

# AUDIOVISUAL PRESERVATION HANDOUT

## Brief Glossary of Film (and Some Video) Terminology

(these terms and their definitions have been culled from the glossary of *The Film Preservation Guide* (2004) by the National Film Preservation Foundation. A link to the NFPF's website, which contains the *Guide* as a free download in PDF form is provided elsewhere in this handout)

**Access copy:** Film, video, or digital copy used for public service

**Analog videotape:** Videotape that records sound and image information using frequency-modulated signals. Digital videotape, in contrast, records information as numeric values

**Base:** In motion picture film, transparent layer that supports the photographic emulsion. Can be made of cellulose nitrate, cellulose acetate, or polyester plastic. (more on these later)

**Color correction:** In the transfer of film to video, the process of adjusting the color and brightness from scene to scene.

**Combined print:** film positive carrying both picture and sound track. Also known as composite print or married print.

**Conservation:** Processes and activities resulting in the protection of the film original

**Digital videotape:** Videotape that stores picture and sound as numeric values.

**Emulsion:** Image-forming layer within motion picture film

**Film Cleaner:** Solvent applied to the film surface to remove dirt, oil, dust, and wax.

**(Film cleaner is very toxic and must be handled with care.)**

**Frame:** Rectangular area of the motion picture film strip that holds a single film image. Sometimes used as a unit of measurement, as in "frames per second."

**Gauge:** Width of the motion picture film from edge to edge, expressed in millimeters.

**Leader:** Blank film attached to the beginning and end of film rolls to facilitate handling.

**Magnetic sound track:** Motion picture sound track in which the sound information is carried by magnetic oxide. Magnetic sound track can be affixed to a print as a stripe along the film edge (**striping**) or exist as a separate element (**full-coat mag**).

**Negative:** Film carrying the reverse image of the motion picture subject. The negative is exposed in the camera or created from a positive in the laboratory. It is printed to produce a positive for projection and viewing.

**Optical Sound Track:** Photographically printed sound record (sound track) carried on the film print or produced as a separate element.

**Original:** Film artifact that can be used as a source material in duplication. Also used to describe film exposed in the camera.

**Perforations:** holes, usually along the film edge, used to advance the film strip through a camera, projector, or printer. Also known as sprocket holes.

**Positive:** Film that has a positive image of the motion picture subject. The positive is generally produced from a negative and used for viewing.

**Preservation Master:** Sound and picture elements that are sufficient for printing new film copies without the reuse of the original source. (this essentially serves as a surrogate for the camera original film and protects the originals from having to go through the rigors of the printing process)

**Raw stock:** Unprocessed film.

**Splice:** The joining of two film pieces usually by cement, tape, or ultrasonic technology.

**Sprocket:** Toothed mechanism that engages with film perforations to advance the film strip through a camera, printer, or projector.

**Telecine (pronounced tell-uh-sin-ee):** Piece of laboratory equipment that converts film images and sound into digital or analog video images and sound. Also used as the term describing this transfer process. A piece of video that has been transferred from film may also be called a telecine.

**Vinegar Syndrome:** popular term for acetate decay.

## Online Film References

National Film Preservation Foundation  
<http://www.filmpreservation.org/>

Association of Moving Image Archivists  
<http://www.amianet.org/>

Storage Guidelines for Film and Videotape (from AMIA):  
<http://www.amianet.org/publication/resources/guidelines/storage/intro.html>

Image Permanence Institute – Film Preservation Quick Reference Wheel  
[http://www.imagepermanenceinstitute.org/shtml\\_sub/cat\\_pubs.shtml](http://www.imagepermanenceinstitute.org/shtml_sub/cat_pubs.shtml)

Film Forever  
<http://www.filmforever.org/>  
(this site has a great deal of do-it-yourself information for the home storage of motion picture film)

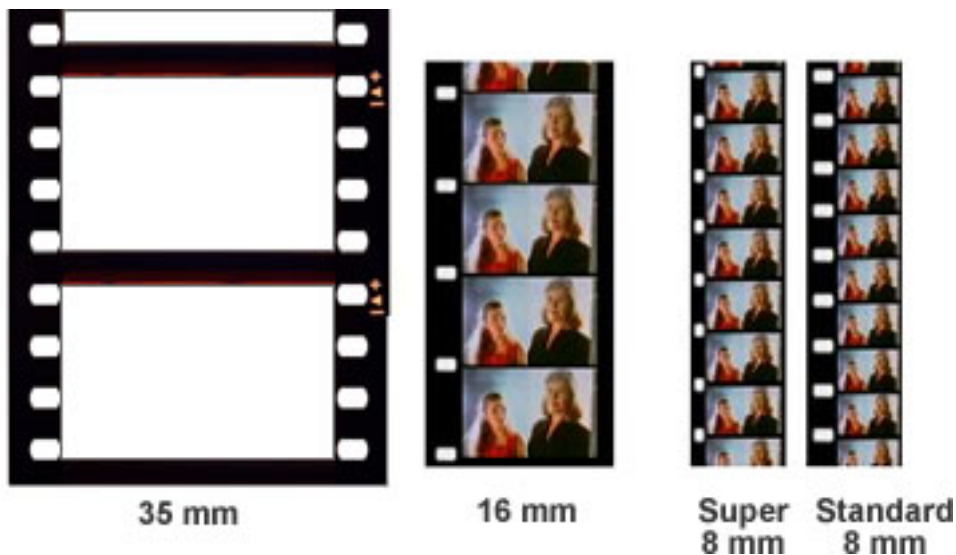
## Why Film?

