

# Sound and Magnetic tapes

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# Specific problems of magnetic tapes

## Sepmag : image and sound on separate reels

- acetate base > 1970 then polyester, except for post production
- magnetic layer is composed of ferric oxide in a binder
- this layer has a catalytic effect on the base > SV
- loss of plastifier and degradation of binder = many problems on reading the tape

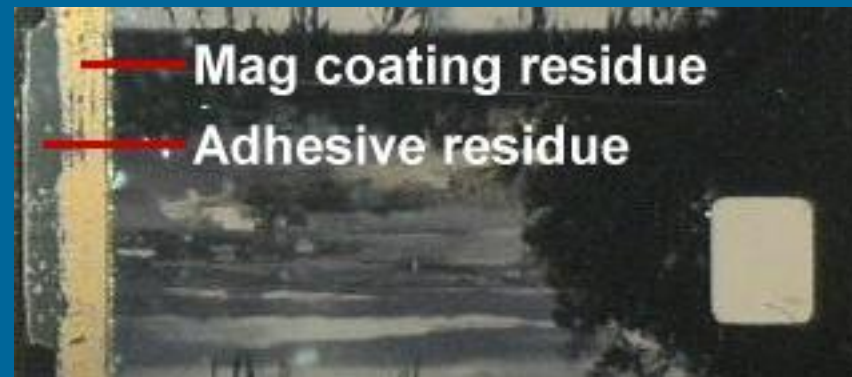
NEVER STOCK SOUND WITH IMAGE

