be possible to store information of thousands of pages in it. Here, information is stored either in the 'disc' or tapes and could be retrieved from there. Considering the fact of huge accumulation of records and the type of information that is to be handled, computerisation of information would be the only course left for us to deal with the 'information management' in the years to come.

## IV. INDEXING OF RECORDS

Records that have ceased to be current are kept and maintained so that the evidence contained in them may be utilized, in times to come, for purposes of administration and historical research; but all the records created by a government or university to preserve the memory of various facts and events are not fit for permanent retention. There is much which is of ephemeral nature. It must be weeded out and destroyed in order to manage the useful records more efficiently.

This ever increasing bulk of useful records will not be utilized, by the posterity for any purpose, unless there exists some reference media to show where the records on a particular subject could be found. An index is an instrument that provides such an information. It is, therefore, necessary that records meant for permanent retention should be indexed.

The aim of indexing is to furnish some clues to the contents dealt with in a document or file so that an enquirer may find out at a glance if there is anything in it to interest him with regard to a particular subject. An index, therefore, is an instrument of search for specific information as a catalogue is an instrument of search for documents as a whole.

Records need indexing more fully than books and periodicals because facts contained in them may assume different aspects and different degree of importance for every person who consults them. Therefore, it becomes necessary to enter facts under a variety of subject-headings and nothing important should be left unnoticed. In practice, it is found that a file generally deals with one subject only which therefore, is important in relation to the file concerned, and other items derive their claims to inclusion in the index from their bearing on the aforesaid subject. But this is only a general rule, for in some cases the subject of a file may be of so little intrinsic value that only barest reference to it will suffice whereas a detail in a letter, perhaps a mere side issue from the subject, may be of sufficient administrative or historical interest to deserve to be noticed. It is, therefore, imperative that all records kept for permanent retention should

The information under heading 'Indexing of Records' has been prepared by Dr. S.S. Rekhi, an Archivist who has a specialised knowledge of compilation of indexes to records. This is reproduced with the courtesy of the Association of Indian Archivists.

be indexed in their full depth. For this purpose it will be necessary to scan through the entire file rather than depending only upon broad subject given on the title at the time of opening it. A caution is perhaps necessary here. It has been found many a times that the subject given on the title is not adequate and does not properly reflect the matter contained in the file. Let us give an example to illustrate this fact. A file was examined in a private collection which bore the subject as—Papers relating to Mahatma Gandhi's death. When the file was opened and read, it was found that it contained only the condolence messages received on Mahatma Gandhi's death. Therefore, the subject of this file should have been given as—Mahatma Gandhi's Death—Condolence Message Received On, and not papers relating to Mahatma Gandhi's Death.

An indexer must have imagination and a highly developed critical faculty to enable him to analyse and to exclude what is un-important so as to avoid over indexing and retain only what may be required by an administrator or a historian in future.

Broad rules for indexing have been given in the next few pages which could be learnt only by application, but it is well to remember that apart from rules, an indexer has to use essentially his judgement and insight while preparing the entries by asking himself frequently as to what an enquirer is likely to look for when in search of a given information. Therefore, indexes prepared by two individuals may not be exactly alike, but will serve equally useful purpose in case both have a sound judgement and deep insight.

*Rules for Indexing*

1. The index to a document is to be an index of names and subjects arranged in alphabetical order. Each entry is to consist of a name or a title (or both together) of a subject-word as a heading, followed by a reference. The reference is to be by the number of the file.

2. All titles or official designations (i) when they are unaccompanied by a person's name and when the person referred to cannot be ascertained, (ii) when no actual person but only the office or post is referred to. Thus : Qualifications of a Professor must be indexed as Professor, qualifications of,

3. All titles accompanied by place names or place implied, but not given under that name.

Thus : Letter from Chief Minister Punjab must be indexed as Punjab, Chief Minister, letter from,

4. Compound names of public bodies and institutions, are generally indexed under the first word not an article, unless they contained a place name. Therefore, the following are correct :

Board of Examiners, and not the Board of Examiners.

5. Business firms with two or more names are to be indexed as it is, e.g.

Lila Ram Murli Dhar, Paper Merchants.

6. Indian Place names as they exist in the India Gazetteer, as far as their spellings are concerned.

7. Indians under their first names unless they adopt the European style and give only the initials of their first and second names, just as Ram Lal, Sarup Singh, Kidar Nath will be indexed as it is but the second type will be indexed as Sahni K. N., Mehta A. S. or Banerjee S. N.

8. It will be really difficult to index Muhammadan names if one does not have some knowledge of Persian and Arabic. It is often noticed that the various catalogues and indexes clearly show that no definite rules can be laid down for the purpose. But there is still hope if the common names are classified and their importance understood, we can surely attain a fair degree of consistency in indexing these. For this purpose it is necessary to analyse the composition of Muhammadan names. Mostly they begin with one of the following prefixes :

(i) Abdul—A name with this prefix is invariably indexed under it.

(ii) Abu or Abul—If followed by one word as Abu Bakr, Abu Salih, Abul Hasan, Abul Khair etc. index under A, but if another pair of words is joined on to it as Abu Salih Muhammad Ibrahim, the name is indexed under the second part thus—Muhammad Ibrahim, Abu Salih.

The name Abul Qasim Muhammad is treated on the same line : Muhammad, Abul Qasim.

(iii) Agha or Aga (Per. Lord, Master) is not a part of a name—Agha Musa, Agha Musa, Agha and Ahmed Ali, Agha.

But Agha Khan or Agha Jan is different.

Here Khan or Jan is not a name in itself and is therefore, inseparable from Agha.

(iv) Khwaja is treated exactly like Agha.

(v) Mir (a synonym of Saiyid, but ordinarily used before names of Muhammadans of the Shia Sect) is rarely treated as a part of the name, and is not indexed.

But well-known historical names may require different treatment. For instance, Mir Jumla (the famous general of Aurangzeb) should be indexed under M. Mir, it may here be added, is not a synonym of Saiyid but a construction of A'mir (Ar. a Chief) Mir Jafar. (Ar. a chief). Mir Jafar and Mir Qasim (the Nawabs of Bengal) may be indexed under M as cross references to their full names.

(vi) Mirza (a prefix of names of persons of Persian origin commonly of the Shia Sect). In Persia, Mirza when followed by a name, suggests that the person comes of a royal family. But this is not usually the case. This prefix is treated like Mir. Note that the name Mirza Khan is to be dealt with like Agha Khan—see rule (iii) above.

(vii) Muhammad—This may or may not be a part of a name. If followed by two or more words (Khan is not one) it need no longer be regarded as a name, e.g., Muhammad Ali, Muhammad Hassan, Muhammad Hussain Khan, Muhammad Israil Khan, etc., all are to be indexed under Muhammad; but Muhammad Altaf Hussain, Muhammad Abdul Ali, Muhammad Habibul Hasan, Muhammad Habibullah (which is really Habib-u-Allah). etc., should be indexed thus—

Altaf Hussain, Muhammad, Abdul Ali, Muhammad, Habibul Hasan, Muhammad, Habibullah, Muhammad.

(viii) Saiyid (a descendent of the prophet Muhammad). If only one word follows it, it may be regarded as part of the name and indexed under S, as—

Saiyid Ahmad, and Saiyid Hussain.

If it precedes more than one word, as Saiyid Ahmad Ali, Saiyid Abu Salih Muhammad Ibrahim, it is no longer part of the name; the index will then be—

Ahmad Ali, Saiyid and Muhammed Ibrahim, Saiyid Abu Salih.

Note that in Saiyid Abdullah, Abdullah is not to be regarded as one word, it is actually Abd-u-Allah.

(ix) Shaikh can never be part of a name, e.g., Shaikh Sadi, Shaikh Ali Baksh, should be indexed thus—

Sadi, Shaikh and Ali Baksh, Shaikh.

Sadi is here a poetical pseudonym. Poets are better known by their pseudonyms than by their names and we should therefore, give preference to pseudonyms when indexing their names, e.g., Khwaja Shams-u-din Muhammed Hafiz should be indexed under Hafiz.

(x) Some of the common endings of Muhammadan names are Ahmad, Ali Baksh, Beg, Din, Haidar, Haq, Hasan, Husain, Imam, Khan, Muhammad, Zaman. Ordinarily, names are not indexed under these terminations but under the words that precede them.

For subject headings it is necessary that the words occurring in the records themselves are used and no attempt is made at classification. Thus if the words laboratory, practicals, experiments and chemicals occur, they may be used as headings and on no account they are to be grouped under Science.