Film is heavy, storage-space intensive, and in some cases difficult to preserve. It is also costly to produce and ship, and there seem to be fewer and fewer people trained to handle it. Wouldn't it be better to digitize it all and allow the prints to deteriorate? It's also getting harder and harder to find/maintain projection equipment for film. Why would we want to keep film?

Here are some reasons for preserving film:

- Film can be read with the naked eye
- Film, properly preserved, can last centuries
- No one owns the film format
- Hasn't changed much in a century (other than color and sound)

## Film Gauges:



(from <http://www.pictureshowman.com>, accessed February 2, 2007)

## **Film Basics:**

### **Nitrate**

- Flammable
- Only in 35mm
- Most 35mm before 1950 was made of cellulose nitrate base
- Burns until it burns out – creates own fuel for burning

### **Acetate**

- Safety Film
- 8mm and 16mm formats were in safety film
- Very common in libraries
- “SAFETY FILM” Printed on the edge coding
- Prone to **VINEGAR SYNDROME**, wherein the base breaks down and creates acetic acid, which is chemically identical to vinegar
- Vinegar syndrome is contagious – films infected with it should be quarantined
- Vinegar odor; film starts to shrink, white powder may appear on the film
- Should be duplicated (if possible) immediately

### **Polyester**

- Introduced in the 1950s
- Not prone to vinegar syndrome
- Much stronger plastic base so less prone to mechanical damage than other film bases
- Kodak uses “Estar” in the name of the film stock to distinguish its polyester film
- If stored properly, can last for centuries

**TABLE 3. FILM DAMAGE AND DECAY: SUMMARY**

<b>Problem</b>	<b>Detection Method</b>	<b>Symptoms</b>	<b>Remedy</b>
<b>Mechanical damage</b> <i>(All film gauges)</i>	Visual Inspection	<ul style="list-style-type: none"> <li>• Tears</li> <li>• Torn or broken perforations</li> <li>• Broken splices</li> </ul>	Physical repair
<b>Careless handling</b> <i>(All film gauges)</i>	Visual Inspection	<ul style="list-style-type: none"> <li>• Dirt</li> <li>• Scratches and abrasions on the film surface</li> </ul>	<ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Scratches can be minimized during preservation copying</li> </ul>
<b>Mold, mildew, and fungus</b> <i>(All film gauges)</i>	Visual Inspection	<ul style="list-style-type: none"> <li>• Matte-white spots on exterior of film roll</li> <li>• Growth into lacy, white web</li> </ul>	<ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Improved storage</li> </ul>
<b>Acetate decay</b> <i>(All acetate base film)</i>	<ul style="list-style-type: none"> <li>• A-D Strips</li> <li>• Smell</li> <li>• Shrinkage</li> <li>• Visual Inspection</li> </ul>	<ul style="list-style-type: none"> <li>• Vinegar odor</li> <li>• Shrinkage</li> <li>• Loss of flexibility; curling</li> <li>• Cracked emulsion</li> <li>• White powder on edge</li> <li>• A-D Strip level greater than 0</li> </ul>	<ul style="list-style-type: none"> <li>• Slow by improving storage</li> <li>• Isolate infected films</li> <li>• Copy content before decay is too advanced</li> </ul>
<b>Color fading</b>	Visual Inspection	<ul style="list-style-type: none"> <li>• Shift in color</li> <li>• Loss of contrast and color balance</li> <li>• Film appears washed out</li> </ul>	<ul style="list-style-type: none"> <li>• Slow by improving storage</li> <li>• Copy content before decay is too advanced</li> </ul>
<b>Nitrate decay</b> <i>(Not relevant to acetate or polyester film)</i>	<ul style="list-style-type: none"> <li>• Visual Inspection</li> <li>• Smell</li> <li>• Rusty metal cans</li> </ul>	<ol style="list-style-type: none"> <li>1. Image fading. Brownish discoloration of emulsion.</li> <li>2. Sticky emulsion. Faint noxious odor.</li> <li>3. Emulsion softens and blisters with gas bubbles. Stronger odor.</li> <li>4. Film congeals in solid mass. Strong noxious odor.</li> <li>5. Film disintegrates into brownish powder. Extreme fire danger.</li> </ol>	<ul style="list-style-type: none"> <li>• Slow by improving storage</li> <li>• Copy content before decay is too advanced</li> <li>• Dispose films in advanced decay as hazardous waste</li> </ul>
<b>Decay of magnetic sound track on acetate film</b>	<ul style="list-style-type: none"> <li>• A-D Strips</li> <li>• Smell</li> <li>• Shrinkage</li> <li>• Visual Inspection</li> </ul>	<ul style="list-style-type: none"> <li>• Film base loses flexibility</li> <li>• Mag track sheds, sticks, and separates</li> <li>• Vinegar odor</li> <li>• A-D Strip level greater than 0</li> </ul>	<ul style="list-style-type: none"> <li>• Slow by improving storage</li> <li>• Copy sound as soon as possible</li> </ul>

