

# Analogue and Digital Audio-Visual Preservation

Reto Kromer • AV Preservation by reto.ch

## Film Preservation and Restoration

Prasad Film Lab, Chennai, India

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# Priority

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	quick	longtime
important		
not important		

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## ๒. สิทธิของอนุชน

๒.๑ ด้วยตระหนักในความรับผิดชอบของตนในอันที่จะอนุรักษ์ฟิล์มภาพยนตร์ให้ดำรงอยู่อย่างยั่งยืน หอภาพยนตร์จักยืนหยัดต่อการบีบบังคับใด ๆ ที่จะกำจัดหรือทำลายสิ่งของที่หอภาพยนตร์ซึ่งเคยเก็บรักษาไว้เป็นตัวเลือกที่จะปฏิเสธหรือรับส่งของใด ๆ ที่มีเส้นอึดหรือเก็บสะสมด้วยเหตุผลใดซึ่งอาจอยู่นอกเหนือกฎเกณฑ์ว่าด้วยการอนุรักษ์หรือนโยบายการคัดเลือกที่ใช้อยู่ของหอภาพยนตร์นั้น

## ๓. สิทธิในการใช้ประโยชน์

๓.๑ หอภาพยนตร์ตระหนักว่า สิ่งของในความดูแล มีทั้งมูลค่าในเชิงพาณิชย์และคุณค่าในทางศิลปะ จึงให้อำนาจการพอย่อมดังนี้

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## Conservation

Conservation encompasses all activities for the care of an object, which **delay its further decay** and ensure that it remains in the most intact condition for the future.

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## Restoration

Restoration includes all interventions and treatments that serve to **retrieve a certain historical state** and contribute to the legibility, aesthetic integrity or **reuse** of an object.

Restorative actions may be irreversible and require great care in planning, justification, execution and **documentation**.

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## An Ounce of Ethics

- The probability that a work is available in its integrity in the future is increased.
- All the options that existed before taking an action remain open after the action.
- Every step is carefully documented.

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## Analogue

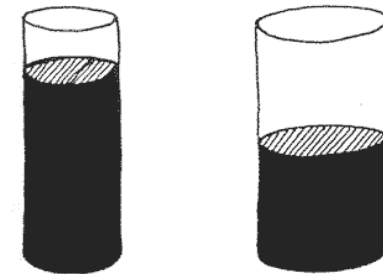
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## Develop a strategy

1. list the ISO standard for each media type which is present in the collection
2. assess the environment inside each vault at least for one year
3. inspect the condition of the collection
4. analyse the results and find the weak link
5. improve the conservation

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## Warming...

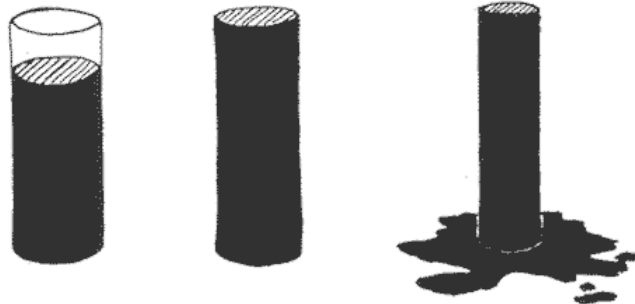


22 °C  
80% RH

30 °C  
50% RH

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## Cooling...