The choosing of subject headings is the most difficult part of the work. The indexer must be constantly on the alert and at every turn must ask himself, what is some future engineer likely to look for ? What will be a useful clue to him ? What do those words mean ? And what is the word which one would naturally turn up in an index when searching for information

about this subject ? The way to proceed is to analyse the sentence or paragraph, to put it into (a) your own words, (b) the simplest words, (c) the fewest words possible.

The indexer, then checks that the subject given on a file corresponds to the information contained in it and then proceeds forwards to make an entry of the correct subject as a whole. Thereafter he goes through the file making entries of all the important specific subjects dealt within the file.

Indexes are prepared on special paper ruled into divisions of equal size; each division contains one entry and when the index is done the sheets are cut up into these divisions, or small slips of paper, which are then arranged in alphabetical order, and typed.

The sub-headings must, of course, be arranged in alphabetical order. No classification however logical or ingenuous will equal, in perspicuity, simple alphabetical order. When writing the slips, the heading should be written in the top left-hand corner; the sub-heading below it and one inch to the right; a second sub-heading below that again. Write the reference in the bottom right-hand corner. This will make the slips easier to sort and arrange.

# CONSERVATION

# CONSERVATION OF DOCUMENTARY HERITAGE

Records, manuscripts, rare books etc. constitute our documentary heritage and their longevity depends primarily upon the stability of materials composing them. These materials undergo changes due to ageing and are also affected by storage environment, biological pests and improper handling. These records can therefore, be preserved by controlling the storage conditions, careful handling and proper arrangements for their scientific restoration.

## I. COMPONENTS OF DOCUMENTS AND THEIR STABILITY

Documents amassed in our archives, libraries and manuscript repositories are mostly on paper, though some collections could be in the form of parchment, palm leaf, birch bark etc. All these materials are organic in nature and prone to decay.

Parchment is made from the inner skin, usually of sheep or goat, but sometimes of other animals, dressed and prepared for writing, painting etc. Palm leaf and birch bark on the other hand, are natural plant materials and contain cellulose mixed with glucosides, oils etc. With the passage of time these plant materials undergo rapid chemical changes and their structure gets weakened.

Paper is made from cellulose which is also derived from plants. A variety of materials containing cellulose are available and are used for manufacturing paper. These include cotton rags, wood, straw, bamboo and grass. For preparing paper with a smooth writable or printable surface, these materials are first treated with alkalies under heat and pressure to obtain free cellulose fibres (termed as pulp) to which loading and sizing materials of sorts are added.

Durability and longevity of paper depend to a great extent on its process of manufacture and chemical composition. Imbalance in loading materials which are clays, and sizing materials which are adhesives, also brings about deterioration of paper.

Quality of paper available commercially differs widely and hence, paper should be selected with due regard to its intended use. It has to be kept in mind that paper used for records of permanent value or enduring importance should be durable, strong and acid free.

The quality of ink used for writing also plays an important role in the preservation of records and manuscripts. Acidic inks affect the life of paper adversely. Specifications of good quality papers and writing inks have been formulated by the Bureau of Indian Standards and these could be adopted as per requirement. For detail see Appendix V.

*Factors of Deterioration*

While acidity in ink eats up the paper at the strokes of the writing and can be treated by deacidification, various climatic and biological deteriorants affect the paper differently. A close examination of the documents in the light of the two tables given below indicating effects of various deteriorative agents on paper, will help in finding out the cause for any damage and in taking appropriate corrective measures.

Table A

*Damage caused by adverse climatic conditions and remedial measures*

| Sr. No. | Physical condition and appearance | Deteriorative agents | Remedial measures recommended |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 1. | Stinking smell resembling wet rot, black or gray spots on paper. | Internal dampness, high humidity and stagnant atmosphere-conditions favourable for the growth of moulds. | 1. Regulating relative humidity in the range of 45–50% by air-conditioning.<br>2. Use of mechanical dehumidifying units.<br>3. Use of dessicating chemicals like silica gel, calcium chloride etc. in the room for lowering moisture content of air.<br>4. Avoiding contact of stored materials with damp floor or walls. |

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| | | | 5. Adequate air circulation in the room for rapid air change. Avoiding pockets of stagnant air.<br>6. Use of fungicidal spray. |
| | 2. Blocking or sticking of paper sheets. | Exposure to repetitive cycles of humid and dry climate. | Treatment in a restroration laboratory. |
| | 3. Yellowing of paper accompanied with loss in flexibility. | 1. Exposure to high temperature and incident sun-light. | 1. Regulating temperature in the range of 22–25° C. by air-conditioning. |
| | | 2. Dry climate. | 2. Adequate ventilation for circulation of air in the storage area. Use of electric fans or air circulators for rapid air change. |
| | | | 3. Avoiding exposure of paper to direct sunlight by providing sun breakers and sun-shades or by using coloured (lemon yellow/green) glass panes or curtains at the windows. |
| | 4. Grey or yellow colour accompanied with crumbling tendency in paper. | 1. Atmospheric pollutants like acidic gases. | 1. Air wash system with air-conditioning. |
| | | 2. Internal acidity of paper. | 2. Avoiding stagnant air by maintaining fresh air circulation as in 3(2) above. |
| | | 3. Transmigration of acidity by contact with acidic containers | 3. Avoiding use of acidic material for repair and binding and for storage containers.<br>4. Treatmentfor deacidification. |

Table B

*Damage caused by biological pests and remedial measures*

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| 1. | Growth of black or grey specks or spores on paper. | Active fungus (Mildew) growth. | 1. Cleaning of the growing mass on paper wit cotton swab.<br>2. Fumigation of the infested material in an air tight vault with thymol.<br>3. Sterilising the atmosphere in the storage room by spraying 10 per cent solution of thymol in methylated spirit.<br>4. Provision of cross ventilation, air circulation, exhaust fans etc. in the storage areas. |
| 2. | Brown specks or spots on paper (foxing) | Action of organic acids excreted by fungi, on iron compounds present in paper as impurity. | Chemical treatment such as localised bleaching in a restoration laboratory. |
| 3. | Presence of pin holes in binding boards of bound volumes, penetrating deep inside the paper text. | Book worms. | 1. Isolation of the infested material.<br>2. Fumigation of the infested materials in an air-tight vault with paradichloro-benzene or vacuum fumigation with carboxide mixture. |
| 4. | Indented marks in binding cloth and board etc. | Cockroaches, Silver fish. | 1. Dusting of cracks and crevices in floor and walls where the insects breed, with D.D.T. Gammexane, sodium fluoride or White arsenic etc. |

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| | | | 2. Use of insect repellent chemicals like naphthalene or camphor balls on shelves and almirahs. |
| 5. | Irregular incised tunnels etc. with muddy borders starting from binding, penetrating deep in the text. | Termites (white ants) | 1. Remedial and control measures for eradicating the white ants by pest-control experts.<br>2. Painting of wooden structures with moth proof varnishes.<br>3. Provision of at least 15 cm. clear space from floor, walls and ceiling.<br>4. Avoiding contact of storage racks with floor by keeping their legs in bowls containing creosote oil in Kerosene oil (1:2).<br>5. Avoiding use of wooden furniture for storage of the materials in a termite infested building.<br>6. Cleaning and fumigation of the infested materials. |
| 6. | Irregular incision marks of cutting of the bindings and paper of the text (mostly starting from fore-edges). | Rodents | 1. Making the storage areas rat-proof by providing wirenet on windows and ventilators and grills on drains opening in the room.<br>2. Sealing the rat holes and other entry spaces in the walls, floor etc. with cement.<br>3. Trapping the rats with poisonous baits. |

## II. STORAGE

A record room should, as far as possible, be located on the ground floor, unless the floors of the building have been designed with load bearing capacity. It has been estimated that the average weight of a linear metre of records is between 60—80 kgms. It has also to be ensured that the record room is free from danger of flood due to rain splash, bursting of water pipes or choked drains etc. Seepage of water through the floor, walls or ceiling has to be taken care of by laying water proof flooring|roofing and giving water proof oil paint dressing to the walls.

### A. Shelving

Shelving in a record room should ensure maximum protection to records. Use of metal shelves is preferable to wooden shelves since the former provide safety against fire hazard as well as termite attack. Steel shelving however, must have anti-rust non-staining paint. The main considerations for shelving are :

(1) Maximum space utilisation and storage density ;

(2) Accommodation to suit all formats of records ;

(3) Facilities for easy access and retrieval; and

(4) Provision for future growth.