## Commag : magnetic layer spread on film next to the image frame

- acetate base with ferric oxide layer
- accelerated degradation

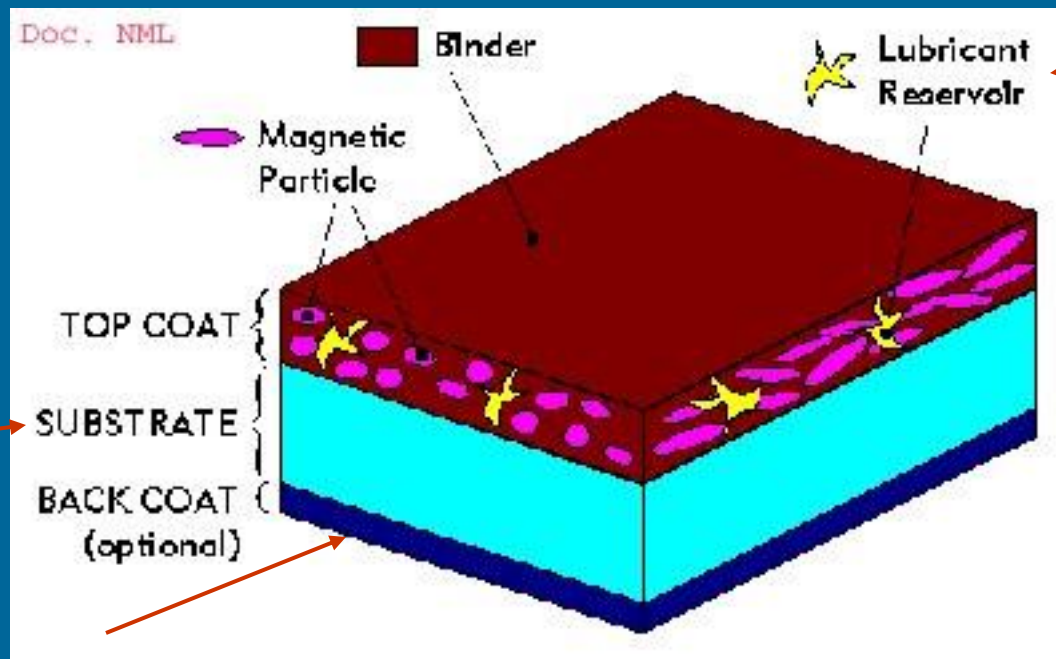
# Specific problems of magnetic tapes

Commag



# Specific problems of magnetic tapes

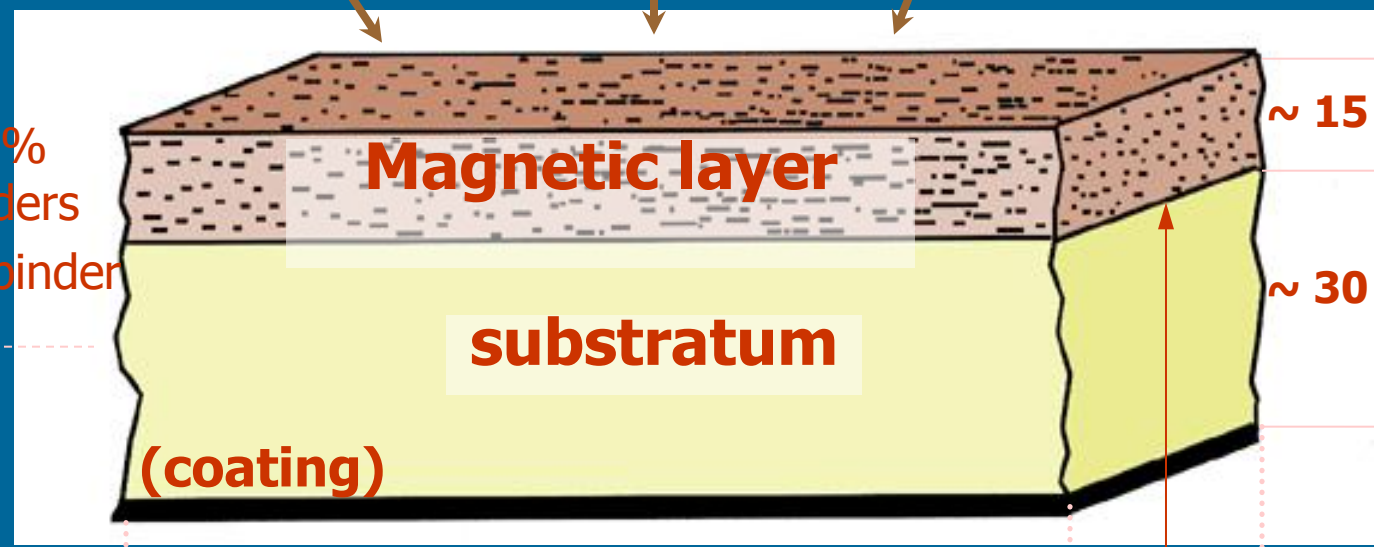
## Degradation of the binder of the layer of magnetic tapes



powder binder additives

masses

25 % { 80 % powders  
20 % binder  
75 %



~ 15  $\mu\text{m}$

~ 30  $\mu\text{m}$

~ 130  $\mu\text{m}$

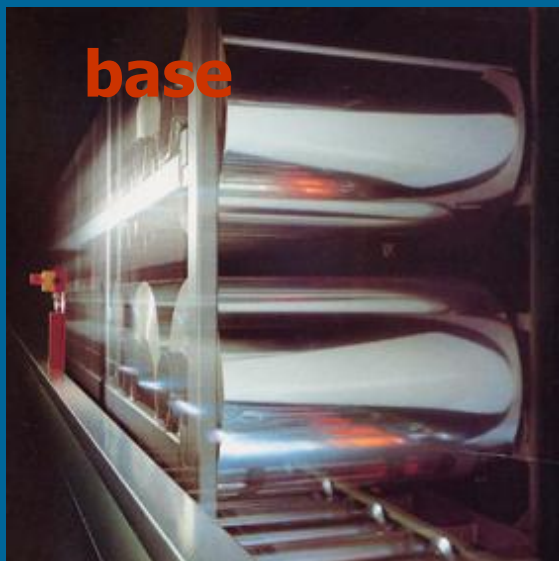
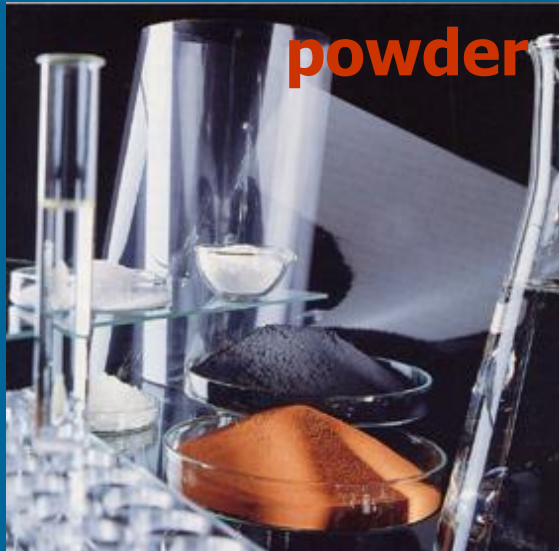
film