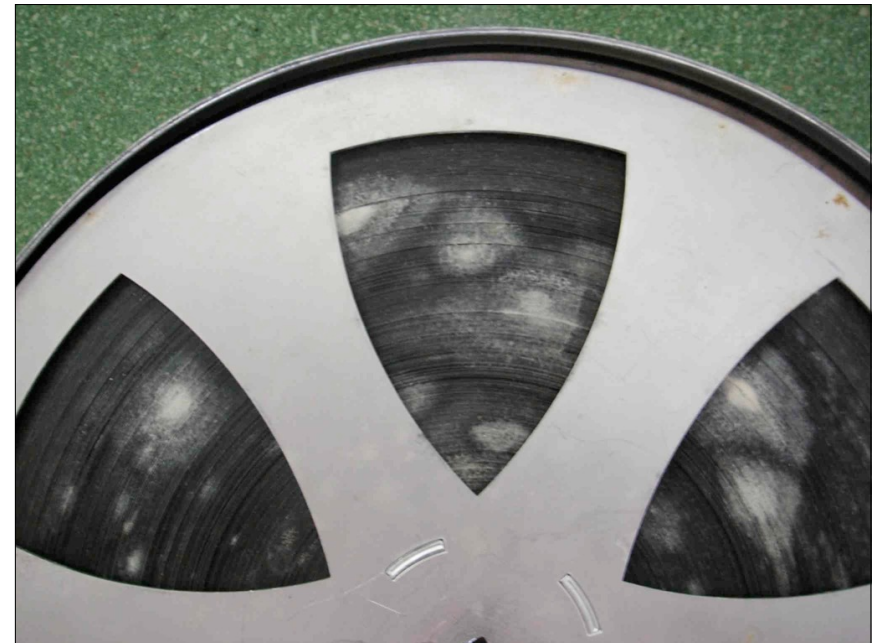


22 °C  
80% RH

19 °C  
100% RH

10 °C  
100% RH

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## Statistical method

The analyse of a randomly chosen subset of

**164 items**

of each type of material and in each storage vaults informs about the full collection with the precision of

**80% ± 5%**

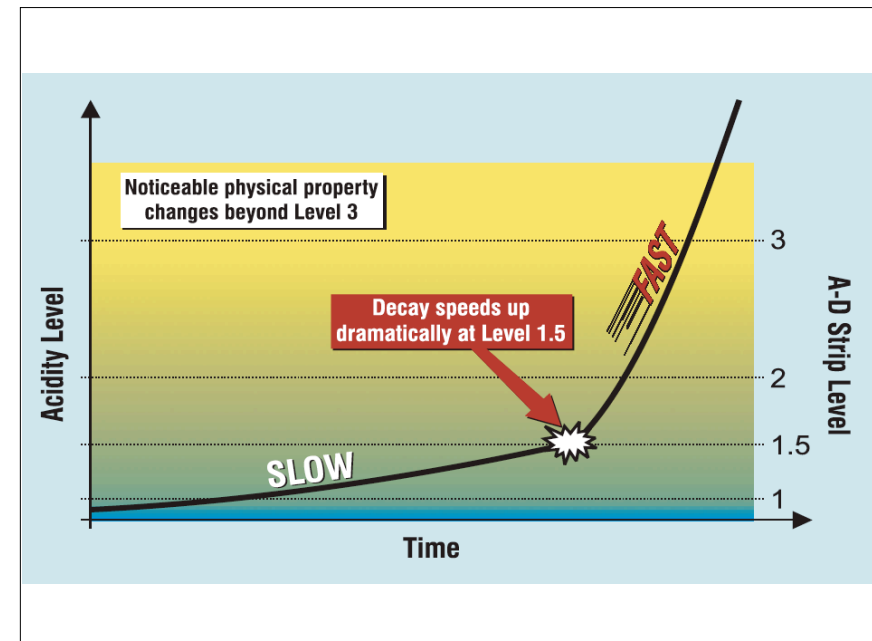
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## Principle

In order to guarantee the conservation, one must know both the **condition** of the each media type **and** the **climate** in each storage vault:

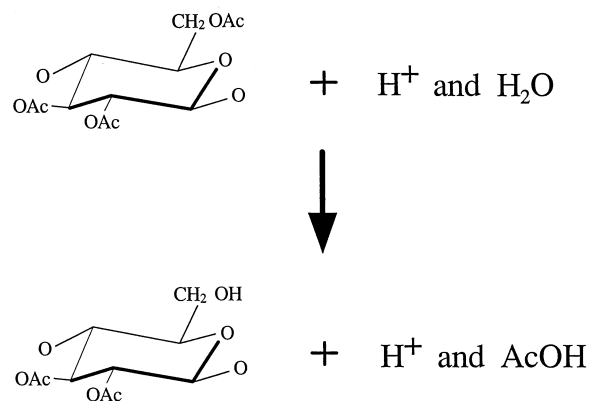
- condition of the collection
- temperature and relative humidity

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## Acid catalysed hydrolysis (deacetylation)