Standard uprights with slots are available to provide adjustable shelving for maximum space utilisation. The steel racks should be fixed away from the walls and the distance between successive rows may vary from 0.80 metre to 1.0 metre with a central gangway of 1.5—2.0 metres to allow free movement of trollies. A maximum height of 2.2 metres is usually desirable so that all the shelves are easily accessible. The racks should have a clearance of at least 15 cm. from the floor, walls and the ceiling. To suit the storage of outsize materials. special filing cabinets could be used. In this connection Indian Standard IS : 2663—1989 "Recommendations relating to primary elements in the design of building for archives" may be referred to.

Besides the stationary shelving described above, mobile or compactus shelving is also available. The use of mobile shelving gives more storage density but their installation, maintenance and operation is more expensive.

**B. Storage Environment**

Climate, whether hot or cold, dry or humid, affects the physical upkeep of documents. In hot and dry weather, paper and other organic writing materials such as palm leaf, birch bark, and parchment lose their flexibility and these materials are also prone to microbiological decay. In addition, sunlight, acidic gases and dust present in environment also bring about physical weakening and deterioration of paper and other allied materials. Maintenance of optimum storage conditions viz., control of temperature and relative humidity in the range of 22—25 degree C and 45—50 per cent respectively are desirable for ensuring longevity of documents. Such regulation of temperature and relative humidity necessitates air-conditioning of the storage area.

Since air-conditioning needs costly equipment and its operational cost is high, it is out of reach for most of our Indian repositories. In the absence of air-conditioning, it is therefore, desirable to provide air circulation in all parts of the repository. Cross ventilation, use of electric air circulators and exhaust fans facilitate air circulation.

For checking incidence of high relative humidity or internal dampness, mechanical dehumidifiers or chemical dessicants such as silica gel, calcium oxide or calcium chloride can be used.

Direct sunlight in the storage area should be avoided by proper external design of the windows and ventilators. Sun breakers or rain shades could be provided for windows and ventilators for this purpose. Green or lemon yellow coloured glass panes or curtains for windows also help in protecting documents/files against sunlight.

Accumulation of dust among documents is injurious as well as unhygienic. Maintaining neat and tidy conditions by regular cleaning of the materials, helps in the preservation of documents and for this purpose vacuum cleaners should be used.

**C. Biological Pests**

Cellulose which is the chief component of documents, is attacked and damaged by a wide variety of micro-organisms like mildew or moulds and insects like cockroach, silver fish, termites and bookworms. Rodents also cause enough damage to these materials.

For preserving documents, it is not only necessary to provide an insects free environment, but also to make arrangements to treat the infested documents. Use of insect repellent chemicals like naphthalene, camphor, and spray of insecticides like Pip, Finit, Baygon, D.D.T. in the places which are frequented by insects (such as the space behind and beneath the racks and almirahs, cracks and crevices in walls and floor) help in checking menace of these pests. Avoiding stagnant pockets of air, dark, dingy and damp corners, and maintaining neat and tidy conditions help in ensuring pest-free environment.

Documents and other materials infested with mildew or moulds, or pests like book worms, need fumigation with toxic chemical vapours. Fumigation with thymol eliminates mildew or moulds, while use of paradichlorobenzene for fumigation kills book worms, silver fish and cockroaches.

Thymol fumigation is done in an air-tight wooden chamber. The documents meant for fumigation are supported on a frame work covered with wire mesh at a height of two feet from the bottom of the chamber. A 40-watt electric bulb is installed at the base of the chamber under a circular opening and over that a disc containing thymol crystals is placed. A dose of 150 gm. of thymol per cubic metre is required while the cycle of fumigation varies from 6 to 8 days.

Fumigation using paradichlorobenzene chemical is done in an air-tight steel vault or almirah containing adjustable, perforated shelves for keeping infested documents. A dose of 1.5 kg. of the chemical per cubic metre is required while cycle of fumigation is completed in 7 to 8 days.

Instead of paradichlorobenzene, killoptera—a mixture of ethylene dichloride and carbon tetrachloride (3 : 1) can also be used for fumigation. A dose of 225 gms|cubic metre of this mixture is required with a fumigation cycle of 24 to 36 hours.

For complete eradication of bookworms, re-fumigation is necessary after 21 days because the eggs laid by bookworms hatch out after this period, and the hatched larve also need elimination.

These chemicals vapourise at room temperature and their vapours are heavier than air. They are therefore, placed on the uppermost shelf of the fumigation vault.

National Archives of India after extensive studies and experimentation, has got fabricated a portable thermo-statically controlled air-tight vault which can be used effectively for sterilising all types of biological infestation. For details about the vault see Appendix IV.

*Protection against Termites*

Termites or white ants, as these are usually known, are the most voracious enemies of cellulosic materials. Paper, binding board, cloth, wooden racks and almirahs are often extensively damaged by these insects. For complete eradication of termites, proper treatment of the foundation of the building as well as its overall structure is desirable. However, for preventing damage to documents in a building infested by white ants, the following precautions are necessary :—

1. All places in the storage area from where these insects are likely to emerge e.g. joints in floors, joints of floor or ceiling with walls, cracks and crevices, and joints of wooden framework with masonry etc. should be treated with D. D. T., gammexone powder, arsenic oxide or spray liquids like pip etc. For safety, wooden structures and furnitures are to be treated with dieldrex or creosote oil.

2. In a building infested with white ants, use of steel storage equipments is helpful.

3. Contact of storage almirahs or racks with walls should be avoided. A distance of at least 15 cm. is to be maintained between the walls and almirahs or shelves. The contact of racks and almirahs with the ground could be avoided by keeping their legs in cups filled with dieldrex or creosote oil or by painting them upto a height of 10-15 cm. with any of the above chemicals.

4. Cracks and crevices in floors and in wooden joints with masonry should be cemented after applying poisonous dusts as mentioned above in para 1.

5. Regular inspection and proper cleanliness in the storage area would help in detecting infestation and adopting remedial measures in time.

*Control of Rodents*

Damage by rodents can be checked by preventing their entry into the storage area. The windows and ventilators are to be covered with metal grills containing wire gauze. All other openings in the area e.g. drain outlets etc. should be covered with metal grill of appropriate design. It would be preferable that the storage area has double doors flush with the ground and one of these doors should be of self-closing type. Carrying of foodstuffs inside the records room should be strictly prohibited Rodents seen in the area could be eliminated by trapping them with the help of poisonous baits.

**D. Protection against Fire**

For protection against accidental fire in the records room, smoking, use of heaters and storage of inflammable liquids should be prohibited. All electric wiring should be through conduit pipes and main control switches of lights etc. installed in the storage areas, should be located outside. The use of temporary lights and power connections and over-loading of electric circuits should be avoided. Electric wiring should be regularly checked to guard against weakening insulation. Proper fuses, circuit breakers and earthing should be provided. All electrical equipment should be serviced regularly. As a precautionary measure all light and power circuits should be switched off after office hours. Use of fire resistant materials conforming to National Fire Code reduces the chances of fire hazard.

In order to control fire, provision should be made both for its detection and extinguishment. An efficient fire protection system detects a fire, sounds the alarm and sets off automatic extinguishing devices. Ionisation type smoke detectors and rate of rise-cum-fixed temperature heat detectors are recommended for use in a record office. To prevent spreading of fire, separate fire-proof compartments should be provided in the records room. It is also advisable to provide emergency exits.

Depending upon the type of anticipated fire hazard, carbon dioxide, dry chemical powder or halon fire extinguishers and buckets filled with sand should be provided in easily accessible places in the vicinity of the record room. Though one fire extinguisher is recommended for every 10 metres, yet their number, type and adequacy depends upon the degree of fire hazard and local fire regulations. In addition, water pipes and hoses should be installed with adequate arrangements for storage of water.

All equipments, installed for detection or fire fighting, should be checked at regular intervals to ensure their proper working at all times. Emergency lights are to be provided at vantage points to safeguard against electric failure. Compliance with local Fire Regulations is a must.

*Fire fighting Teams*

Fire fighting teams recruited from the staff working at the location offer additional advantage in the sense that they could be deployed very quickly. Further, they possess the exact knowledge of the site. Such teams should be formed at every site with one leader for each floor. These teams should be adequately trained in first aid fire fighting operations. Practice drills for fire fighting should be conducted at least once in two months. In addition, all personnels working on each floor have to be properly informed about :—

(i) Raising of alarm in case of fire;

(ii) The telephone numbers of Fire Safety Officer and Local Fire Brigade;

(iii) Location of fire extinguishers and hydrants;

(iv) Use of first-aid fire extinguishing equipment;

(v) Safeguarding of property against fire;

(vi) Orderly evacuation; and

(vii) Use of stairs instead of lifts.

