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CONTENTS

ARTICLE: Industrial Hygiene Practices for the Improvement.....	1
ARTICLE: Challenges of Preservation of Rare Books, manuscripts and other Materials.....	6
INSTITUTE NEWS	9
ABSTRACTS	12
MATERIAL SAFETY DATA SHEET.....	14
TRAINING CALENDER: DGFASLI	15

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मेरी कलम से

इंडोशयूज के इस अंक को पाठकों के सामने प्रस्तुत करने में मुझे बेहद खुशी है। इंडोशयूज का प्रत्येक अंक कार्यस्थल में व्यावसायिक सुरक्षा एवं स्वास्थ्य के कुशल प्रबंधन से संबंधित किसी

विशेष समस्या अथवा वर्तमान मामलों पर जोर डालता है।

औद्योगिकरण, जो कि किसी भी अर्थव्यवस्था की रीढ़ है, में तीव्र गति से वृद्धि हुई है अर्थव्यवस्था में त्वरित वृद्धि का कारण नई प्रौद्योगिकी खोज है। ये नई और जटिल प्रौद्योगिकियाँ अपने साथ नए प्रकार के जोखिम/रसायनिक प्रक्रियाएँ लाती हैं और उत्पादन शैली में परिवर्तन उत्पन्न करती हैं। इस प्रकार के जोखिम देश में लाखों कामगारों के लिए जान का खतरा उत्पन्न करते हैं। अतः इन जोखिमों से उत्पन्न खतरों को प्रौद्योगिकी के प्रारंभिक स्तर में ही रोकना चाहिए। व्यावसायिक सुरक्षा एवं स्वास्थ्य प्रबंधन में हमारा यही प्रयास होना चाहिए कि हम इन प्रणालियों से उत्पन्न जोखिमों को पहचानें और उनका नियंत्रण करें।

इंडोशयूज के इस अंक में दो लेख हैं। खतरनाक औद्योगिक रसायनों की हैंडलिंग अथवा परिचालन से संबद्ध स्वास्थ्य समस्याएँ, कार्यस्थल में उनकी मौजूदगी की निगरानी और नियंत्रण के लिए रणनीति अपनाना पहले लेख की विशिष्टता है। दूसरा लेख दुर्लभ पुस्तकों, पांडुलिपियों एवं इस प्रकार की अन्य सामग्री के परिरक्षण की चुनौतियों पर प्रकाश डालता है। यह लेख डिजिटलाइजेशन की प्रक्रिया की जटिलताओं तथा इसके लाभ एवं सीमाओं के बारे में भी समझाता है। इन न्यूज पत्र को और अधिक मजबूत बनाने के लिए संपादकीय बोर्ड को पाठकों द्वारा भेजे गए बहुमूल्य सुझाव मिलते रहे हैं। आशा करता हूँ कि इंडोशयूज के इस अंक में प्रकाशित लेखों और अन्य सामग्रियों से प्राप्त जानकारी व्यावसायिक सुरक्षा और स्वास्थ्य वृत्तियों और अन्य पणधारियों के लिए लाभदायक सिद्ध होगी।

FROM THE DESK

It gives me immense pleasure to put before the readers, this issue of the INDOSHNEWS. Each issue of INDOSHNEWS puts emphasis on a particular problem or a current issue concerned with the efficient management of OS & H at workplace.

Industrialisation, being the backbone of any economy, has achieved a very high pace of growth rate. The inventions of newer technologies are aimed at accelerated growth of the economy. These new and complex technologies bring with them new hazards / chemicals, processes and involve changes in production methods. Such hazards associate with them, serious threats to the lives of millions of working population in the country. Hence these hazards have to be taken care of during the incipient stage of the technology itself. Our efforts in the OS & H management should be directed towards identifying such hazards which might have crept into the system and devising methods to contain them.

This issue of INDOSHNEWS contains two articles. The first article highlights the health problems associated with the handling or manipulation of hazardous industrial chemicals, monitoring their presence in the workplace and application of strategies to control them. The second article highlights the challenge of preserving rare books, manuscripts and other materials. It also explains the process of digitization its advantages and limitations.