# structure of magnetic film and tape



# Specific problems of magnetic tapes

## Magnetic tape manufacture



# Binder degradation

- hydrolysis reaction

  - alteration of the chemical properties : molecular weight, solubility in solvents, acidity rate,...

- loss or migration of plastifier and lubricant

  - brittleness

- mecanical degradations, fungi,...

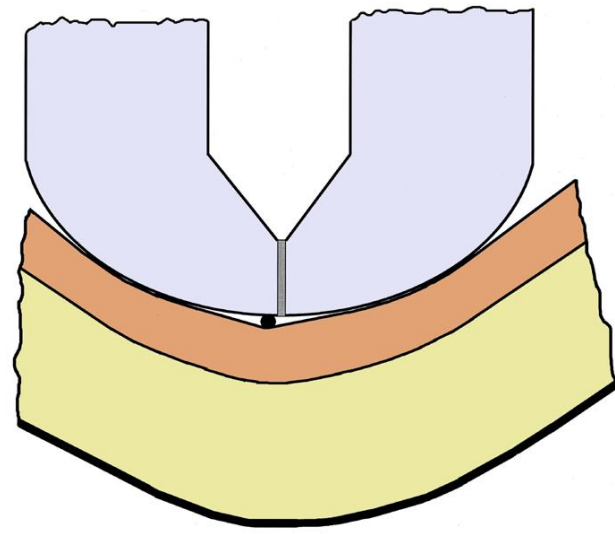
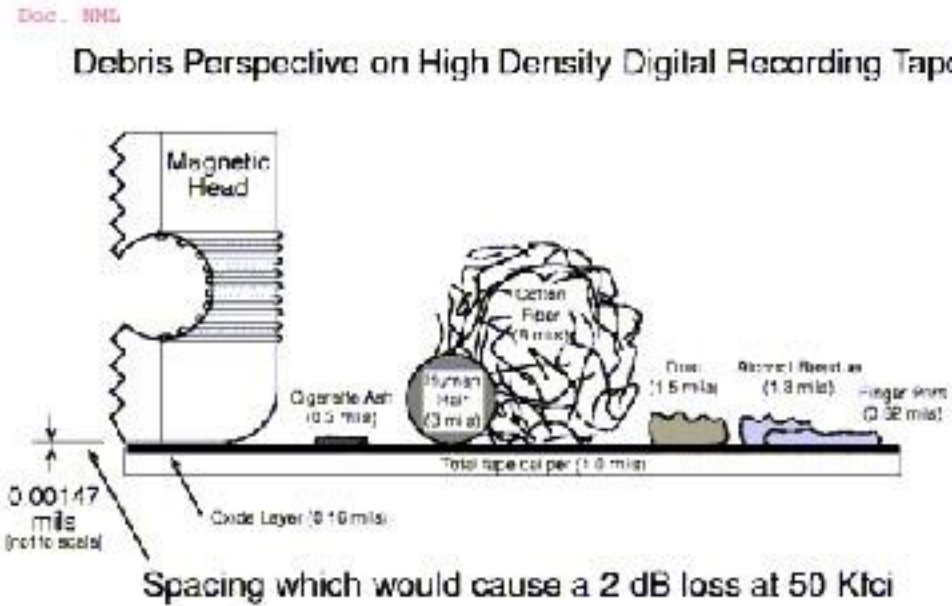
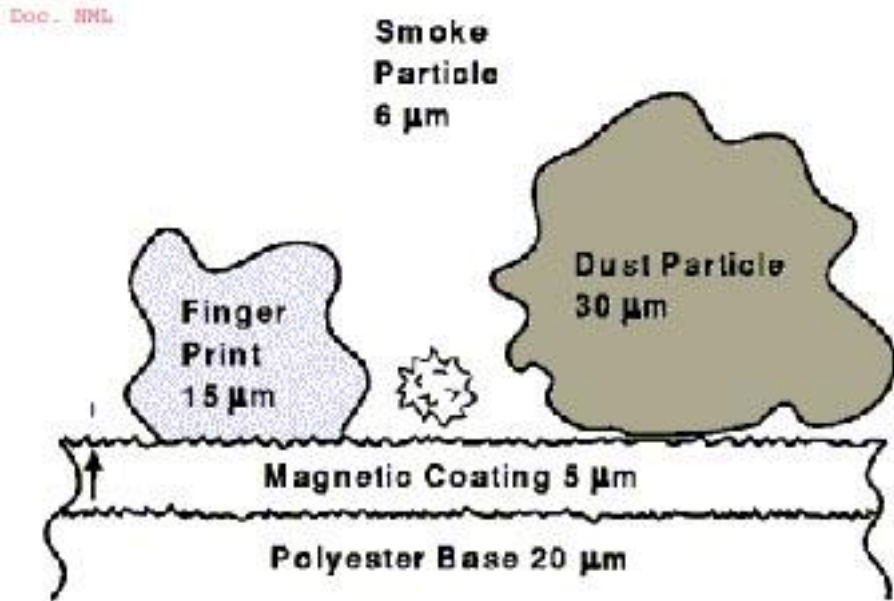
  - layer loses its adherence with base