## III. RESTORATION OF BRITTLE AND FRAGILE DOCUMENTS

Restrengthening of weak and fragile documents is necessary for their safe handling and storage. These days many techniques are available for adding strength to a weak document. But judicious selection of techniques and materials to be used is necessary for restoration. Before adopting any of these techniques, an evaluation of their likely effect on the life of paper is most desirable. Instances are common when piecemeal repair and use of unstable repair materials have further damaged the document. In certain documents, legibility of the writing has been completely obscured by yellowing of the repair materials e.g. tracing paper and pressure sensitive adhesive tape. In a few cases, the appearance of the documents has been marred by pasting slips over torn parts. An understanding of the various procedures and materials used in restoration, therefore, helps in preserving documents for posterity. It has to be kept in mind that the selection of a suitable technique is guided by the following considerations :

(i) The technique used should give maximum strength to the document with minimum change in bulk and should be easy to apply.

(ii) The materials used for repairs should be stable and lasting.

(iii) The technique should be reversible, i.e. capable of being undone by simple means.

(iv) The originality and the aesthetic value of the document should not be marred and the legibility of the writing should be maintained.

(v) The technique should be economical.

It is also desirable that the following factors are kept in view before taking steps for restoration of documents :—

(a) Reasonable knowledge of the constituent materials of a document and their behaviour.

(b) Maintenance of an identification card/file for every document.

(c) Theoretical and practical possibilities of the restoration involved-limits and methdology of the treatment.

It is important that no new method or material is used for restoration of documents, without first establishing its usefulness and efficacy.

*Cleaning of soiled and disfigured documents*

Paper of old documents is quite often very weak and fragile. Many a time the paper is stained due to growth of micro-organisms like mildew, fungi or soiled for want of adequate care in storage. Cleaning of such disfigured documents to remove fungus spores, muddy scars, greasy or oily stains is necessary. Use of mechanical erasing devices such as flattened spatula, blunt edge knife, soft rubber, brushing, air-cleaning, kneaded and synthetic erasing medium etc. is desirable for removing many stains.

However, in certain cases dry-cleaning techniques by using inert organic solvents such as ethanol, petroleum ether, xylene, carbon tetrachloride, acetone etc. are adopted. Use of these chemicals is made by sponging or dabbing. Chemical bleaching agents such as bleaching powder, chlorine di-oxide, sodium sulphite, chloramine T are also used. But these chemicals need cautious working and follow up treatment with an antibleach chemical or washing with water for neutralising the after-effects.

Before using any solvent or bleaching agent, it is necessary to ascertain whether the writing ink can withstand the treatment without getting spoiled. It is also desirable to take adequate precautions to see that only the portion where stain occurs, is treated. Use of a blotting paper or absorbent paper beneath the stained paper, helps localising the application of the solvent or the bleaching agent. These agents are applied by dabbing without rubbing. Each solvent or bleaching agent has a specific action for a particular stain. Some of the solvents and stains to be removed by them are :—

| | |
|---|---|
| 1. Oil & Wax | Toluene, Benzene, Petroleum Ether. |
| 2. Old Rust | Potassium bioxalate, Salt and fresh lemon juice, Citric or Tartaric acid. |
| 3. Ink | (i) Oxalic acid and Potassium permangnate<br>(ii) Phosphoric acid and Ammonia. |

*Deacidification*

The acidity in paper is attributed partly to the treatment rendered to the pulp during its processing, and partly due to absorption from the atmospheric pollution and migration from acidic covers through contact. Acidic nature of ink used for

writing also contributes appreciably to the weakening of paper. Treatment to counteract acidity in paper prior to repairs is thus desirable. Among the techniques of deacidification which can be used in archives and libraries are :

1. Use of Dry powders.
2. Use of Aqueous and Non-aqueous solutions.
3. Use of Vapour Phase techniques.

Selection of a suitable deacidification process depends on the physical condition of the document and the quality of the writing—whether it is water-washable or water-resistant.

"Dry powders" are used only when the paper is extremely decayed or if there is possibility of its getting damaged by treatment or its ink likely to spread by treatment. Calcium carbonate and magnesium carbonate powders are used for treatment. For "non-aqueous treatment" 2 per cent solution of magnesium acetate or barium hydroxide in methylated spirit is used. For "Aqueous treatment" 0.15 per cent solutions of calcium-hydroxide and calcium bicarbonate in water are used. The document duly supported on waxed paper is treated for 20 minutes in each solution. For "Vapour phase deacidification", ammonia in water (1 : 10) is normally used.

Universal indicator solution helps in determining pH of a paper (water extract technique). pH can also be directly measured with a flat bed glass electrode and pH meter.

*Flattening and Minor Repairs*

Papers kept folded are likely to suffer damage along the fold line. The removal of folds, wrinkles and curls is, therefore, necessary. It has to be seen that no attempt is made to flatten a dry document. Before applying pressure by hand or an electric iron, the document should be made damp. While using an iron for flattening, the document should be covered with a white blotting paper so as to avoid direct heat to the document.

Minor repair of torns and damaged margins etc. is done by using properly cut paper slips in such a manner that the appearance of the document is not made ugly. If there is necessity of

using too many paperslips for a document then full-repair is to be taken up. If repair on the written side is to be carried out, slips of tissue paper should be used. Otherwise handmade paper or quality bond paper is to be used for all minor repairs. Care has to be taken that no part of the document is trimmed or cut. It is desirable to add extra paper on corners or on margins where the paper of the document is missing.

*Reinforcement*

Tissue repair, chiffon repair, full-pasting, hand or solvent lamination and inlaying are commonly used for reinforcing the documents. While undertaking repairs the following considerations are to be kept in view :—

(a) Documents containing writing on only one side, are reinforced by full-pasting using handmade paper which should be acid-free.

(b) Documents containing writing on both sides, are reinforced by using tissue paper or chiffon and CMC paste or with hand lamination by using tissue paper, cellulose acetate foil and acetone.

Chiffon repair is used for documents which are extremely brittle as also for documents where legibility of the writing is poor.

Tissue repair is used for documents whose writings are legible and which are only slightly damaged, e.g., printed documents.

Hand lamination (solvent lamination) is used for documents that have major damage and poor legibility. The process makes use of cellulose acetate foil (plastic foil) with tissue paper and acetone. Besides hand|solvent lamination, documents can be reinforced by machine lamination with application of heat and pressure.

Since price of cellulose acetate foil has shown steep rise during recent years, use of such foils should be minimised.

(c) Inlaying is a framing technique for protecting the margin of documents. The documents that are odd in size and have to be accommodated in the same format or folio also need inlaying subsequent to their reinforcement.

*Docketing, Binding and Miscellaneous Problems*

After the individual documents have been flattened, reinforced or attended to for minor repairs as the case may be, a flap or guard of 2.5 to 3.5 cm. width, is pasted along the margin taking care that the written portion is not covered. Stitching of document in docket cover is done on the guard so that the document is protected against needle marks. Guarding also helps in making sections for stitching.

Docket cover should be of lasting, durable and acid-free paper and its colour should be fast to light, water and other organic solvents commonly used in cleaning of documents. If the text exceeds 100 pages, its binding with hard cover (straw board) is desirable.

While binding, specifications prescribed by Bureau of Indian Standards vide IS : 3050-1965 'Specifications for reinforced Library Bindings' should be kept in mind. Use of good quality materials for binding is essential. Poor binding craftsmanship or rough use results in physical damage to records. If such damage is not attended to in time, it might result in major damage needing rebinding which would be costly and time consuming. It is desirable to restitch loose sections, repair and reinforce the fly leaves (end papers), and set right the back cover as soon as damage is observed.

For preserving leather coverings, and ensuring their flexibility and durability leather preservative dressing is applied.

MISCELLANEOUS RESTORATION PROBLEMS : Care and repair of palm-leaf, parchment and water soaked documents.

**A. Palm-leaf documents**

To keep palm-leaf flexible, it is a usual practice in Indian manuscript repositories to smear it with til oil and then run off the extra oil. As a result, the surface of the leaf becomes very greasy and dust starts accumulating on palm-leaf manuscripts. At times the leaves kept in bundles get stuck and need separation. Palm-leaf manuscripts which have water resistant writings are cleaned with a solution of glycerine in alcohol (1 : 10) while those manuscripts where the ink is water washable, are cleaned with carbon tetrachloride or petroleum ether.

