



Community Archiving Workshop

## **Webinar 1: AV Basics** **Identifying & Assessing Analog Media**

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Southwest Region IMLS + NEH Cohorts

# **AV Basics:**

## **Identifying & Assessing Analog Media**

**April 14, 2021**

**Presenter: Kelli Hix**

In this session, participants learn to identify some of the most common audiovisual analog formats, and will gain a foundational understanding of the history of major formats, signs of decay, and how to properly store materials. There will be a special focus on film identification and care-- participants will practice using their lightbox and loupe to identify film components, as well as practice splicing and adding leader to film.

**#cawesome**

# Overview

## 3 Analog Format Types Covered:

1. Film
2. Magnetic Media (audio and video)
3. Optical Disks (DVDs and CDs / analog-ish)

## For each category, we will cover:

- How to identify the format
- A brief history of the format
- The risk factors for the format
- How to inspect and assess the item and its level of risk

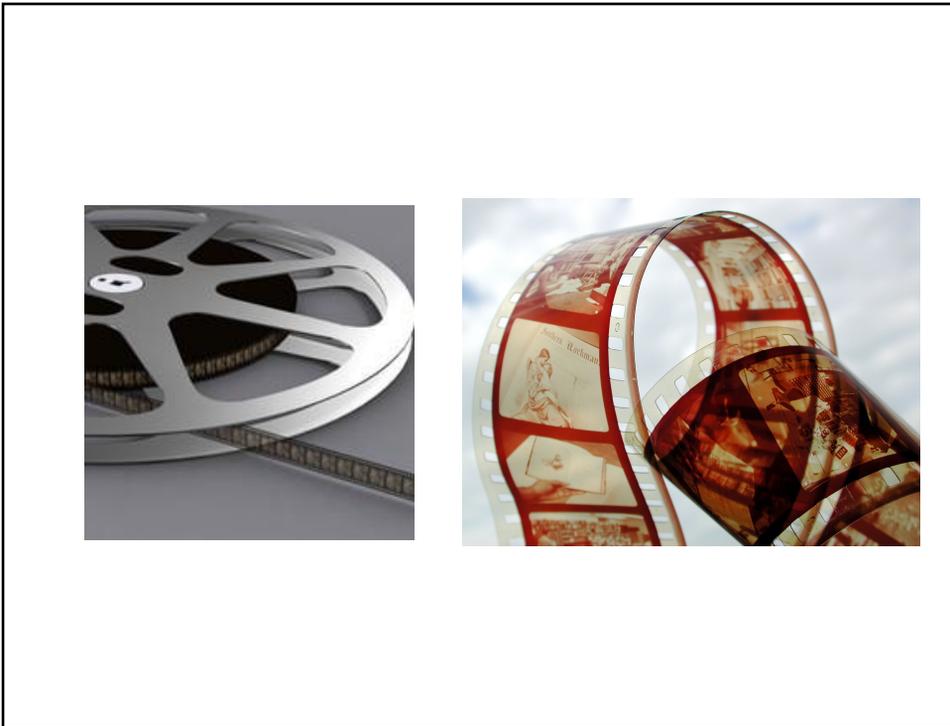
In this presentation, we normally focus on three major types of analog audiovisual assets: Film, magnetic media (both audio only formats and video formats), and optical disks (CDs and DVDs). However, today we will primarily focus on film and using your toolkit to inspect film. There are other types of analog formats, such as grooved disks and wax or wire recordings, but this presentation does not cover those. For each of these three categories, you will learn will cover how to identify the format, a brief history of the format, the risk factors for the format, and how to inspect and assess the item and its level of risk.