The editorial board has been receiving valuable suggestions from the readers to strengthen the newsletter. I hope the information carried by the articles and other features of this issue of INDOSHNEWS will be very much useful for the OS & H professionals as well as other stakeholders.

S.B.Mathur

Director General & Editor- In -chief

INDUSTRIAL HYGIENE PRACTICES FOR THE IMPROVEMENT OF WORK ENVIRONMENT

P.B.Pal

ABSTRACT

Working community in industries is exposed to different types of hazards. These hazards adversely affect the health of the exposed persons. The application of industrial principles can bring about remarkable improvement at the work place. The hazards at the workplaces should be properly identified, evaluated periodically so that effective control measures can be devised to protect the health of the workmen. Health problem associated in the handling or manipulation of hazardous industrial chemicals such as Pesticides, Solvents, Epoxy Resins, Polyurethane foams and paints, Fluorocarbons & Dyestuffs are presented in the paper. Monitoring workplace air to evaluate the exposure of chemicals, Hierarchy of strategies to control chemicals and Use of Personal Protective Equipment are also highlighted in the paper. The paper highlights the different dimensions of Industrial hygiene with a view to encourage industries to adopt these practices for quantitative changes at the work places.

INTRODUCTION

There has been a considerable industrial growth in India since three decades. Industries like petroleum & petrochemicals, fertilizers, power generating plant etc have increased in manifold. It is a well known fact that modern technology has improved the quality & productivity in industries but at the same time has introduced several physical hazards such as heat stress, noise etc and chemical hazards in the form of particulates & gaseous form at the work place. The workers come across with these hazards during the work and on excessive exposure may impair their health and cause occupational diseases. As we are aware that most of the occupational diseases are not curable, we have to have preventive measures. Industrial Hygiene is a preventive measure for the prevention of occupational diseases. It is defined as science & art which deals with anticipation, recognition, evaluation & control of occupational health hazards in industrial work environment.

However, the adverse health effects on working community due to prolonged exposure of airborne chemicals at workplace may lead to chronic crippling health implications and occupational disease. Therefore industries should adopt good industrial hygiene practices for the prevention of occupational diseases. THIRD SCHEDULE under Section 89 of the Factories Act, 1948 has listed out 29 occupational diseases. It is the challenge for industrial management, industrial hygienists, occupational health professionals, safety professionals and government agencies to control the health hazards at

the workplace. The present paper highlights the salient features of the industrial hygiene practices particularly to control hazardous chemical at the work place. The application of the good industrial hygiene practices will not only protect the health of the employees but will also improve the working conditions. The hazards of the commonly used chemicals are also summarized for the benefit of the industry.

HARMFUL EFFECTS OF SOME OF THE COMMON HAZARDOUS CHEMICALS

Pesticides

All pesticides are toxic to life – that is their rationale. Their effects are not confined to 'pests' but are exerted in any life form exposed to them. They are biocides.

The health hazards of pesticides vary with their mode of formulation - as gas, solution or powder – and with the mode of application – as a spray, dust or powder. The solvent or dispersing agent is frequently just as harmful as the biocide, e.g. benzene or carbon tetrachloride. The gaseous form is typical of many of the fumigants, such as methyl bromide, used to fumigate ships' holds. The liquid form is assumed by many common pesticides, such as Parathion, Mevinphos and DEF. They can be inhaled if applied as a spray or mist. Solids like DDT or Lindane can be applied as a dust or as an aerosol. Some pesticides come as baits, such as Warfarin.

The principal classes of pesticides are:

Class	Examples	Health hazards
Organophosphorus insecticides	Azinphos-methyl (Gusathion), diazinon, dimethoate, ethion, maldison Malathion), mevinphos and parathion.	These biocides act by attaching themselves to the essential enzyme cholinesterase , thereby disrupting brain and nervous functions, and inducing muscle spasms and convulsions. Many organophosphorus insecticides are rapidly absorbed through the skin, and produce symptoms within half an hour. They can kill, even in small quantities. Repeated skin contact and inhalation may progressively increase the susceptibility of poisoning without showing earlier symptoms.
Organochloride insecticides	Aldrin, BHC-(Gammexane), campechlor (Toxaphene), Chlordane, DDT, dieldrin, endosulphan (Thiodan, Endoson), endrin, heptachlor	The greatest occupational hazard is absorption through the skin. Inhalation is also a problem. Whatever the route of absorption, the organochlorines act on the central nervous system, producing convulsions and coma