Stuck up palm leaves are separated by immersing them in hot paraffin liquid and working with blunt edged knife. Palm-leaves where writing is incised into the surface with metal stylus, need reinking. This is done by applying graphite powder over the leaves and then rubbing off the powder with cotton swab to remove excess graphite. Lamp black is also used for reinking such palm leaf manuscripts. Old and dried palm-leaves are made flexible by applying a solution of di-ethylene glycol and lemon grass oil. After the treatment, these leaves are enveloped in polypropylene sheets. Damaged palm-leaves are best reinforced by chiffoning. The repaired sheets are inlaid in pulp-board for protecting the edge. Inlaying helps in making the size of leaves uniform for storage in bundles.

**B. Parchment documents**

Because of residual alkalinity, parchment often becomes yellow and gets hardened. The sheets curl up due to drying and their flattening needs cautious handling.

Sudden immersion of dry parchment in water is not safe. The dried parchment is made damp by applying wet sponge or by placing it in a humidifying chamber. The curled sheets are opened with light pressure. The flattened sheets are pressed under heavy weight after covering the surface with waxed paper.

Use of excess water or organic solvent for cleaning parchment is not desirable as it can spoil the texture of the surface. The soiled parchment documents are cleaned with soap jelly (neutral soap). Extra soap can be removed by a wet sponge.

**C. Treatment of water soaked or wet documents**

Documents that get soaked with water due to flood, rains or as a sequel to use of water for fire fighting, suffer damage due to rot, mildew etc. Besides, these sheets often get blocked on drying. Such documents need attention and treatment on an emergency basis. While handling wet documents the following points should be borne in mind :

1. The handling and treatment of wet documents should be done in a well-ventilated and airy room.

2. The soaked documents should not be mechanically pressed.

3. No attempt should be made to separate documents till excess water is drained off or soaked away with blotters. Covers of the wet books should not be pulled away till they are dry.

4. The wet sheets should not be handled without giving them a support of waxed paper.

5. Coloured blotting paper or docket cover should not be used with a wet document.

6. The separated sheets are to be interleaved with waxed paper to prevent their blocking on drying.

7. Wet documents should not be dried in the sun. They should be dried in the shade preferably under a fan. The temperature of the room can be raised by the use of a heat convector.

8. Documents soiled with mildew|fungus are to be cleaned with cotton swab with light pressure and fumigated with thymol.

## IV. SUMMARY OF RECOMMENDED PRACTICES TO ENSURE LONGEVITY OF RECORDS, MANUSCRIPTS AND RARE BOOKS

1. Good quality paper and ink should be used for documents and records.

2. Documents should be kept flat and not in folded shape, since folded papers are likely to break at the line of the folds.

3. Documents should not be kept loose but be kept duly stitched in acid free docket covers. Use of pins and clips should be avoided while keeping documents.

4. Documents should be kept in carton boxes or tied between two pieces of 5-ply wood boards. The size of the carton box or plywood boards should be at least 2.5 cm. more than those of the documents. Books and volumes should be supported by proper book-rests.

5. Steel racks or steel almirahs are preferable to wooden ones since the latter are susceptible to insect attack. The use of wooden almirahs built in the walls, should be avoided for storage of records etc. The racks and almirahs should have a clearance of at least 15 cm. from the floor, walls and the ceiling for proper cleaning. The steel racks and almirahs should have rust proof paint, preferably olive green in colour.

6. Direct sun-light is harmful to records. Windows in record rooms should therefore, be provided with lemon-yellow or green coloured thick curtains or glass panes. Indirect diffused lighting is preferable in a record room.

7. Atmospheric pollution, excessive heat, humidity and dryness are harmful to records. Their adverse effect can be controlled by air-conditioning of the storage areas where temperature and relative humidity are maintained in the range of 22-25°C and 45-50 per cent respectively. Air-conditioning however, has to be round the clock.

The records room should be free from the danger of floods and seepage of water from the floor, walls and ceiling. In the absence of air-conditioning, circulation and diffusion of air

through the storage areas together with some amount of humidity control can meet the requirements. Temperature can be kept within reasonable limits by choosing such rooms for housing records which are in the interior and have a verandah around them. This will minimise the effect of light as well.

8. Vacuum cleaners should be used for cleaning.

9. To safeguard records stored in non-conditioned areas against damage by insects, naphthalene bricks or balls should be kept at the back of records|books in the racks or almirahs to act as an insect repellent.

Use of insecticidal sprays directly on the records is to be avoided. The storage room could be sprayed with insecticidal solutions beneath the shelves, in the corners and behind the almirahs. Fumigation and use of insecticital sprays should be done under the supervision of a qualified officer who is fully trained in handling these works. Use of untested chemicals is also to be avoided.

10. Windows and ventilators should be provided with metal grills and wire gauze netting as a precaution against pilferage, sabotage and entry of rodents. Similarly all drains should also be covered.

11. Smoking and taking of food in the stack area should not be allowed. Entry to the stack areas should be restricted and limited only to those who are connected with the work.

12. As a protection against fire, carbon dioxide type fire extinguishers should be provided in the records room and electric wiring should be through conduit pipes. Staff should be trained to handle fire-fighting equipment. An underground water storage tank of sufficient capacity should be located near the building. If possible, arrangements for fire detection and alarm system should also be made.

13. Repair of brittle and damaged manuscripts or books should be undertaken under the guidance of experts.

# APPENDICES

## APPENDIX I

**Policy Resolution in Respect of the Records of the Union Government, 1972.**

1.1 There has been a persistent public demand for legislation for the purpose of proper maintenance and management of the records of the Union and State Governments, and for grant of reasonable access to these records for purposes of research. The Committee on Archival Legislation, which enquired into the matter and reported on the subject in 1960 has inter alia made the following recommendations :—

1.1.1 Steps be taken to amend the Constitution by making suitable entry in the Concurrent List to enable the framing of a single Central Law that would take care both of the Union and the State Archives.

1.1.2 Pending the amendment proposed, separate Archival Laws be enacted for the Centre as well as for each of the States.

1.2 While an amendment of the Constitution is not considered feasible at present, it is possible to have a common Archival Law which will be applicable to the Union and such of the States as accord their consent under Article 252(1) of the Constitution. The Government of India propose to undertake in consultation with the State Governments suitable legislation in this behalf. Since such legislation would take time, it is not considered desirable to delay action on the substantive recommendations of the Committee on Archival Legislation, at least in so far as the records of the Union Government are concerned. Accordingly, with a view to defining and regulating the responsibilities of the Ministries, Departments and all offices of the Union Government for proper custody, care and management of records in their possession, for selection and retirement of records of permanent value to the National Archives, laying down the responsibilities of the National Archives in respect of Public Records in its custody and also those with Ministries and other offices, and prescribing the limits and conditions governing public access to the records retired to the National Archives,

Government of India have approved the measures set out below :

2.1 These measures will extend to the records of (i) all the Departments|Ministries of the Union Government, (ii) all Committees and Commissions set up by them, (iii) the Union Public Service Commission, and (iv) such of the attached and subordinate offices of Ministries|Departments as may be determined from time to time, but not to the records of the Supreme Court, the Comptroller and Auditor General, the Election Commission and the Parliament or of autonomous bodies set up by the Union Government, including nationalised undertakings and enterprises. It would, however, be open to any of the above excluded bodies to seek the assistance of the National Archives in any matter coming within the scope of the Resolution and to retire their non-current records of permanent value to it, if they so desire, at any time, in consultation with the National Archives of India. The term "records" for this purpose would include documents, rolls, codices, sheets, files, dossiers, microfilms, photographs, charts, plans, diagrams, maps, sound recording, etc.

3.1 The Minitries|Departments and other public offices coming within the purview of this Resoluion will be responsible for their current and semi-current records, periodical appraisal and elimination of ephemeral records and for orderly and systematic transfer of records of permanent value to the National Archives.

4.1 The Departmental Records Rooms holding semi-current records, should be placed in the charge of properly trained, suitable and responsible full time staff.

5.1 Suitable training|reorientation programmes should be organised by the National Archives of India for the officers in charge of the Departmental Record Rooms and their Assistants, to enable efficient discharge of the duties entrusted to them.

6.1 The Departmental Record Officers should be responsible for the proper maintenance and management of the semi-current records entrusted to their care, for compilation and periodic revision of Retention Schedules of the Department, for appraisal and weeding of records in accordance with the procedure laid down for compilation and issue of Annual indexes to Records, for compilation and issue of the Organisational History of the Department and annual supplements to it, for maintenance of

general liaison with the National Archives, and for tendering advice generally on all matters pertaining to records management to all sections within the Department.

7.1 Retention Schedules indicating the periods for which particular classes or categories of records should be preserved, shall be drawn up by the Departmental Record Officers in consultation with the National Archives and should be got approved by the Ministry|Department concerned. The Schedules should be revised once in five years to ensure that adequate notice is being taken of the changing and expanding activities of the Department.