# Analog AV Formats: Basic Identification and Assessment

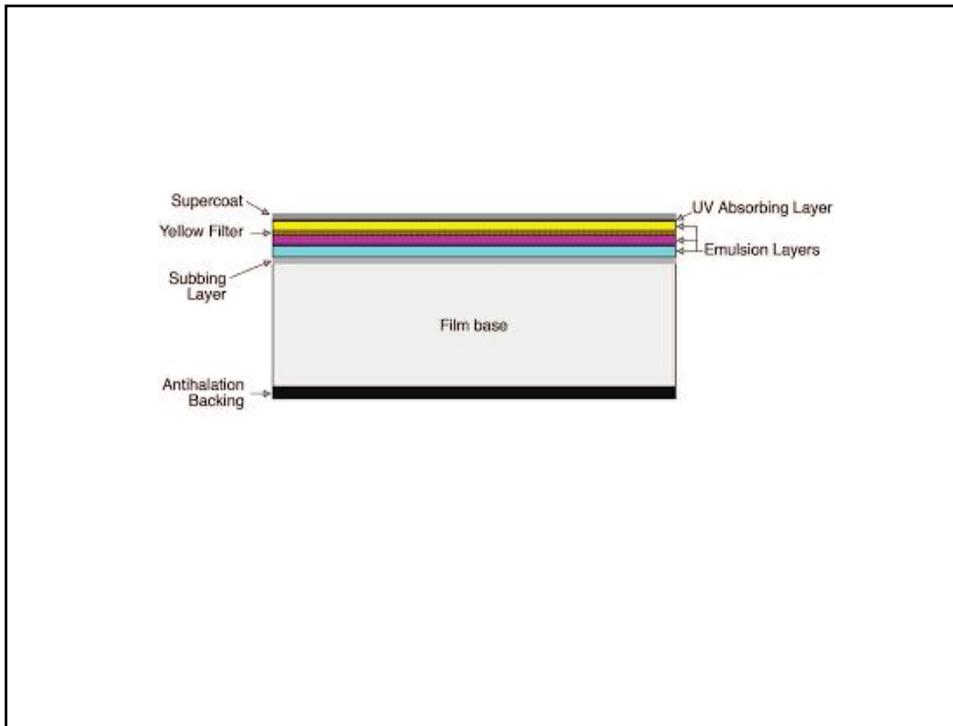
Your Training Kit:



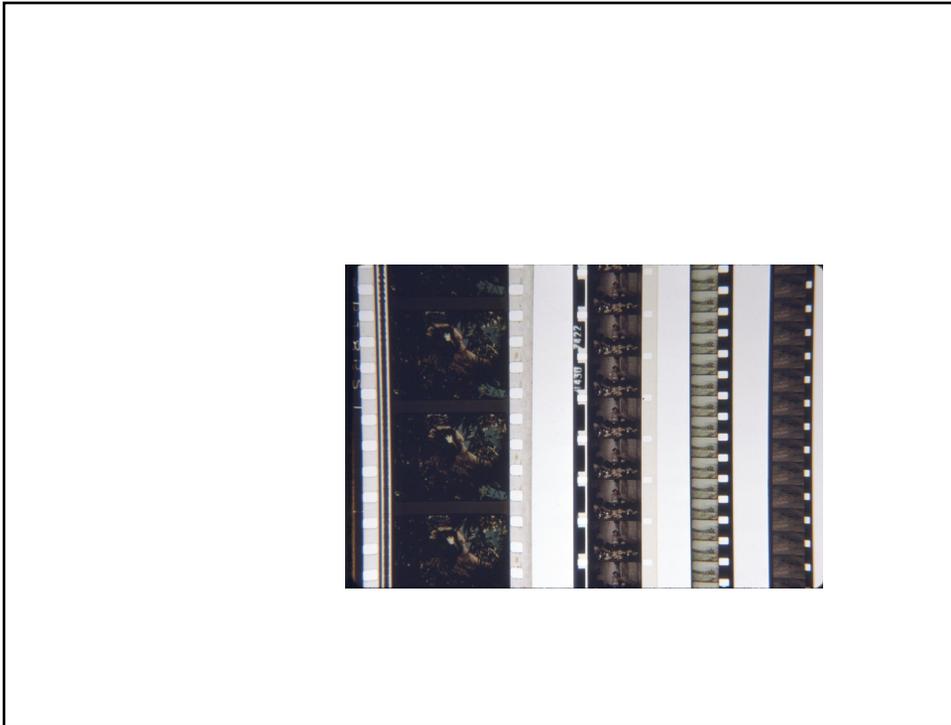
First of all, let's take a moment to go over the contents of our toolkits.