  - tape sticks to adjacent layer and to head of machine

  - binder produces debris > no more adhesion tape to head

## Degradation of information

# Specific problems of magnetic tapes





# Specific problems of magnetic tapes

## Machine temperature



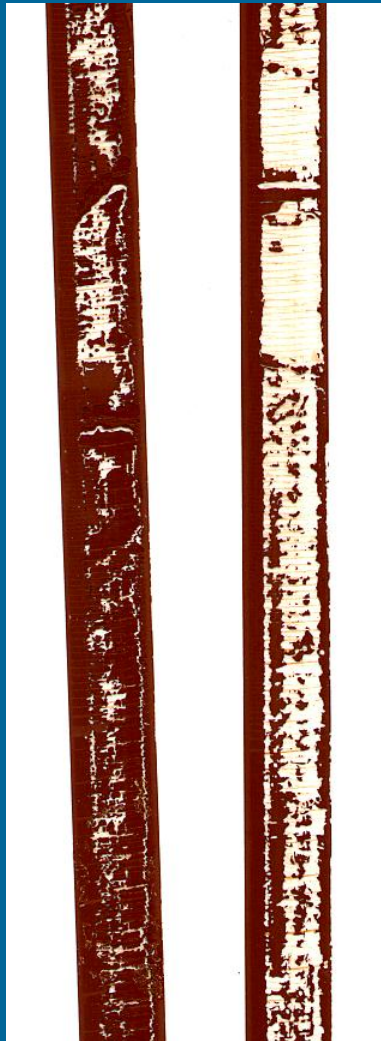
off : 25,4 °C



on : 36,1 °C

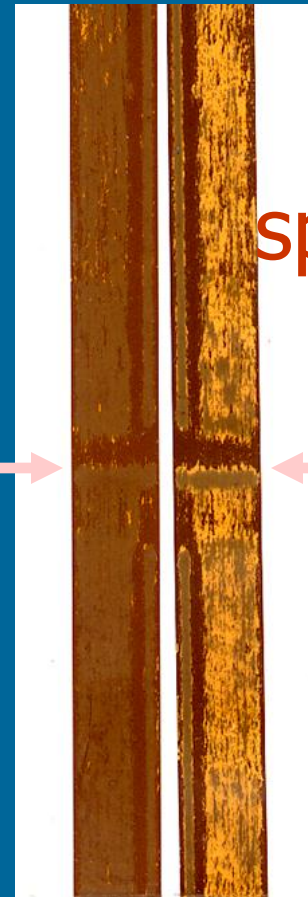
# Specific problems of magnetic tapes

Magnetic layer goes off



spool  
n

Back side



spool  