7.2 The authority given to Departmental Record Officer to draw up retention schedules in consultation with the National Archives of India should not, however, over-ride the instructions contained in the Manual of Office Procedure, according to which officers dealing with the records at appropriate levels will have to take decisions regarding the period of retention of different records. The function of the Departmental Record Officer will be only advisory.

8.1 All records and files selected for permanent preservation should be transferred to the National Archives 25 years after being closed or recorded, as laid down in the Manual of Office Procedure, subject to the following limitations :—

8.1.1 Files bearing any security classification should not be transferred to the National Archives.

8.1.2 The President's Secretariat, the Cabinet Secretariat, the Prime Minister's Secretariat and the Union Public Service Commission may prescribe a period longer than 25 years for the transfer of their non-confidential records.

8.1.3 Any individual file or records series may be retained by a Ministry|Department or Office beyond the stipulated period for any reason subject to the National Archives being apprised of the position.

8.1.4 Classified files remaining untransferred to the National Archives at the end of the stipulated period should be appraised once in five years with a view to down-grading them and down-graded files fit for permanent preservation transferred to the National Archives.

8.1.5 File once transferred may be withdrawn from the National Archives by the Ministry|Department or Office concerned for a stipulated period, apprising the National Archives of the reasons for taking such action.

8.1.6 The administrative Ministries would have sole authority to decide on the consigning of particular records of the attached and subordinate offices to the National Archives.

9.1 Records pertaining to a body becoming defunct with no successor taking over its functions, should be transferred to the National Archives soon after the body is defunct.

10.1 No records more than hundred years old should be destroyed.

11.1 The Director of Archives will be responsible for the custody, proper care and management of all records received in the National Archives of India.

12.1 The Director of Archives may receive public records of any public office or organisation falling outside the scope of this Resolution or papers of historical value with private institutions and individuals, subject to the conditions mutually agreed upon.

13.1 The Director of Archives is required to co-ordinate and guide all operations connected with public records in respect of their administration, preservation and elimination, with a view to ensuring that records of permanent value are not destroyed and are transferred to the National Archives at the appropriate time.

14.1 The Director of Archives will tender such advice and render such assistance as may be possible to offices and institutions falling outside the scope of this Resolution in respect of technical problems bearing on record management.

15.1 The Director of Archives will be responsible for attending to ancillary matters, such as archival commisisons and committees, archival publications, compilation of the National Register of Private Archives and organising exhibitions and for developing general archival consciousness in the country.

16.1 The Director of Archives will submit a report to

Government every year on the management of public records, with particular reference to the actual working of the record management system.

17.1 All non-confidential public records, transferred to the National Archives, of the period prior to the 31st December 1945, and prospectively all such records more than 30 years old, will be open to bonafide Research Scholars, subject to such exceptions and restrictions as may be found necessary by the Departments concerned in consultation with the Director of Archives, National Archives of India.

18.1 The Ministries|Departments and other offices may, in consultation with the National Archives of India, grant special access to records not transferred to the National Archives of India.

I. D. N. SAHI
Secretary to the Government of India

## APPENDIX II

**Note on the Minimum Requirements for a Departmental Records Room.**

### 1. Introductory

All Ministries and Departments of the Government are expected to have their own Records Rooms. But at present only a few Ministries|Departments have proper Records Rooms. In some cases even those Ministries|Departments who have their own buildings keep their records in ordinary Office Rooms. Occasional survey of conditions of maintenance and preservation of records in Government Departments have shown that adequate measures which ensure proper upkeep and longevity of records are wanting.

1.1 The present note, therefore, discusses and lays down the basic requirements essential for the health of the semi-current and non-current records which the Ministries|Departments have to preserve till their transfer to the National Archives.

1.2 For planning new buildings for offices with well equipped Records Rooms, a reference to Indian Standard : 2663—1989 "Recommendations relating to Primary Elements in the Design of Buildings for Archives" will be helpful.

### 2. Records Room

2.1 A separate Records Room|Stack Area is a vital necessity for all Government Ministries and Departments. A Records Room should, as far as possible, be located either on the ground floor of a building or in its basement. If its windows open into the space outside or in the courtyards in the interior, they should be fitted with metal grills and wire mesh nets. To avoid splashing of rain water in the room, rain shades should be provided at all the openings. For reasons of safety of records and security, it is advisable to permit limited entry into such rooms.

2.2 The floor of a Records Room should be such as to permit easy movement of records carrying trolleys etc.

2.3 To allow free movement of trolleys, ramps should be provided near the entrance.

2.4 Where accommodation and design so permit, the stack area, the record reference and reception portions should be separate.

**3. Drainage**

While selecting the location of the Records Room, it may be ensured that no water pipes or drains pass near, above or under the Records Room, building. Further, in order to prevent any inflow of water in the stacks due to blockage of drains or accidental damage to water pipes in the building, its floor level should be raised a few centimeters above the general level of the other portions of the building.

**4. Air-Conditioning**

4.1 Storage of records in an air-conditioned atmosphere is conducive to their longevity. Air-conditioning is, therefore, essential for Records Rooms. In existing buildings, which do not have central air-conditioning, use of package type air-conditioner or window type air-conditioner is recommended.

4.2 For effective air-conditioning, ventilation should be so planned as to permit minimum leakage of the conditioned atmosphere. While calculating conditioning load, bulk of shelving equipment, archive material, the number of persons working in the Records Room, the bulk of records moving in and out, and the lighting wattage should be taken into account.

4.3 Humidity and temperature in conditioned Records Room should be measured regularly. The ambient conditions for storage of records are (i) temp. 22°C-25°C and (ii) relative humidity 45 per cent-50 per cent.

4.4 In order to maintain proper humidity control in the conditioned area, it is necessary that permeation of dampness through the walls or floors does not take place. The floor should be laid water proof and the walls should be given water proof oil paint coating.

4.5 Air-conditioning of the Records Room has to be planned for round the clock operation and provision should be made for a stand-by plant to take care of occasional service break-

downs, since such break-downs are likely to create conditions leading to accelerated damage to records.

**5. Non-Conditioned Area**

5.1 Keeping in view economy in resources, in many cases it may not be possible to get Records Room air-conditioned. In such a case steps should be taken to provide circulation of air in the storage room by providing air-circulators, fans and exhaust fans to counteract the effect of high humidity and prevent formation of pockets of stagnant air in the storage room. Use of chemicals like silica gel or anhydrous calcium chloride in enamelled or glazed earthen pots, helps to reduce humidity in the room. Mechanical dehumidifiers are now available and during rains their use will help to check the deleterious influence of excessively humid climate.

5.2 Temperature in Records Room can be kept within reasonable range by choosing such rooms, which are in the interior or have a verandah around them. During summer, if the Records Room is fitted with air-circulators, electric fans and exhaust fans for proper circulation of air, high temperature can be brought down by installation of room coolers in windows. Care should be taken to see that direct sunlight does not fall on the records. This can be achieved by fitting either lemon yellow or green coloured glass panes or heat resistant glass panes on the windows or by providing coloured curtains.

**6. Shelving**

6.1 Shelving in a Records Room should be functional, durable, easy to clean, simple in design and which offers maximum protection to records. It should provide maximum safety from fire, dust etc. and offer maximum facility and convenience for servicing.

6.2 Shelves should be fixed away from the walls on upright fixers and at equi-distance throughout the storage area. Distance between successive shelf rows may vary from 0.80 M to 1 M with a central gangway of 1.5-2M or in accordance with the requirement laid down in Indian Standard : 2663—1989 "Recommendations relating to Primary Elements in the Design of Buildings for Archives". Distance between successive rows of shelves may depend on the dimensions of records|files and the manner of keeping the record series on them. A perusal of the Indian Standard referred to above will be helpful.

6.3 If steel shelving is provided in the Records Room, it should be painted rust proof. The paint should be stable and non-injurious to documents. Steel shelves may preferably be slotted for vertical free circulation of air. Where wooden shelves are provided, the wood should be protected against termite infestation. Sharp edges and corners in the shelves and supports which can result in physical damage to documents, should be rounded off.

7. Storage

7.1 Collections in Records Room differ in bulk, size and shape and commonly consist of bound volumes, loose sheets, files, manuscripts, maps, charts, plans and drawings. Shelving arrangement needed for specific materials need designing according to the nature, shape and bulk of the material. While designing these shelves, it may be ensured that neither these nor the materials kept on them touch either the walls, ceilings or the floor. The distance from wall, ceiling and floor should be at least six inches (15 cm.).