Film is a series of still photographs on a plastic base. The illusion of movement is created when the film is shown through a projector. Motion picture film was introduced largely by the Lumiere Brothers in France and Thomas Edison in the United States in the late 1800s. Please get out the laminated film samples from your toolkit and look at the series of images you can see there.

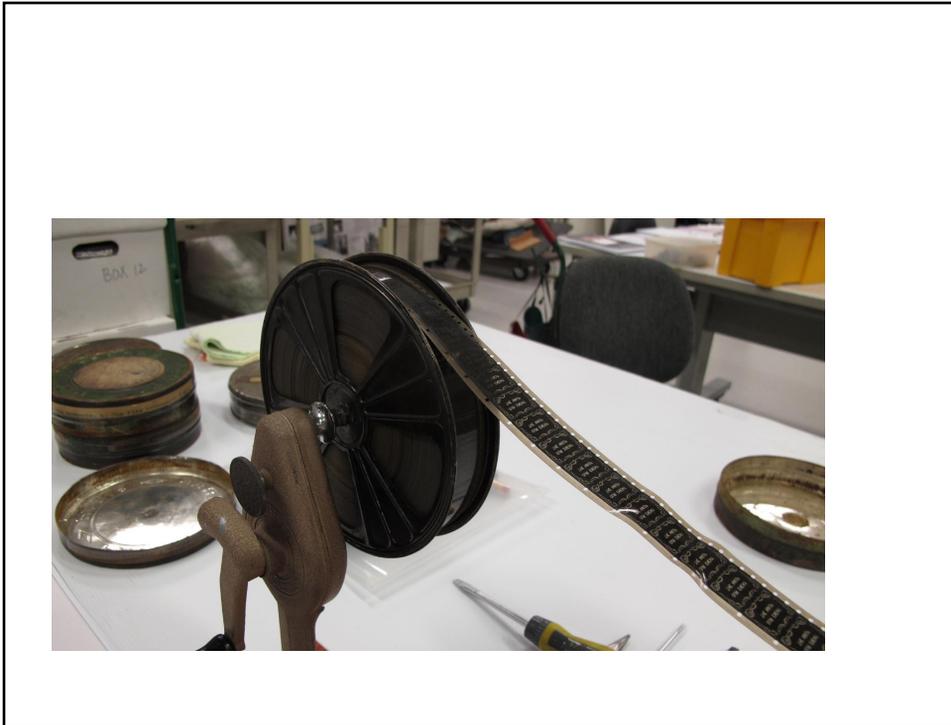


Film is made of a light sensitive emulsion on a plastic base. Other layers can include layers for color and other chemical layers which improve how film looks when projected. Film is created by a photochemical process, and it differs from magnetic media in that we can see the photographs on the film with our eyes, though it requires a machine to create the illusion of movement.



Film comes in different sizes, or gauges. The different gauges were developed and sold for different uses. 35mm is a common theatrical screening and professional gauge, still shot and screened today. 16mm film, 8mm film, and super-8 film were developed for home use and use by community organizations such as schools, churches, and businesses. The smaller gauges of film are cheaper to buy and shoot, and the equipment is smaller. Because of this, small gauge film was adopted by amateur filmmakers, experimental filmmakers, and documentary filmmakers who needed an affordable way to make films and often needed to use smaller, lighter equipment.

You can see here that all film has perforations, or “perfs” on the edge. These are used to pull the film through the projector or camera. We will come back to perfs in a minute.



35mm, 16mm, super-8, and 8mm are common gauges, but other gauges were also developed. For example: 9.5mm was common in Europe, 28mm can be found in some collections, and the giant 70mm film format is used for professional films. In this presentation, we focus on the first four, since you are most likely to find these in your collections. Shown here is a rare gauge called 28mm.