n + 1

Layer side



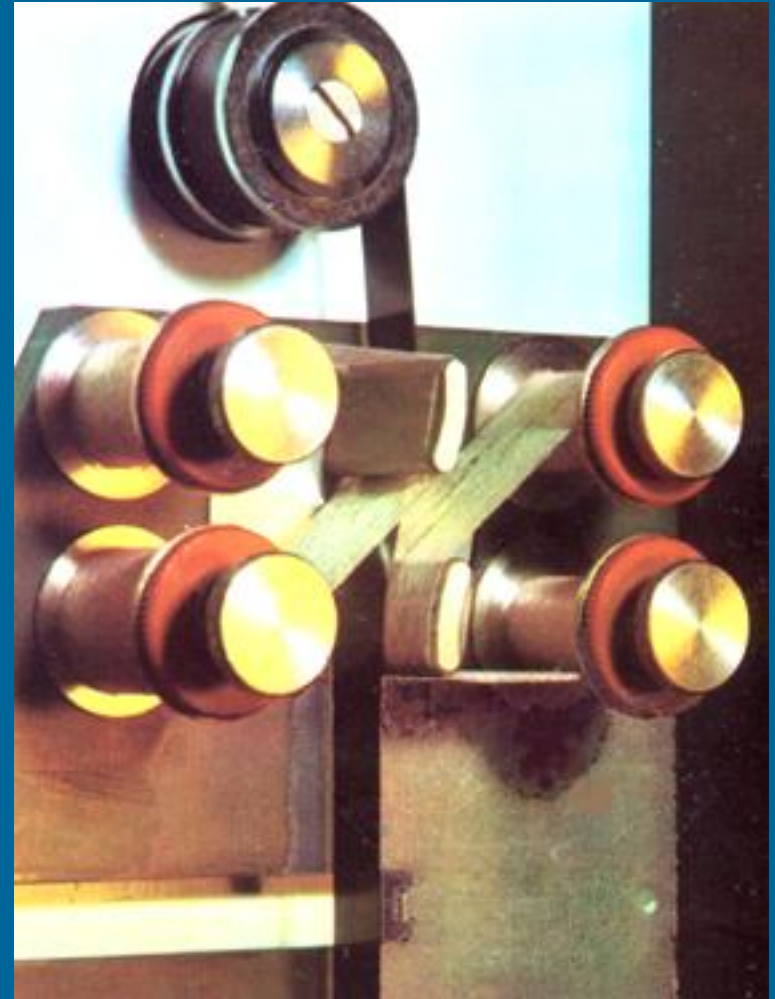
# Treatments of degradation of magnetic layer binder

- **lower the humidity rate :baking, dessicants**
- **spool separation and rewinding**
- **cleaning**
- **lubrification**
- **duplication**

# Treatments of degradation of magnetic layer binder

cleaning

tape



Doc BASF

Doc. Jean-Marc Fontaine

12



# Specific problems of magnetic tapes

## Some other cases



Fig. 2. An example of scalloped tape.