7.2 The records should be loosely packed on the shelves to enable free circulation of air and prevent formation of pockets of stagnant air. Unbound records may either be tied between 2 pieces of 5 plywood boards or kept in carton boxes for safety.

7.3 Use may be made of step ladders or platform type ladders and trolleys fixed with swivel castors for movement and proper servicing of records.

7.4 For safeguarding the records against damage due to insect infestation, all cracks in the floor and walls should be filled up to deny any hiding place to pests. The Records Room should be sprayed with insecticidal solutions beneath the shelves, behind the cabinets and also in corners etc. Use of spray guns or pressure guns or any other similar equipment can be made. However, only those chemicals should be sprayed whose effect on the durability and permanence of paper and other record components has been properly studied.

7.5 In a non-conditioned area, use of preservatives like naphthalene in the form of balls tied in meshed cloth or bricks kept on shelves helps to keep the records safe from insects. The insecticidal formulations like flit, Shell-tox and other related insecticides are effective.

7.6 Much damage to record is usually done by rodents. Whereas it is desirable to prevent their entry into the Records Room by using proper wire mesh at the outlet drains, a few rat traps should be kept handy for eliminating their menace in case of their entry in the Records Room. Eatables should not be allowed in the storage area.

7.7 At the first sign of rise in humidity in the Records Room preventive action should be initiated. Also, help of Institutions like the National Archives, New Delhi, should be sought when any insect infestation or fungus growth is noticed or detected.

7.8 In spite of dust-proof buildings and air-conditioning, dust does find its way to the stored materials. Regular dusting operations in the storage area with the help of a vacuum cleaner is, therefore, desirable to remove dust from the stored material. The Records Room itself should also be kept absolutely clean. Staff engaged in dusting should be provided with dust respirators. A cloth bag with surgical lining which can be changed occasionally, works as a satisfactory respirator.

## 8. Lighting

8.1 Good lighting either natural or artificial is necessary for every Records Room. Modern lighting practice is to provide diffused lights of varying intensity for different rooms. Lighting can be improved by using paints that reflect light.

## 9. Fire Fighting Arrangements

9.1 To protect against any accidental fire, all electric wiring should be through conduit pipes and the main control switches of lights etc. installed in the storage area should be located outside the Records Room. As far as possible, the Records Room should be made fire resistant. In big Records Rooms, the storage space should be divided into separate fire-resistant compartments and additional automatic dampers should be installed in the centrally air-conditioned ducts to ensure their immediate closure to prevent the spread of fire to other compartments. It is advisable to provide emergency exits, besides the main entry door to the Records Room to remove valuable archival material to safety, when necessary. Every Records Room should be fitted with a fire detection alarm system to detect any fire in the storage area. Use of naked light, heaters and smoking in the room should be prohibited. As a preventive measure against accidental

fires, all light and power circuits should be switched off after office hours. Watch and Ward Staff provided for this area may use torches, if necessary. Use of temporary lights, loose and ordinary flexible wire for fans, air-circulators and other electrical appliances for the repository should be avoided and instead "Workshop Braided and Armoured" flexible wire should be used. Electrical appliances and fittings in the repository should be periodically checked for loose connections and defects rectified.

9.2 For combating fires, adequate equipment of carbon dioxide ($CO_2$) type should be provided at suitable places in the building for easy accessibility. Besides, water pipes and hoses should be installed at convenient points to fight any major conflagration.

9.3 All the equipment for either detecting of fire or combating of fire should be checked at regular intervals to ensure their being in active operative state at all times. Similarly, staff connected with the storage of records should be trained in fire fighting. A fire drill may be arranged at least once in two months to keep the trained staff alert.

9.4 Instructions regarding prevention of fire and fire fighting should be prominently displayed in the Records Room. Likewise telephone number of District Fire Service for contact in emergency should be prominently displayed at a central place in the Records Room. It will help in seeking quick aid of the expert fire fighting agencies, whenever exigencies so demand.

**10. Care & Vigilance**

10.1 To sum up, good house keeping, creation of hygienic conditions and proper environment, combined with constant staff vigilance facilitate maintenance of records in healthy state thus prolonging their life.

## APPENDIX III

### An Out-line of Paper-making Process

One of the most important achievements of human civilisation has been the invention of 'Paper'. Paper is a thin flat sheet composed of closely matted fibres obtainable mostly from plant sources. In all activities of the present day world, paper is an important item which finds a variety of uses in writing, wrapping, packaging, towelling and most important of all in printing of books, newspapers and magazines etc.

The word paper is derived from 'Papyrus'—a reedy plant, which grows abundantly on the banks of the river Nile in Egypt. People in ancient Egypt developed the technique of making sheets from the papyrus plant for writing purpose. Stems of the plants were cut and the fibrous layers within the stem were removed. These were later placed side by side and crossed at right angles with another set of layers similarly arranged. The sheet so formed was dampened and pressed. On drying, the glue-like sap of the plant acting as an adhesive, cemented the layers together. All the dried sheets were levelled|smoothened by polishing with ivory or a smooth shell. Though Complete de-fibring, which is an indispensable element in modern paper making, did not occur in the preparation of papyrus sheets.

Later, this technique was passed on from Egypt to other countries and people belonging to different countries started using papyrus sheets for writing purposes. This becomes evident from the fact that a large number of papyrus manuscripts have been preserved in many countries even today. One of the famous examples of papyrus manuscript is a roll in Egyptian hieratic writing known as 'Papyrus Prisse'. This manuscript dates back to Circa 2500 B. C. and it is preserved in the 'Musee de Louvre' at Paris. Other writing materials which had been in use in different parts of the world before introduction of paper were : parchment and vellum (prepared from sheep and calf skin), birch bark (bhurjapatra), and palm-leaf (talapatra).

History of Paper-making could be traced back to 105 A. D., when Tsai L'un, an official of the Imperial Court of China, prepared for the first time a single sheet of paper using mulberry and other bast fibres alongwith fish nets, old rags and hemp waste. From China the art of paper-making reached Samarkand in Central Asia in 751 A. D. In Baghdad (Iraq) paper was manufactured in 793 A. D. during the time of Khalifa Harun-ar-Raschid. By 14th century many paper mills were established in several parts of Europe. The demand for paper had increased enormously with the invention of Printing Press in 1450 A. D. At that time paper was largely manufactured from vegetable fibres which had been reclaimed from cloth rags. The paper manufacturers of that period used to sort out white rags, cut them into small pieces carefully and washed them thoroughly. Afterwards these cloth pieces were fermented in a vat of water and beaten to a pulp. The entire process of paper-making was then done by hand and the same process is followed even today for manufacturing certain expensive types of paper. Further changes have occurred in the field of paper manufacturing over the years and at present pulp is obtained through digesting| cooking of the rags followed by beating.

In the manufacture of hand made paper, pulp is dipped out from the vat into a mould fitted with a fine screen at its bottom. Deft motion of this mould, helps the soft pulp to spread over the screen in a thin layer of matted fibres. Gradually, water in the pulp drains off leaving a rather firm mass, which is transferred to a piece of felt. More sheets of half-dried pulp spread on the felt are added. The whole pile is later pressed to squeeze out more of water. Thereafter, the fibres are pressed to come together very closely and this results in the formation of a firm sheet.

The paper sheets are removed from the felts, pressed once again and dried. Surface sizing is carried out during final treatment so as to make paper more suitable for receiving ink. Sheets of hand-made paper are naturally limited in size and comparatively more expensive.

When the demand for paper increased, machines were developed for its manufacture. This change also led to the utilisation of other materials for making pulp in addition to rags. As a result, vast pulp industry was developed to supplement and convert the vegetable material into pulp. These materials were mostly soft woods such as spruce, fir, poplar, hemlock and pine. Other raw materials such as bamboo, grass and straw were also

used. All these fibrous materials contain not only cellulose but also non-cellulosic impurities like gums, lignins, resins, fats, waxes etc. which could cause deterioration of paper. Since paper consists of cellulose fibres, the first step in the manufacture of paper is to separate cellulose fibres from the non-cellulosic constituents of these raw materials. It may be emphasized here that since pure cellulose (expressed as *alpha cellulose) is the *sine qua non* for the durability and permanence of paper, the need for such an ingredient can hardly be over-emphasized.