From *The Film Preservation Guide*, p. 18

## Film Storage:

Generally speaking, film does best when frozen. Frozen film must be brought up to temperature slowly before use, however, to avoid condensation. Color film and black and white film have different needs in terms of storage above freezing.

Again, generally speaking, if you're not going to freeze film, it is best to store it between 40-50 degrees Fahrenheit and 20-40% relative humidity. Again, different film stocks have slightly different needs, so I would encourage taking a look at the *The Film Preservation Guide* for more detailed information.

<b>Film Material</b>	<b>Room 68°F (20°C)</b>	<b>Cool 54°F (12°C)</b>	<b>Cold 40°F (4°C)</b>	<b>Frozen 32°F (0°C)</b>
Nitrate film*	Likely to cause significant damage	Likely to cause significant damage	Meets ISO recommendations	Provides extended life
Acetate film*	Likely to cause significant damage	Likely to cause significant damage	Meets ISO recommendations	Provides extended life
Polyester film	B&W: May be OK Color: Causes significant damage	B&W: Meets ISO recommendations Color: Causes significant damage	B&W: Provides extended life Color: Meets ISO recommendations	Provides extended life
Videotape, magnetic sound track, and prints with magnetic sound track	May cause significant damage	Acetate: May be OK Polyester: Meets ISO recommendations	Acetate: Meets ISO recommendations Polyester: May be OK	May cause significant damage
DVDs	May be OK	Meets ISO recommendations	Meets ISO recommendations	May cause significant damage

Source: *IPI Media Storage Quick Reference*.

\*Nitrate and acetate base film should be frozen if there are signs of decay.

From *The Film Preservation Guide*, p. 60

## Film Sound Tracks:

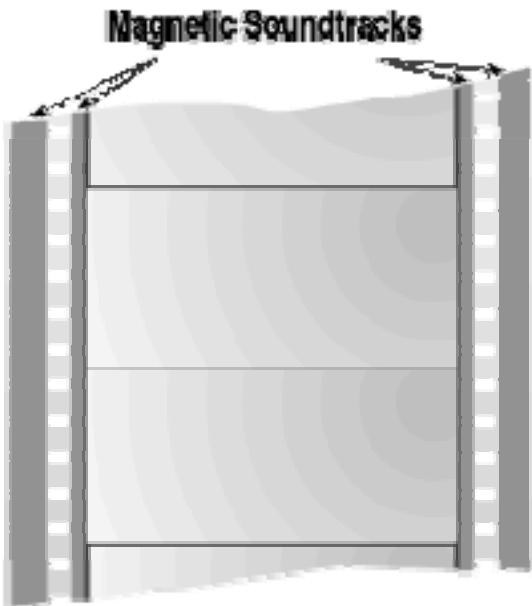
### **Magnetic:**

Film has one or more magnetic stripes along the side of film

Often suffer from vinegar syndrome much worse because the iron in the mag track can speed up the vinegar syndrome deterioration.

This kind of sound track was often used by television producers and documentary filmmakers because the sound track could be recorded in the camera at the same time film was being shot (“single system sound”). Narrative and Hollywood motion pictures usually employ sound recording media that are separate from the camera, and these sound tracks are synchronized with the image and married into single prints after the film has been shot.

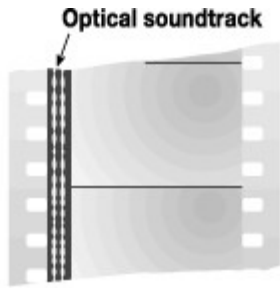
Single system sound was usually cheaper and faster than recording sound separately, hence its popularity with television and low-budget production.