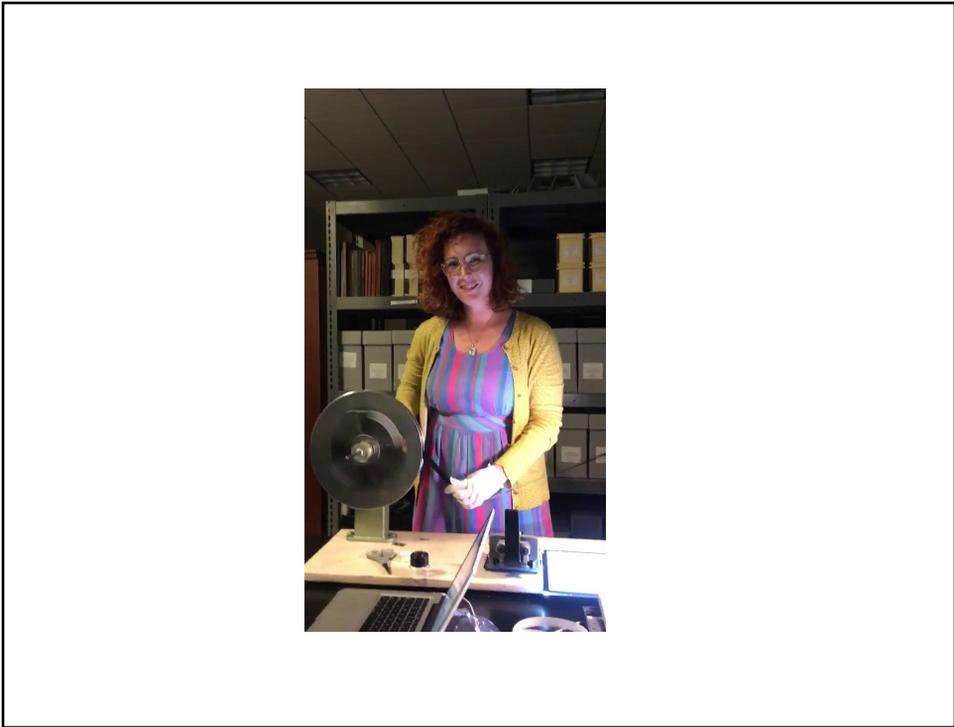


Here is a closer look at these four common gauges. When you describe your collection or prepare for conservation or digitization, it is helpful to know what gauge of film you have.

Identifying the four gauges is simple. This is also where the perfs come back into play. 35mm has 4 perfs per frame on both sides of the film. 16mm can have perfs on both edges or just one edge, and it is half the size of 35mm. 8mm film is half the size of 16mm, and has perfs on one side. Super-8 film is the same physical size as 8mm film, but it has smaller perforations. The smaller perforations allow for more room for a larger image area, creating significantly better quality image for the same size film. Can you identify what gauges you have in your kit? Pull out the first few feet of the test film and look at size and perforation type.



In order to assess a film, some type of inspection must be completed. A frame-by-frame inspection using rewinds is the gold standard. This is used to wind film onto a core for storage, prep film for projection, repair film, and perform detailed inspections of content. This skill can be learned, but it requires training and there is a risk of damaging the film if done incorrectly. It can also be incredibly time consuming, requiring hours of time for every film reel inspected.



Here is an example of winding film onto a core.