Carbamates	(Marlate). Aldicarb (Temik), aminocarb (Metacil), aprocarb (Baygon), bendiocarb (Ficam), carbaryl (Sevin)	Symptoms of acute over exposure include watering of eyes, irritation of skin, headache, nausea, blurring of vision, progressing to dizziness, weakness, chest tightness, cramps. If these symptoms are left untreated, death may result. Carbamates are also cholinesterase inhibitors.
Phenoxy herbicides acid	2,4D (Weedar), 2,4,5-T (Weedone, Butoxone, Trimex), fenoprop (kuron, Silvex), MCPA (Mehtoxone, Methone, Methex), MCPB (Tropotox).	This group are of concern because of their long-term serious effects. The herbicides 2, 4, 5-T and 2,4-D are known to cause cancer, and 2, 4,5-T birth deformities.
Dinitrophenol compounds	Dinoseb (Nocweed, premerge, DNBP), DNOC, dinitramine (Cobex), pendimethalin (Stomp), trifluralin (Treflan)	These compounds are rapidly absorbed and are highly toxic. Symptoms of acute over-exposure include night sweating, sleeplessness and thirst. A dose of 1 to 3 grams taken by mouth is fatal.
Substituted herbicides urea	Chloroxuron - (Tenoran), diuron (Karmex, Diurex), Fenuron (Dybar), linuron (Afolon, Lorox), monuron (Telvar).	These compounds have a relatively low solubility in water and are not readily absorbed. Mildly toxic with short-term exposure.
Triazine herbicides	Atrazine (Gesaprim, primatorl, Atradex, Nutrazine), desmetryne (Semeron) propazine (Gesamil), simazine (Gesatop, Simadex).	These are relatively non toxic
Trichloro group	2,3,6-trichlorobenzoic acid (Trysben), trichloroacetic acid (Socium TCA), picloram (Tordon)	These are irritating to the skin and eyes. Picloram is combustible.
Cyclohexenes etc.	Captan (Orthocide), folpet (Phaltan), 22-DPA (Dowpon, Dalapon)	Mild short-term toxicity. Captan has been shown to cause birth deformities in test animals.
Dipyridyllium group	Diquat (Reglone, paraquat (Gramoxone, Weedex.	These are highly toxic. Cases of severe poisoning amongst applicators are regularly reported in the literature.
Inorganic compounds	Arsenites, copper sulphade	These can be toxic and can also cause chemical burns. The arsenicals, formerly use widely on vineyards, are known to cause cancer. They are still widely used in the timber preserving industry.
Chlorophenols	Trichlorophenol, pentachloro phenol (Penta, PCP)	PCP is usually contaminated with a dioxin that can cause cancer and birth deformities.

Solvents

Solvents are used widely throughout industry, in such processes as metal degreasers, paint thinners, glues and adhesives, on printing presses, in spray painting booths and in dry cleaning.

Some of the common solvents are:

- Alcohols - Methanol, ethanol, isopropyl;
- aromatic hydrocarbons - Benzene, toluene, xylene, nitrobenzene
- chlorinated hydrocarbons - Carbon tetrachloride, chloroform, trichloro-ethylene (Trike), perchloroethylene (Perk, perkylene), ethylene dichloride, trichloroethane (Genklene).
- ketones - Acetone, methyl ethyl ketone (MEK), ethyl butyl ketone (EBK), methyl butyl ketone (MBK)
- ethers - Ethyl ether, isopropyl ether;
- esters - Ethyl formate, amyl acetate;

- glycols - Ethylene glycol, Ethylene glycol Monomethyl ether, ethylene glycol monoethyl ether, methyl cellosolve (Dowanol), butyl cellosolve.

Solvents are used because of their dissolving power. Unlike water, solvents can dissolve oil, grease, paint etc., and they can be used as a vehicle for dyestuff in inks and paints. Solvents are easily absorbed by the body, by breathing solvent fumes, and by absorption through the skin. Most solvents are narcotics, i.e. they have an immediate depressing effect on the central nervous system, causing faintness, dizziness, then unconsciousness and finally death - all within minutes in some cases.

