A SCIENTIFIC WAY IN PAPER CONSERVATION

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INTRODUCTION

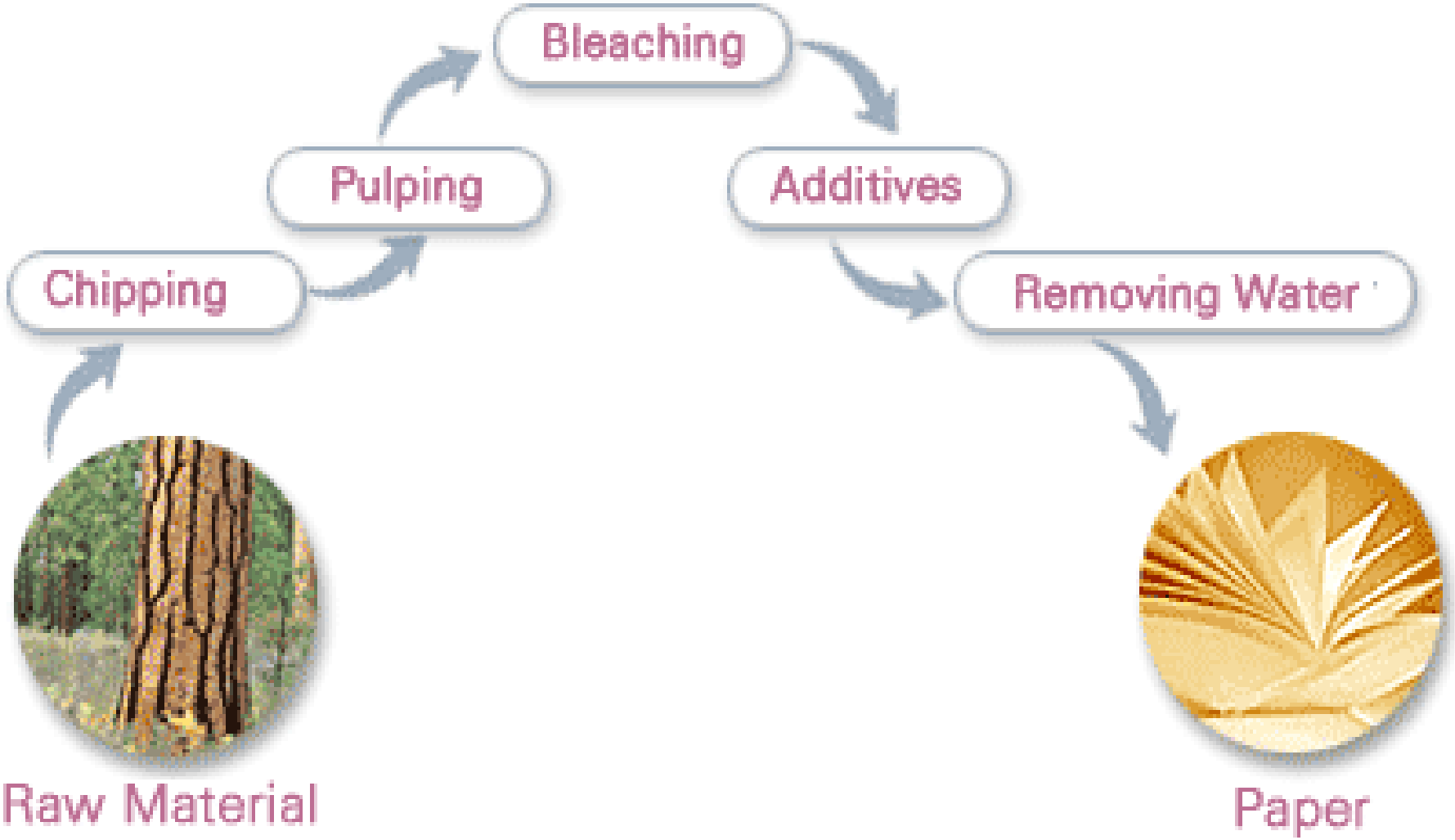
PAPER:

A thin material consisting of flat sheets, made from pulped wood, cloth, or fiber, used for various purposes, for example, for writing and printing on, for wrapping things in, or for covering walls.

NEED FOR CONSERVATION:

In order to maintain the cultural heritage and to conserve the ideas expressed.