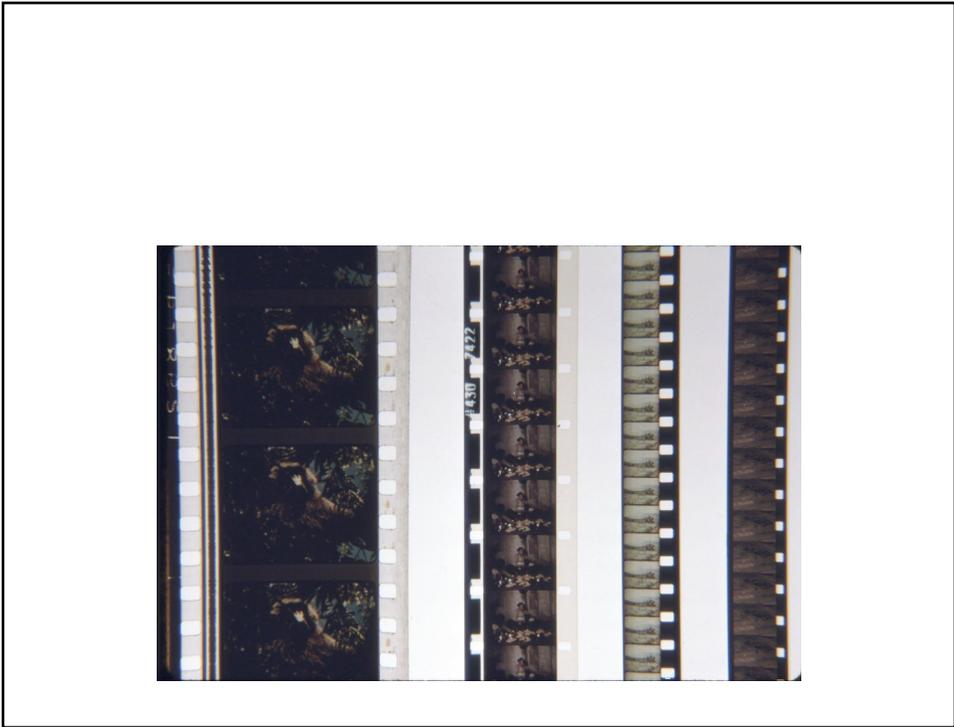


A full film inspection is great, if you can do it. But there is a lot you can accomplish without investing in this time or skill.

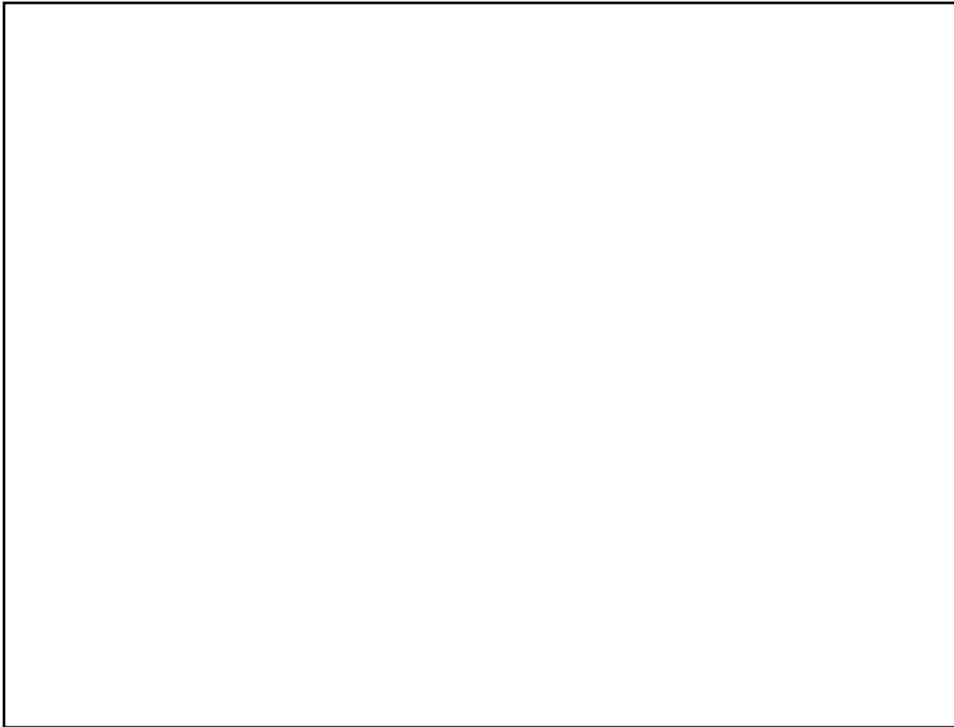
A simple visual inspection of the reel and a few feet of the film can give you enough data to form a plan for your collection if you do not have the time or expertise to hand inspect every reel of film. Since this presentation is about basic strategies, it focuses performing the visual inspection.