Solvents dissolve the oil in skin, so regular skin contact almost always causes dermatitis. Dryness, cracking and blistering, and frequently infection, result. The long-term effects of solvents include damage to the liver, causing a

form of cirrhosis which is identical to that caused by alcohol. Solvents such as trichloroethylene, perchloroethylene, dichloroethane (ethylenedichloride), carbon tetrachloride and chloroform have all been shown to cause cancer in animals. The solvent benzene has long been to cause leukaemia or cancer of the blood.

Genetic toxicity (mutagenicity) has been demonstrated for benzene, styrene, trichloroethylene and some of the chlorinated ethanes. Chromosome changes have been noted in workers exposed to benzene, benzene-toluene mixture, trichloroethylene and styrene.

Foetal damage and spontaneous abortions are suspected to be related to exposure to solvents. Benzene, for example, has recently been shown to cause foetal damage in animals.

The only acceptable strategy for the control of solvents in the workplace is substitution, or total enclosure, or extremely efficient exhaust ventilation.

Epoxy Resins

Epoxy resins are industrial adhesives which come as "two pack systems" – the resin and the hardener. The two are applied separately, and the hardener 'cures' the resin. There are hundreds of different chemicals in the different epoxy resins. Some of the trade products are Araldite adhesive, Scotch cast resin, Devcon A, F2 and WR, Dulux Durepon Chromate – Primer, Resiweld epoxy resin, Epirez epoxy resin and Repco-Woodhill epoxy.

Epoxies are used throughout industry, in aircraft, ship and car manufacture, electrical industries, plastic industries and many more. These resins are found to be extremely useful throughout industry – but they have also been found to cause severe dermatitis – irritation and sensitisation of the skin. Once you are sensitized, the slightest exposure to one of the chemicals in the resin or hardener can provoke an extremely painful skin reaction. All measures should be provided to avoid skin contact. All mixing of the resin and hardener should be mechanical, and enclosed or provided with exhaust ventilation.

Disposal of epoxies is especially hazardous. Uncured or partially uncured wastes should be stored under water until they are collected. They may only be disposed of in approved tips or chemical waste facilities. These materials should not be burned as they are known to produce fumes of hydrochloric acid and ammonia.

Polyurethane foams and paints

Polyurethanes are another of those chemical products which have extremely useful hardening properties. Flexible polyurethane foam is widely used in the furniture industry, as the filler in upholstery and bedding. Individual moulded articles are used, for example in car seats. Flexible foam is also flame-boned to fabrics and used widely in the textile industry. Rigid polyurethane foam is widely used as a container material (e.g. the white packing that comes around TV sets and other appliances) and it is used as an insulating material in the refrigeration industry. Polyurethane paints are used in

the motor industry and as marine coatings; they harden as moisture in the air reacts with the active ingredient in the paint.

This active ingredient is an isocyanate. Isocyanates come in many chemicals forms, Toluene di-isocyanate (TDI) and 4, 4-diphenylmethane di-isocyanate (MDI) are prominent.

Trade names under which TDI is supplied include Hylene, Adiprene etc. (Du Pont), Desmodur etc. (Bayer), Suprasec etc. (ICI), Linene, Ekanate etc. (Ugine Kuhlmann), Flexocel, Castomer, Clole etc. (Baxenden), Quazilan, Isocon etc. (Lankro), Caradate etc. (Shell) and Isonate etc. (Upjohn).

The isocyanates are extremely reactive (which is the basis for their industrial use) – but they are also biologically active.

Isocyanates are lung sensitizers

Both TDI and MDI can produce crippling occupational asthma – and in some severe cases, death. Once someone is sensitized to an isocyanate, the slightest exposure can bring a crippling attack of asthma.

Yet another hazard in the manufacture of polyurethanes is the use of particular catalyst, called 'Niax catalyst – C125'. Evidence has come to light of a high level of bladder malfunction accompanied by severe pain when attempting to urinate and associated kidney problems, amongst workers at two US companies manufacturing PU foam. In one of the studies, no less than 69 out of the 101 workers in the plant were found to have bladder disorders. This catalyst was the subject of an International Hazard Alert put out through the International Labour Organisation.