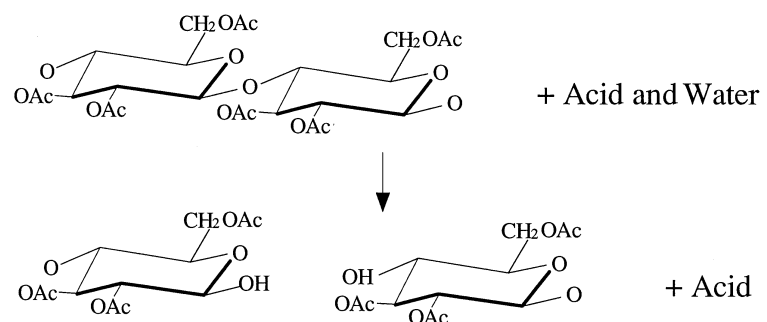


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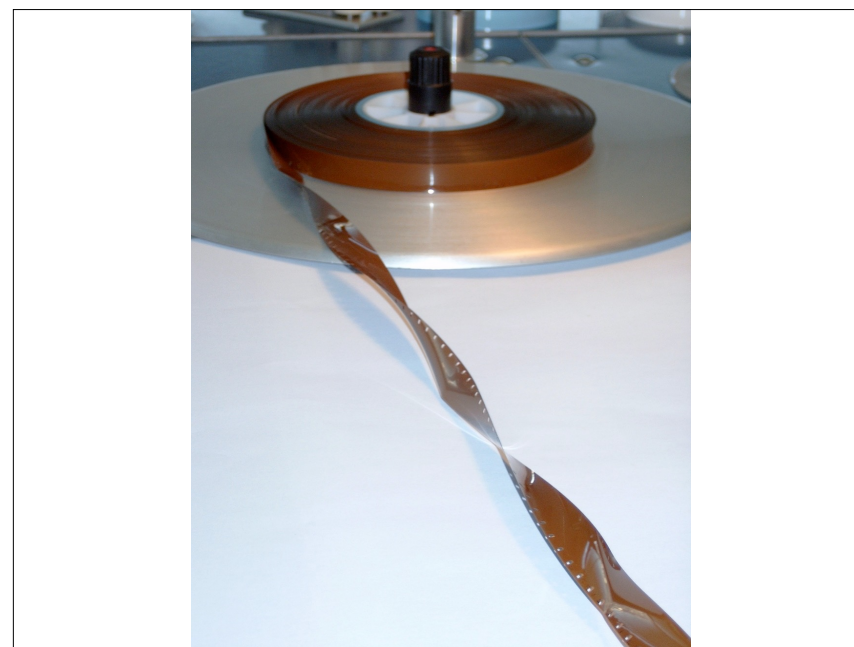


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## Glycosidic cleavage by hydrolysis



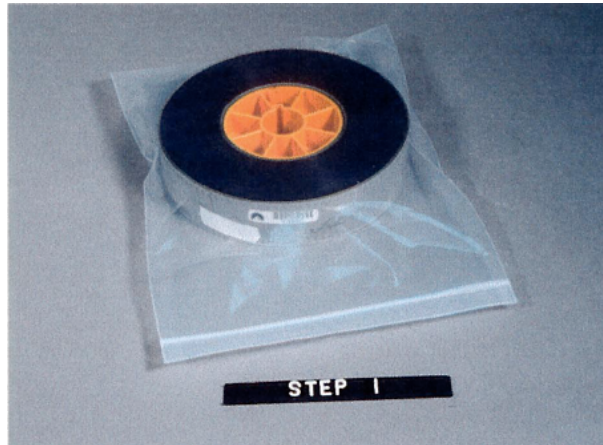
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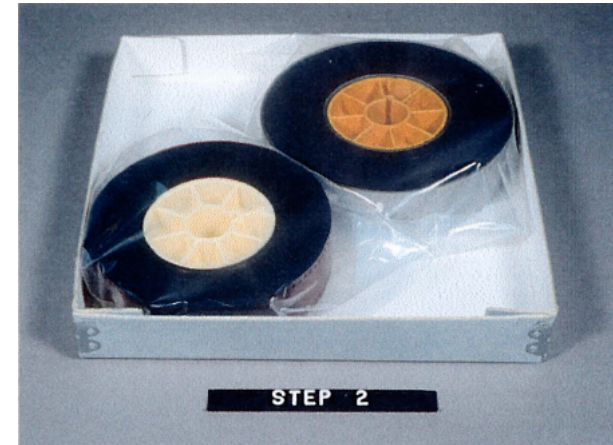


Put the reel into a first bag



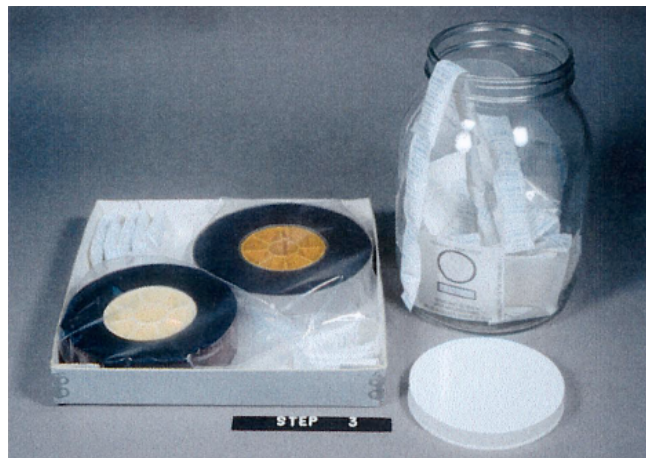
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Put the bag in a box...