(from <http://screensound.gov.au>, accessed February 5, 2007)

**Optical:**

Light shines through the track onto a photoreceptor, which translates the changes in brightness into electrical signals, which the speakers read as sound. The optical track looks like wavy lines on the side of the film print. There will be one set of wavy lines in the case of a mono sound track, and two sets in the case of stereo. Film prints with optical sound are the more likely kind of married film print to be found in a library or archives.



**Figure 1: 35 mm optical print**

(from <http://www.dolby.com/images>, accessed February 5, 2007)



## **Videotape Basics:**

- Must preserve playback equipment as well as the video media
- Videotapes (VHS) are rated at around 150-250 plays before significant deterioration
- Video is NOT archivally sound, at least not in the same way that film is, because it requires playback equipment and video materials are not expected to last as long as motion picture film
- The preservation medium of choice for video is an analog format: Beta SP. This durable video format holds a very good image and has very durable base and recording strata.
- Videotapes work well as cheap access copies (in order to protect the original AV media from use)
- Hydrolysis (sticky shed) occurs when the binder layer of the videotape gets too much moisture and starts to break down
- In audiotapes, sticky shed makes them squeal. In videotapes, sticky shed makes the tapes unplayable.
- Sticky shed usually appears as a fine white powder on the surface of the tape.
- Tapes suffering from sticky shed should be duplicated immediately if possible.
- Exercise each videotape every 2-3 years. You can do this by fast forwarding or rewinding all the way through each tape. This helps to keep the tape flexible.
- Never touch the recording surface
- Store tapes on metal shelves as the finishes on wooden shelves can offgas and damage the tapes.

Storage of videotapes:

50-70 degrees Fahrenheit

20-50 percent relative humidity

### **Good Resources About Video Preservation:**

American Institute for Conservation of Historic and Artistic Works (2007). Caring for Your Home Videotape. <http://aic.stanford.edu/library/online/brochures/video.html>. Accessed on January 17, 2008.

Texas Commission on the Arts (2004). Videotape Identification and Assessment Guide. <http://www.arts.state.tx.us/video/>. Accessed on January 17, 2008.

## Sound Materials:

### **Grooved Media:**

- 78s, LPs, 45s are all commonly found in libraries, archives, and museums
- Instantaneous discs are less familiar and may also be known as acetates, lacquers, or direct-cut discs
- Vinyl discs are very stable, but acetate discs are inherently unstable
- Acetates are usually a base of cardboard or aluminum coated with plastic – this plastic can break down and crack or deteriorate
- Instantaneous discs will often have handwritten or typewritten labels instead of printed labels
- The appearance of fine powder on the disc (the byproduct of the breakdown of the plastic coating) should alert you that this disc is an instantaneous disc and not a vinyl disc
- Grooved media should be handled by the edge and label areas only. Skin oils can break down plastics in the media.
- Discs should be stored upright, not one on top of the other
- Grooved media should be stored at a constant 65 to 70 degrees Fahrenheit and 45 to 50% relative humidity
- Paper record sleeves should be replaced with antistatic polyethylene sleeves

### **Magnetic Media:**

- Magnetic sound media should be treated much the same as video media
- Sticky shed is a common problem with audio media, much like video media, and presents in the same ways: white powder on the tape, squealing during playback
- Like video materials, magnetic audio materials should be exercised regularly
- Audio media can suffer from “print through” which occurs when a tape has been wound without exercising for a long time. The effect is an echo of sound from other parts of a tape on a specific part of a tape. In other words, a “ghosting” of sound from other parts of a tape can be heard during playback. Exercising a tape can prevent this, but some kinds of tape have very thin plastic backing layers and print through can be hard to avoid.
- Polyester plastic backing layers have been industry standard for the past few decades, but older audiotape may use acetate as the backing layer. This kind of tape can suffer from vinegar syndrome, just like safety motion picture film.
- ¼ inch analog reel-to-reel audiotape is still considered the archival audio standard by many archives and libraries. Cassette tapes are **not** considered archival standard because of their thin, fragile tape.

**Good Resources for Audio Preservation (which were used in the preparation of this handout):**

Library of Congress (2006). Cylinder, Disc, and Tape Care in a Nutshell.  
<http://www.loc.gov/preserv/care/record.html>. Accessed on March 10, 2007.

Paton, Christopher Ann. 1998. "Preservation Re-Recording of Audio Recordings in Archives: Problems, Priorities, Technologies, and Recommendations." *American Archivist* 61 (Spring 1998): 188-219.

**Film and AV materials are not made just to be preserved – they are made to be shown.** Consider how you can use your films in outreach programming, pedagogy, and online.

**University of Illinois' Audiovisual Self-Assessment Project:**

<http://www.library.uiuc.edu/prescons/AVSAP.htm>

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I like answering questions! Feel free to contact me.