Polyurethane foams burn very easily and give off thick clouds of choking black fumes. It is these fumes which now pose the greatest threat in house fires and fires in furniture stores, and they have been responsible for many deaths in such fires.

Fluorocarbons

Fluorocarbons are widely used today as refrigerant gases and aerosols for use in spray cans. Fluorocarbons have been promoted by Du Pont under the trade name **Freon**. Some of these products are Freon 14 carbon tetra fluoride, Freon 23 carbon trifluoride & Freon 22 chlorodifluoromethane. Freon 22 is a particularly toxic material. It has been found to be positive in the Ames test for mutagenicity (i.e. it is genetically toxic) and must therefore be suspected of causing cancer. It has also been found to cause birth abnormalities when pregnant rats were exposed to it, in tests conducted at Du Pont's Haskell Laboratories in the US, according to documentation issued by Du Pont. The major refrigerants are Freon 11, 12, 13 and 22. The main propellants used in spray cans are Freon 12, 11, 114 and 115.

Dyestuffs

The model chemical industry really started with the development of synthetic dyes from coal tar in the mid-

nineteenth century – and the chemicals used in the production of dyes have been killing and adversely affecting workers ever since.

Virtually all dyestuffs are produced synthetically from such starting materials as benzene, toluene, benzidine, naphthalene and anthracene, derived from coal tar but not almost exclusively from petroleum. Dyestuffs can be classified according to their basic chemical composition. Most are based on a few chemical groups, such as nitroso, nitro, azo, stilbene, quinoline, benzidine, thiazine, anthraquinone etc., or on organic heavy metals as in mercuric dyes.

The US Occupational Safety and Health Administration and the National Institute of Occupational Safety and Health issued a Health Hazard Alert in December 1980 on dyestuffs based on benzidine, ortho-tolidine and ortho-dianisidine. This Alert was based on evidence that the dyestuffs cause cancer. The Alert stated: "Available studies indicate that some benzidine-based dyes cause cancer in experimental animals and are converted in animals and humans to benzidine" (Benzidine is a known cause of cancer of the bladder) "NIOSH has recommended that the commercial use of benzidine based dyes be discontinued and appropriate substitutes be utilized. OSHA has concluded that exposure of workers to the dyes should be reduced to the lowest feasible levels"

EVALUATION OF WORK PLACE ENVIRONMENT

The hazards should be recognized after due consideration of process /operations, uses of chemicals, work practices, existing control measures including personal protective equipment. Once hazards are identified then evaluation of work environment becomes an important decision point for the degree of control required on particular work area. Therefore the monitoring of work environment is one of the decision making steps in the application of industrial hygiene.

Air monitoring is done in several different ways. There is fixed point monitoring, where a sensor, or collecting device, is placed in a permanent position in the workplace, and takes samples of workplace air continuously or at regular intervals. These samples are normally analysed in a laboratory. If sampling points are strategically located, continuous fixed point monitoring, particularly if performed in real time (i.e. so that you can read the concentration of contaminant as it is collected) is the air monitoring procedure of choice. It is performed, for example, in the chemical industry, particularly for the monitoring of vinyl chloride monomer in plants producing PVC.

Less sophisticated is the procedure of taking grab samples from the air with a portable instrument. The most common and versatile instrument used for this purpose is the Dragger tube system. In this system, a small hand pump is used to draw a known volume of workplace air through a glass tube of test chemical. The extent of discolouration of the test chemical indicates the amount of pollution present. The discolouration extends down the tube which is calibrated in parts per

million of contaminant. This system gives only a rough and ready guide to pollution levels – but frequently this is all that is required. You have to know what pollutants you are looking for, in order to be able to choose the right test chemical.

Finally, there is personal sampling, which involves an individual wearing either a badge (passive monitoring) or a charcoal tube and a small pump (active monitoring). In either case, the badge or tube is worn for complete shift, and then returned to a laboratory for analysis. The contaminant collected by the badge or tube is an indication of the amount of contaminant that also got into your lungs over the same period. Wearing of charcoal tubes and pumps can be a nuisance, and so this form of monitoring should only be contemplated as a means of checking the relevance of fixed point monitoring or grab sampling. Badges are simpler to wear, but independent audit of their performance reveals that they can be widely inaccurate, and so cannot be relied upon as yet. In general, personal monitoring should be seen as complementary to fixed point monitoring – neither is a substitute for the other.