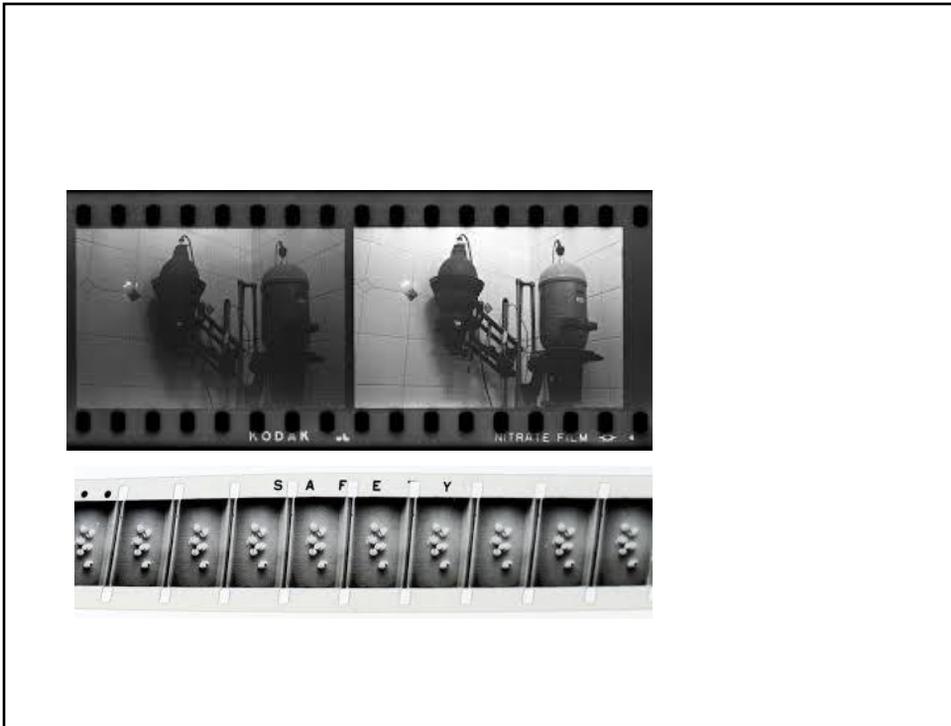
Let's practice a visual inspection. Normally you will do this with gloves and a clean bin that the end of the film can safely fall into. Can you identify what gauges you have in your kit? Pull out the first few feet of the test film and look at size and perforation type.



The gauge is probably the first thing you want to note during your inspection. We will be learning how to create an inventory with these notes in the next webinar.



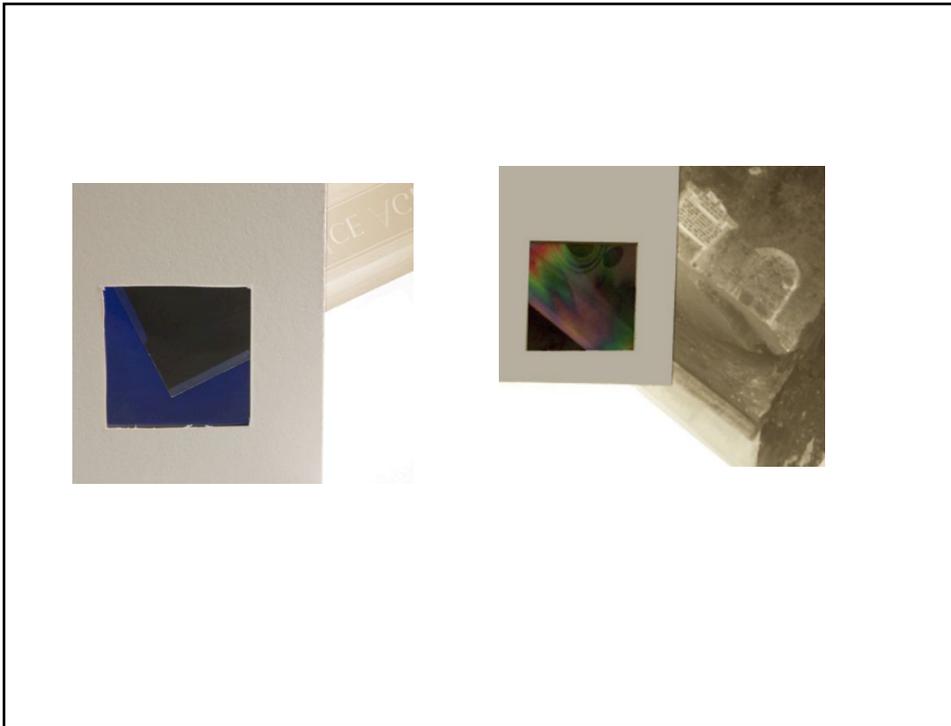
You will also need to note the film base, which is the type of plastic that the film emulsion is on. There are 3 common types of film base, each made of a different type of plastic. Each one is important to identify because each one has different concerns from an archival point of view. Nitrate: high quality images, highly flammable, can decay. This was only made in 35mm film. There are legal restrictions on shipping and storing nitrate film. Acetate: suffers from acetic acid decay, also known as vinegar syndrome. Polyester: most film now is made of polyester. It is very long lasting and extremely strong.