Doc. Richard L. Hess

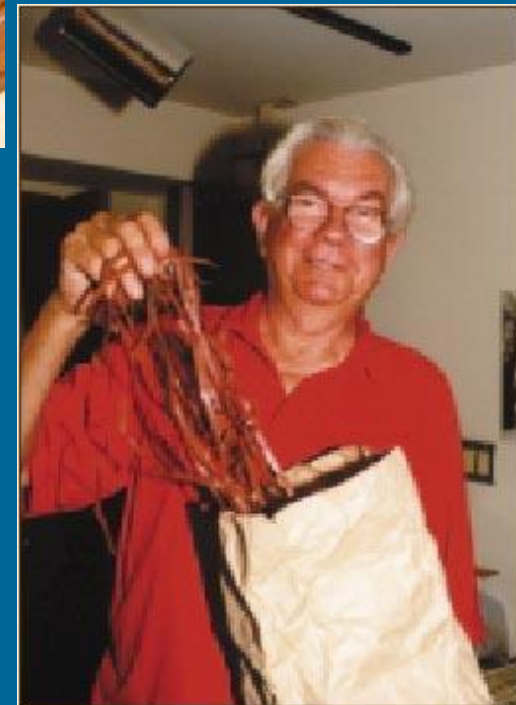
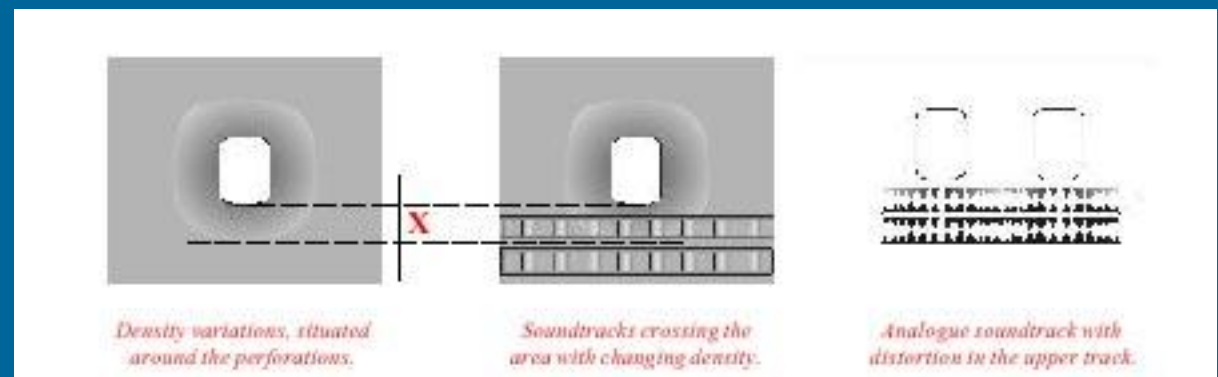
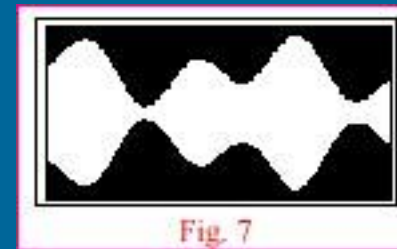
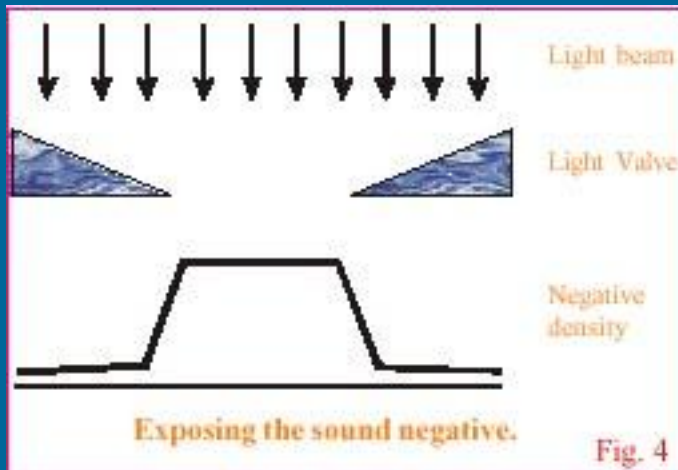


Fig. 3. Jim Wheeler with the one that got away.