Some points to note in any air monitoring programme:

- Are the tester's trained industrial hygienists?
- Are the samples being taken at the right place, i.e. near the breathing zone of operators?
- Is the sample being taken at the right time, i.e. when pollution levels are highest?
- Are all contaminants being measured?
- Are the test results being made available to safety committees and management regularly, and discussed?

HIERARCHY OF STRATEGIES TO CONTROL CHEMICALS

Risks from working with chemicals can be reduced in a number of ways, and according to the principle given above (that the workplace should be made to fit the worker, and not the worker to the workplace) some way should be given priority over others. Indeed there is a hierarchy of strategies, starting with the top priority (or 'first line' of defence) and down to the lowest priority (or 'last line' of defence). The hierarchy is three-fold.

1. Substitution for less hazardous material.
2. Total enclosure or ventilation, backed by environmental monitoring.
3. Administrative procedures or use of protective equipment, backed by medical monitoring.

Use of Personal Protective Equipment

'Enclosure' puts a barrier around the process to prevent contamination of the workplace air; protective clothing puts the barrier on the worker himself or herself.

Personal Protective Equipment for chemical hazards includes:

- face masks
- respirators
- gloves

- plastic overalls
- goggles
- airline-fed helmets

Employees should be warned that Personal Protective Equipment can sometimes lead to a false sense of security. The US National Institute of Occupational Safety and Health (NIOSH) recently carried out a survey on gloves that were commonly marketed as a defence against common solvents like trichloroethylene, xylene and toluene – and found that most of the common commercial gloves were completely ineffective in stopping the solvents penetrating the skin of operators' hands.

The Personal Protective Equipment must be personally fitted and issued; otherwise there will be no effective protective barriers around workers who differ in some way from the norm.

- Personal Protective Equipment must be inspected, cleaned and maintained by management and replaced as necessary. Items should be replaced immediately when damaged or lost.
- Great care must be taken with respirators. They must be personally fitted and chosen to suit the workplace conditions. A filter designed to stop dust, for example, will be ineffective against chemical fumes. Canister and cartridge respirators contain chemicals designed to neutralize particular vapours and fumes – so it is essential to ensure that each type of protection against contaminant encountered in the workplace is by means of the appropriate canister. Particular attention needs to be given to the maintenance of airline fed helmets and masks, because failure of these can result in rapid death. Respirators remain active only for a certain period.
- No worker should be charged for any item of Personal Protective Equipment.
- No worker should be required to clean or in any other way maintain Personal Protective Equipment; it is the responsibility of the management.

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CIS: INTERNATIONAL OCCUPATIONAL SAFETY AND HEALTH INFORMATION CENTRE

CIS (from the French name, Centre International d'information de securite et d'hygiene du travail) i.e. International Occupational Safety and Health Information Centre, is a part of the International Labour Office, Geneva, Switzerland.

The mission of CIS is to collect world literature that can contribute to the prevention of occupational hazards and to disseminate this information at an international level. CIS imparts to its users the most comprehensive and up-to-date information in the field of Occupational Safety and Health. The work of CIS is supported by a worldwide Safety and Health information exchange network, which includes over 91 Centers.

Central Labour Institute, Mumbai has been designated as the CIS National Centre of India. CIS can offer you rapid access to comprehensive information on occupational safety and health through its abstracts on latest OSH publications and ILO Bulletin 'Safety and health at Work'.

EXCERPT FROM CIS DOC

TITLE: Global estimates of traditional occupational risks.

CIS ACCESSION NUMBER: 07-766

This study used employment figures, reported fatal accident rates and mortality data on various diseases and injuries together with literature data to compute the rates of occupational accidents and diseases for several countries worldwide.

It was estimated that an average of 2.2 million fatalities due to work-related factors occurred worldwide annually. The most significant problems identified were work-related cancer (in particular in industrialized countries), occupational accidents (in rapidly industrializing countries), work-related cardiovascular diseases, work-related communicable diseases (in tropical developing countries) and work-related lung diseases in countries where mining is a major activity.