Whatever raw materials are used for making paper, the manufacturing process involves various stages such as removal of undesirable constituents, reduction to fibrous state, bleaching, beating to pulp, and lastly converting the pulp into paper. The methods used to separate cellulose fibres from non-cellulosic ingredients could be broadly divided into following two groups :—

**I. Mechanical Process.**—This process involves treatment of bark-free logs of wood against a grind-stone using an appropriate quantity of water to control the heat of friction. However, this process gives impure cellulose fibres as very little effort is made to separate the cellulose from the least desirable non-cellulosic associates. Paper manufactured from such a pulp is therefore, poor both in strength and colour. For this reason mechanical wood pulp alone is seldom used these days while manufacturing paper. On the contrary, about 20-30 per cent chemical wood pulp is invariably added to the mechanical wood pulp at the time of manufacturing paper which is used for cheaper periodicals and newspapers.

**II. Chemical Process.**—This process utilises various chemical solutions to dissolve non-cellulosic materials in wood, bamboo, grass, rags etc., under controlled high temperature and pressure. The concentration of chemicals used in the process is also regulated so that the cellulose is not adversely affected. If wood is used as raw material, bark if any, has to be removed and then wood is cut in small pieces before the chemical treatment is undertaken. Chemical process could be sub-divided once again into the following three categories according to the chemicals used for digestion :—

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*Alpha cellulose is a measure of the amount of unmodified pure cellulose in paper and it is that part of the cellulosic material in paper that is insoluble in 17·5 per cent sodium hydroxide solution under specified conditions.

(i) *Soda Process* : In this process, raw materials are treated with a solution of sodium hydroxide and sodium carbonate. This process is used for the treatment of rags and grasses. When straw is used as raw material, calcium hydroxide is also added to the solution.

(ii) *Sulphate Process* : In this case, a chemical solution consisting of a mixture of sodium hydroxide and sodium sulphate is used. The process is mostly used for treatment of bamboo and wood. Kraft paper normally used for wrapping purposes is produced by this process.

(iii) *Bisulphite Process* : In this process, the digesting chemicals are magnesium bisulphite or calcium bisulphite or a mixture of these two chemicals is used in the presence of a free flow of sulphur dioxide gas. This process is generally used for treating wood chips.

After chemical treatment of the raw material in the digester, the next step is straining of the material for removal of uncooked pieces. Straining is followed by bleaching and thorough washing to remove residual chemicals. The half stuff is then led to a beater where it is converted into pulp. A certain amount of blue dye is added to neutralise the yellow tint otherwise present in the pulp. The operations carried out in the beater greatly affect the quality of paper which is produced. The old maxim "Paper is made in the beater" is still as basically true today as it was over two hundred years ago. During beating, the fibres get completely separated from one another, besides being frayed, fibrillated and hydrated to some degree. At this stage a carefully calculated amount of sizing and loading materials is added.

The sizing materials normally used in the manufacture of paper are rosin-alum, starch, sodium silicate, gelatine etc. These materials assist in the felting process by coating and binding the fibres together. Besides, they help in (i) increasing the retention of fibres and loadings, (ii) consolidating and hardening the sheet, (iii) rendering paper more resistant to penetration by moisture and (iv) preventing spread of ink on paper.

Materials used for loadings are white pigments such as china clay (aluminium silicate) gypsum (calcium sulphate), barytes (barium sulphate), titanium dioxide, zinc oxide etc., and these are also called fillers. They are intended to increase brightness,

opacity and surface smoothness of paper. They also improve ink receptivity besides providing dimensional stability by reducing expansion and contraction of paper.

From the beater, the pulp containing sizing and loading materials is transferred to a chest. From the chest it is passed on to a mixing box where water is added in proper proportion. The thin pulp is then run into an endless belt of fine mesh bronze vibrating screen of the Fourdrinier machine which strains out the pulp and felts the fibres together. At this stage the wet paper sheet can be "water marked" by a dandy roll. The wet sheet of paper then passes from the wire screen to the felt blankets and to a series of rollers to squeeze out more of water. Finally, it passes on to steam heated dryer rolls where it is pressed and dried. The finished paper could also be calendered to make it glossy.

The strength of paper depends upon the following factors which are to be considered in combination : (1) Strength and length of individual fibres (2) Interfibre bonding strength of the fibres which increases with the degree of fibrillation achieved in the beating process and (3) Structure and formation of the sheet.

**Durability and Permanence of Paper**

Durability and permanence of paper depend upon its physical and chemical properties and the effect of ageing (heating for 72 hours at 103°C) on these properties. The physical strength or durability is determined by folding endurance, bursting strength, tensile strength and tearing resistance. Chemical stability or permanence, however, depends upon alpha cellulose content, copper number* and acidity (pH) of the paper.

**Writing Paper for Permanent Records**

Writing paper used for records of permanent value should be uniform in formation, thickness and substance. It should also be evenly finished and free from specks, holes and other blemishes. Besides, it must conform to Bureau of India Standards Specification No. IS : 1774-1986 (Re-affirmed, 1990) "Specification for paper for permanent and semi-permanent records".

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*Copper number is a measure of degraded cellulose. A high copper number is invariably associated with impermanent papers.

Copper number is the number of grams of metallic copper in cuprous oxide produced from an alkaline copper sulphate solution by 100 gms. of pulp fibres.

## APPENDIX IV

### Thermostatically controlled Vault for Sterilisation and Deacidification of Documents and Books

While the majority of Archives in the country have facilities for fumigating documents in their custody, many smaller archives, libraries and institutions holding paper material have faced great difficulty in getting over the problems caused by insects and acidic gases in the air. After extensive studies and experimentation, the National Archives of India has got fabricated a portable, thermostatically controlled air-tight vault. It is multi-functional and could be used for sterilisation, deacidification and drying of documents, books and allied materials carrying our documentary heritage.

The air tight vault is fitted with heavy duty castors and has a capacity of 16 cu. ft. (24 × 24″ × 48). It has three adjustable perforated shelves, which could be removed to accommodate a specially designed trolley. It has two air circulating fans and air-tight gas inlet and outlet valves. The inside temperature of the vault could be controlled upto 60°C through a thermostat (Temperature above 70°C is harmful for paper and allied materials). The air-circulating fans are also controlled by the thermostat. The equipment works on 220 volts and this may also be connected to any electrical light or power outlet. It has a load not exceeding 1|2 KW.

It has been found that all varieties of domestic pests are killed within 5 minutes at 55°C and in less than an hour at 50°C. An elevated temperature of around 40°C maintained through this vault would effectively sterilise and reduce the time of fumigation and concentration of the fumigants. By longer exposure of the infested material to elevated temperature in the vault, it would be possible to do away with the use of fumigants.

This vault can be used for drying water-soaked documents and for deacidifying documents by using 10 per cent ammonia solution.

The cost of the vault and the trolley is Rs. 32,000|- approximately and the equipment is manufactured by M|s Narang Scientific Works, C-255 Mayapuri Industrial Area, Phase II, New Delhi-110064.

APPENDIX V

## Indian Standards Relevant I-O. Archives and Libraries

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| IS: 1774–1986 | Specification for paper for permanent and semi-permanent records. Reaffirmed 1990. |
| IS: 1848–1991 | Specification for writing and printing papers. |
| IS: 220–1988 | Specification for Ferro-gallo tannate Fountain pen ink, 0.1 per cent iron content (Third revision). |
| IS: 1581–1975 | Specification for ferro-gallo tannate fountain pen ink, 0.2 per cent iron content. |
| IS: 5805–1970 | Specification for ball point pen ink. Reaffirmed 1983. |
| IS: 1211–1971 | Specification for dye-based fountain pen ink. Reaffirmed 1986. |
| IS: 4174–1977 | Specification for type-writer ribbons, Cotton. Reaffirmed 1990. |
| IS: 1551–1976 | Specification for carbon papers for typewriters. Reaffirmed 1989. |
| IS: 3450–1976 | Specification for Carbon papers, handwriting. Reaffirmed 1985. |
| IS: 933–1989 | Specification for portable chemical foam fire extenguishers. (Fourth revision). |
| IS: 934–1989 | Specification for portable fire extinguishers., Water type (soda acid). (Fourth revision). |
| IS: 2878–1986 | Specification for fire extinguishers, Carbon dioxide type (portable and trolley mounted) Reaffirmed 1991. |
| IS: 3050–1965 | Code of practice for reinforced binding of library books and periodicals. |
| IS: 2663–1989 | Recommendations relating to primary elements in the design of buildings for archives. |
| IS: 1553–1989 | Recommendations relating to primary elements in the design of buildings for libraries. |
| IS: 1642–1989 | Code of practice for fire safety of buildings (General)—Materials and details of construction. |
| IS: 11460–1985 | Code of practice for fire safety of libraries and archives buildings. Reaffiarmed 1991. |



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