Doc. Richard L. Hess

# Specific problems of magnetic tapes

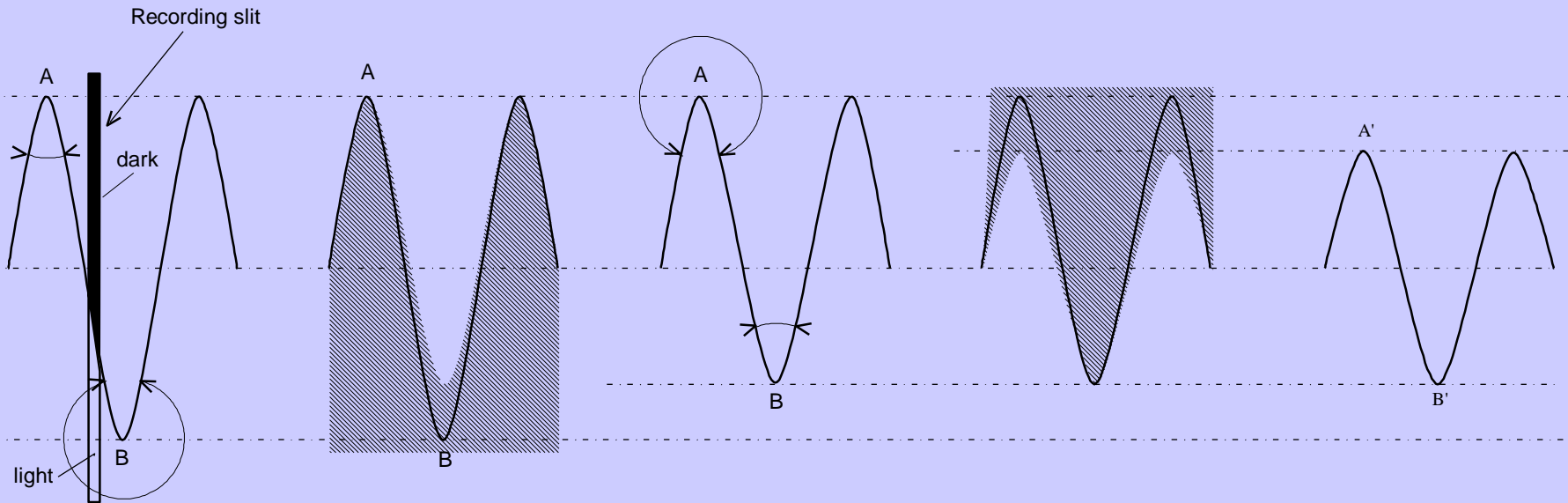
## Optical transfer



# Specific problems of magnetic tapes

## Spread compensation

### IMAGE SPREAD and CANCELLATION ON VARIABLE-AREA SOUND TRACKS



Theoretical sinusoidal signal.

B receive more light than A

Image Spread in B after negative development

Dissymmetrical signal with distortion for printing.

Now A receive more light than B

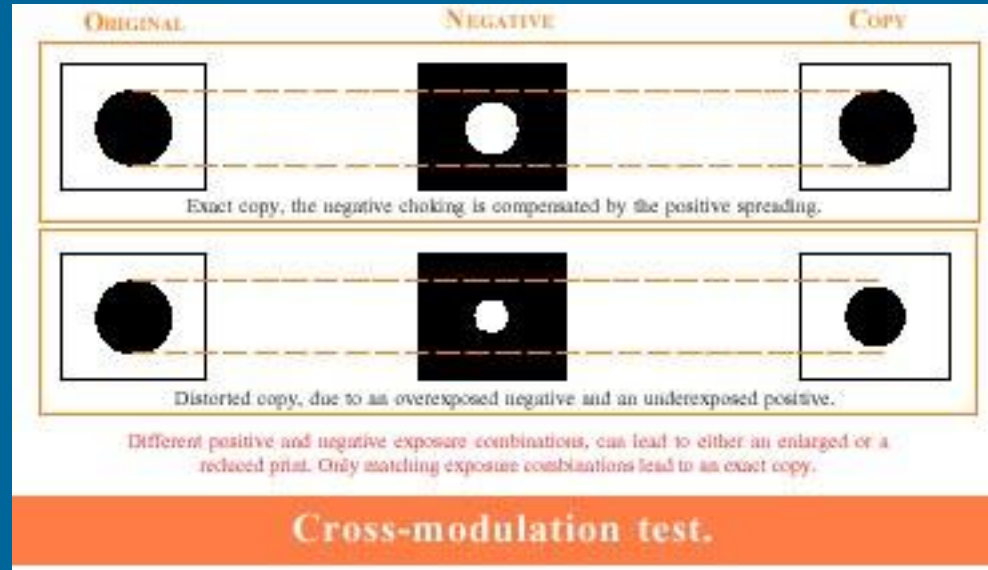
Compensation on the Print obtained after positive development

Possible obtainment of a symmetrical signal without distortion ( level loss < 1 dB )

In Labs this phenomenon must be daily managed by Cross-Modulation tests

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## cross modulation





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cross modulation