MANUFACTURE OF PAPER



PARAMETERS FOR PAPER

- CHEMICAL PROPERTIES
- PHYSICAL PROPERTIES
- OPTICAL PROPERTIES

CHEMICAL PROPERTIES

DERIVED FROM THE FOLLOWING

- Furnish variables: fiber type, composition including filler, size, colorant, coating,etc.
- Formation variables: basic weight and calendaring.
- Manufacturing variables: speed, drying, fiber bonding.

- Degree of polymerization of the cellulose chain: By viscosity measurements.
- Acid content: pH measurements and alkaline titrations.
- Presence of reactive groups like carbonyl, carboxyl, hydroxyl,etc: Iodometric titrations.
- Moisture content: Gravimetric titrations.
- Ester and ether content: Spectroscopic techniques.

PHYSICAL &OPTICAL PROPERTIES

- The physical properties corresponds to density, thickness, basis weight, smoothness, permeability, roughness, porosity, etc.
- The optical properties corresponds to opacity, gloss, transparency, transmittance, reflectance, clarity, brightness,etc.

DETERIORATION

- *Change of original state of any material by the influence of any of the following factors*
- Environmental factors
- Biological factors
- Chemical factors
- Human factors
- Disasters

CONSERVATION

- Preventive measure: Protection from external factors, involves design of the library building and its environment.
- Curative measure: Direct action.

1. Washing & cleaning.
2. Deacidification.
3. Fumigation.
4. Mending.
5. Encapsulation.
6. Lamination.

CURATIVE MEASURE

WASHING & CLEANING:

a.) water soluble inks: rectified spirit.

b.) water insoluble inks: distilled water and steam bath.

DEACIDIFICATION:

a.) Aqueous deacidification.

b.) Vapour phase deacidification.

c.) Mass deacidification.

CURATIVE MEASURE

FUMIGATION:

Occurs due to biological factors.

Chemicals like thymol, nitrous oxide gas can be used.

MENDING:

1.) Chiffon cloth mending.

2.) Tissue paper mending.

CURATIVE MEASURE

ENCAPSULATION:

Document placed in between two polyester films and the four sides are sealed. Air in between causes degradation of paper.

LAMINATION:

1. Irreversible.
2. Struck to each pages in ageing.
3. PVC & BOPP materials have high air permeability.
4. Colour change.
5. Heat process is applied and the paper will get affected.

PHOTOLAM SYSTEM

PHOTOLAM SYSTEM

- A reversible type manually operated lamination system.
- System has three products.
  a.) Photolam liquid 101 for cleaning and deacidification.
  b.) Photolam sheets for protecting documents.
  c.) Photolam liquid 102 for reversing.

PHOTOLAM SYSTEM

- The system makes use of a Non Destructive Type material (NDT) which protects the paper from……

  Dust, direct air, light, heat, water sumultenancy moisture, biological ingredients, natural disasters like earthquake, flood even if buried, chemical factors, wear & tear, etc.,

  The material should give high optical resolution, help in reformatting should not struck to each other and the ability to reverse.

PHOTOLAM SYSTEM

- Polyester film and its properties:
  Film thickness : 18-22 micron
  Tensile strength: 39.2N/10mm width
  Percentage elongation:175.0
  Low air permeability
  Heat barring property
  Water resistant, tear resistant

Special coating to side of the film to enhance antiglare, non sticky, heat retardant properties. On the other side, the glue coating is performed.

PHOTOLAM SYSTEM

- Glue:

  pH : 7.08±1

  Viscocity/RVT/5/20/30°C : 40-60

  Solid at 105°C for 3hrs :55±1%

  'Appearance' : Milky white emulsion

  Flammability : Non-flammable

  Toxic : Non toxic

  Composition : Acrylic – Cellulose co-polymer organic based adhesives

PHOTOLAM SYSTEM

Justification:

- A Manual process (suites brittle doc).
- A Reversible process (doc retained as such)
- Special coating protects the document from heat, moisture, micro organisms, light (esp. UV-rays) & also gives anti reflection.
- Use of a NDT material (protection from disasters & even if buried).
- Polyester films protects the document from oxidation, hydrolysis, handling(tear resistance), direct action of dust & dirt.
- Glue's pH is 7.08 which shows is neutrality & the admixtures like neem, camphor kills the biological factors.

PHOTOLAM SYSTEM

- Scientific Justification :

  As the properties are inter-dependant, the **PHOTOLAM SYSTEM** is tested by optical testing method with Atlas weather meter-Xenon lamp. The test results correlates the physical & chemical properties and reveals that this system extents the life period of paper documents.

CONCLUSION

- Evaluating research in conservation is challenging because there exists a diversity in research, designs, test, procedure, interpretation of results and recommendations.