It is estimated that 270 million nonfatal occupational accidents and 160 million work-related diseases occur worldwide every year.

CHALLENGES OF PRESERVATION OF RARE BOOKS, MANUSCRIPTS AND OTHER MATERIAL IN DIGITAL ENVIRONMENT

SANTOSH TYAGI

ABSTRACT

In this article, I have tried to discuss the challenges of preservation of rare books, manuscripts and other material in Digital environment. The need for digitization, the process of digitization, its advantages and disadvantages with reference to its usefulness worldwide. The cost involved in acquiring the digital equipment and hiring of technical personnel for their operation will be initially high but if we compare the utility, saving of storage space and hiring of manpower, the cost can be set aside. Moreover, we have to coordinate with users worldwide for exchange of heritage and information.

INTRODUCTION

The process of preservation ensures that the rare books, manuscripts and other material held by a library do not get destroyed and are kept safe from the enemies of records. The primary goal of a library is to provide access to its holdings. In order to achieve the above goal, the libraries are required to evolve a systematic preservation planning as without a systematic preservation policy and its systematic implementation, the records, rare books and other material collected get destroyed.

Rare books, manuscripts & archival records are unique because replacement of their information may be impossible, difficult to carry out, or exceedingly expensive. Therefore, their preservation becomes key issue before the management to ensure their safety and preservation. For this purpose they are to identify the enemies of the records, rare books and manuscripts and employ a series of methods for preventive, curative, restorative, duplicative conservation.

NEED FOR DIGITIZATION:

The rapid technological advancement has made it more or less imminent for digitization of rare books and manuscripts as it will be very difficult and time consuming to retrieve the information from paper heritage. Therefore, the digitization of documents is fast emerging as an important tool for solving difficulties of retrieval in so far as consultation and dissemination of information incorporated in documents are concerned, under the process of digitization the images on rare books and manuscripts are transformed into electronic format, which can be shared by a large number of users throughout the world simultaneously, thereby making the information available to users globally. The process of digitization starts right from the stage of converting the information contained in a document into digital form and store electronically. The second step is to ensure that the information so stored digitally is retrieved. The information in digital library are stored in Blue ray optical disc, etc, storage media such as floppy disc, CD Rom, DVD Rom, VCD Video and sound, data graphics etc.

SCOPE AND OBJECTIVE OF DIGITALIZATION

"The process of digitization of documents is a costly process. It requires costly machines for digitization of documents and trained personnel for handling them. A slight mistake can destroy the whole process. The main objectives of the digitization are as follows:

1. To provide personalized and retrospective services in efficient manner
2. To capture stored, manipulated and distributed information.
3. To make available all publications timely and easily.
4. To have large number of data base in CD.
5. To serve widely dispersed communities through the network.
6. To save time of library professionals, archivists and museum curators and conservators.
7. To reduce dependence on handling fragile and brittle documents besides original documents.
8. To ensure and obtain a back up medium/copy

GENERATION OF DIGITIZATION RECORDS

Digitization is the translation of analog text, sound or images into digital format and results in the creation of digital surrogates containing similar information as the original. This differs from objects born in digital format. Digital collections are in a format which could be delivered electronically anywhere and anytime, they can be viewed at the size and resolution necessary for the particular task, they can be down loaded and saved for later use and have the potential to be viewed or used simultaneously.

Text or images, typically printed, manuscript or graphic works on traditional substrates such as paper or parchment, can be digitized by the use of optical scanners or digital photography. In the case of optical scanners, the document is placed in or on the scanner and the scanner translates the image into digital code. Scanners could be used to scan text in two different ways: the text can be scanned as an image; or it can be scanned using optical character recognition (OCR) software to save it as a text file. OCR software digitizes text as alphanumeric characters, which can be further edited by word processing software programmes. The second option scans the text and saves it as an image where characters are treated as areas of light, shade or colour. Manipulation of the resulting image file is performed only through graphics or illustration software (such as 'Adobe Photoshop') and text editing is not possible. Digitization by camera similarly captures information as an image, not as text.