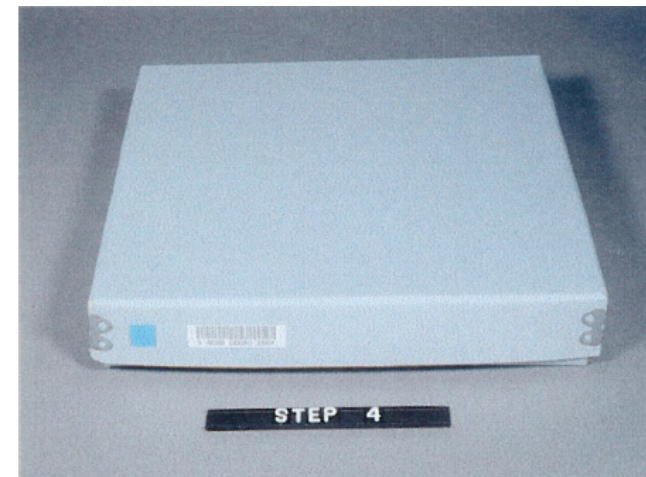
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... and add some silica gel



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Add a moisture indicator



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## Air pollutant...

- $\text{SO}_2 < 1 \mu\text{g}/\text{m}^3$
- $\text{NO}_x < 5 \mu\text{g}/\text{m}^3$
- $\text{O}_3 < 25 \mu\text{g}/\text{m}^3$

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## Outgassed acid

- $\text{CH}_3\text{COOH} < 1 \text{ ppm}$
- $\text{HNO}_3 < 1 \text{ ppm}$

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## Air flow

Outgassed acetic acid or nitric acid are heavy gases:

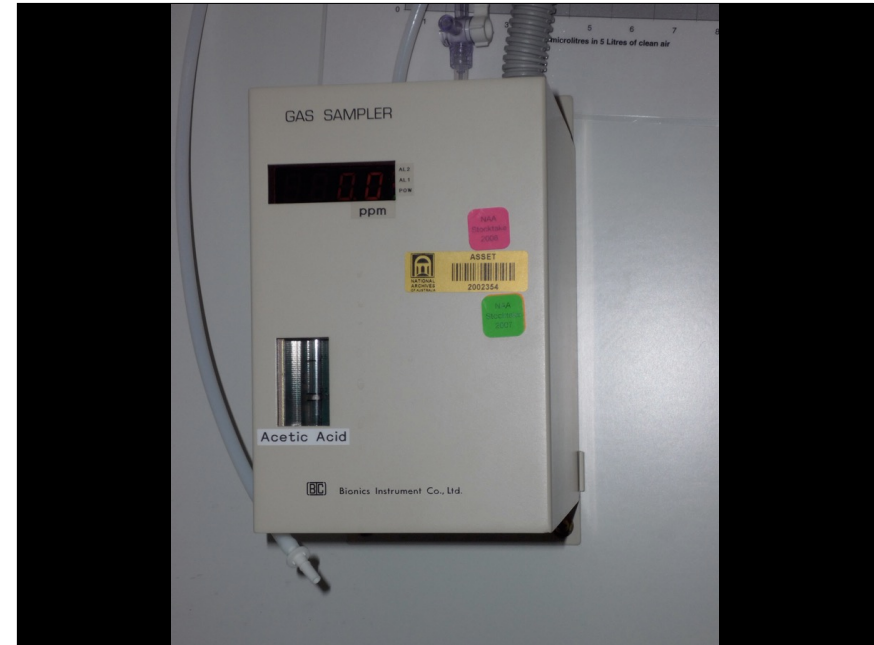
- air supply at the ceiling of one wall
- air exhaust at the bottom of the opposite wall
- air supply and air exhaust on the full length of the opposite longer walls

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## Passive measures

- location
- orientation
- exterior paint colour
- shadow
- insulation
- humidity barrier
- apertures

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## Interaction

- air conditioning
- insulation
- architecture
- materials

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## Advantages

Clear and efficient infrastructure:

- smaller air conditioning
- lower energy costs
- less maintenance
- limited material requirements

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## Live in the real world!

There is only one efficient way:

- keep the source elements
- more prevention:
  - better insulation
  - more efficient air conditioning
- less handling of the source elements
- make copies

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# Digital

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## Investments

- working space
- computers
- LTO desk

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## Running Costs

- staff
- training
- equipment
- LTO cartridges
- maintenance

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## Migration

### cons

- imposed
- [wo]manpower
- cartridges
- time

### pros

- reduces space
- possibility to keep the data updated

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## LTO

- migrate only every second generation
- make two sets of cartridges instead of three
- two geographically distant locations are mandatory
- store the cartridges a secure room
- workflow must remain consistent if a 50% of the staff and/or funding is cut

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