a. Born Digital

For a record to be 'born' digital format, it is to be created by a computer system. Digital technology has brought

forth many significant advantages to users in many fields. The interest of the creator of the digital documents in the computer is not necessarily long term preservation or access to the information. Other experts see quite a different set of advantages and disadvantages associated with digital technologies than do the creator. The disadvantages of digital media and technology, and the challenges they present to heritage institutions, are related to the long term preservation. Another important characteristic of digital electronic records is their logical format. Bits and bytes cannot represent real-world things without application of additional means through which this code could be rendered accessible and understandable as informational content. Computer software programmes provide the means to organize and package data into logical formats programmed to represent information in specific ways. Logical formats are usually proprietary to their creators (software companies) and more often not completely compatible with software programmes other than that in which they were originally created.

b. Electronic Textual records

Electronic textual records include all types of documents created by computer systems (typically word processing software) that would have previously created through various printing or manuscript techniques (e.g. typewriter, adding machines, letterpress, handwriting, etc). Digital textual records are produced by computer authoring systems in a variety of logical formats (usually proprietary), and on various media (e.g. magnetic tape or disk, optical media, computer memory chips) common proprietary formats include, Corel, World perfect or Microsoft word. Non-proprietary or "Open" file formats include, the ASCII format, the Adobe PDF format and markup language formats used for exchange over the internet (e.g. HTML, XML).

c. Databases and Spreadsheets

These records are created as tables or indexed collections of data (numeric or alphanumeric) image by software programmes. As with textual records they typically exist in collections as digital files in proprietary or non-proprietary formats on magnetic or optical medium. The adoption of digitization as a preservation copying strategy is also pitted against formidable and well established traditions. The standard format preservation for microfilming and photography as set this medium with long term potential. Recent technical expert still support microfilming as the preservation reformatting option of choice for analog originals.

d. Migration

Migration ensures the period transfer of digital information from one software/hardware configuration to another available medium in vogue, or from one generation of computer technology to a subsequent generation of information technology. If there is a potential for loss of valuable information during migration then institutions would have to determine what would be a total acceptable quantum of loss (risk management) with the primary goal of access in mind, which should be to kept as watchword or an evolution of a definite policy to be evolved.

ADVANTAGES

The main advantage of digitization is to access up to date current information on all subjects without moving from their place of work

- All government rules and regulations, current policies on any matter are stored in one domain. If necessary, the user can make a hard copy of the information for reference.
- The rare books, manuscripts and other brittle records of archival value are not destroyed by frequent uses.
- This also helps in saving of storage space for other material.
- With intensive use of internet worldwide the information contained in rare documents reaches to larger number of users.

DISADVANTAGES

- Digital information can be manipulated by using computer devices.
- The website can be hacked by anyone to their advantage

CHALLENGES

Conventional preservation policy in libraries are primarily confined to the management and upkeep of records, rare books, manuscripts and other materials received in paper form etc. and dissemination of information to scholars and other users through traditional methods i.e. xerox, copies, publications, microfilms, microfiche, etc. The preservation methods adopted by the libraries are also traditional. Now with the change in the environment since 80's the government departments and other organizations have started maintaining records in digital form. It has therefore become necessary for the libraries to acquaint themselves about the rules and regulations for the maintenance and use of digital documents. All departments are therefore to formulate a specific preservation policy and provide suitable training to the staff connected with changes in the preservation policy is therefore need of the hour for survival of data for future generations.

Besides digitization of information the documents in their physical form are also required to be maintained as digital information cannot be used as evidence, it can only serve as a source of information. The information generally available in digital form on the website is taken for guidance and considered to be accurate but due to the frequent changes in policies and timely not updating the information on website makes a difference. The staff concerned in all the departments is therefore required to ensure that as and when a change in the information occurs, it must be simultaneously updated on the website. It is often seen that the web-sites are not updated for months together. This, therefore, goes without saying that any user accessing the information on web-site cannot depend on it unless verified by the original documents.

CONCLUSION

After going through various aspects of digitization, as brought out above, it can be easily understood that the process is enough cumbersome but very useful. We have seen spectacular rise in the users of internet worldwide. The desired information can be accessed by the users in any part of the world without moving out from their desk.