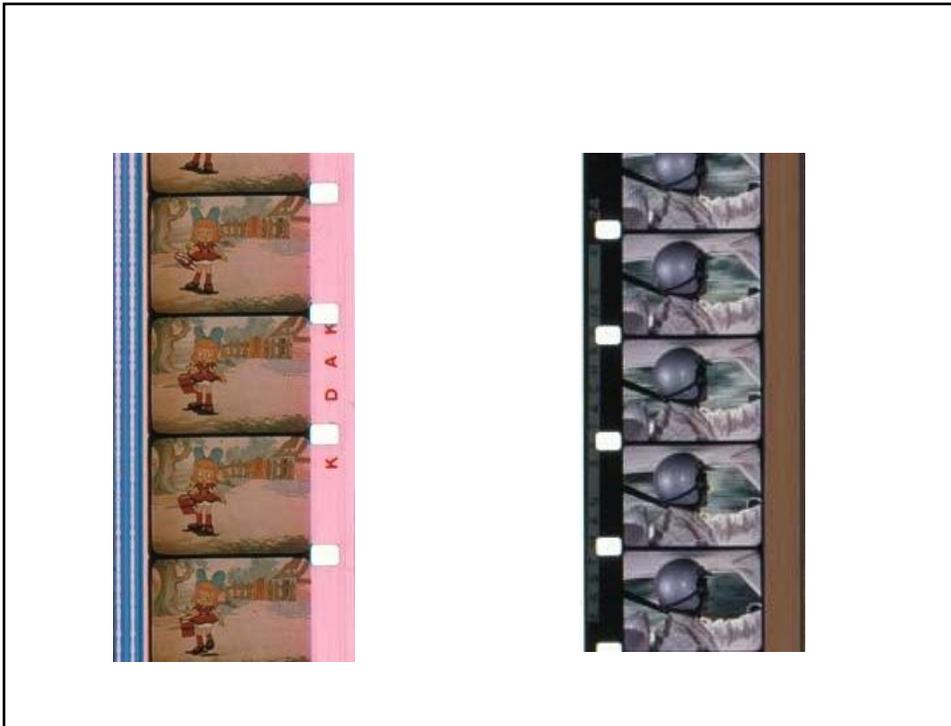
Nitrate is especially important to correctly identify and, thankfully, it's easy to do so. Nitrate film is pre-1950, is always 35mm, and it has "nitrate" printed right on the edge. For many years, non-nitrate film had the word "safety" written on the edge. We will go over more information that you can find on the edge of the film in a few minutes.



Acetate and polyester film are more difficult to tell apart. They can be any gauge. Acetate will also tear easily, polyester will not tear. Acetate film sometimes says “safety” on the edge to indicate that it is not flammable. Polyester film will sometimes say “estar” on the edge. If you hold a film up to a light, polyester film appears iridescent. Acetate film appears opaque. This works best with 35mm film. However, with 16mm film, this trick sometimes doesn’t work and acetate film can look like polyester.



You can also use a homemade polarizing filter tool to tell the difference. Polyester film creates a rainbow effect under the filter. Acetate and nitrate appear dark. In summary: use all of the clues you have to determine the plastic base type. Take your film reel and hold it up to the light and see if you can guess which film base you have using everything you just learned.



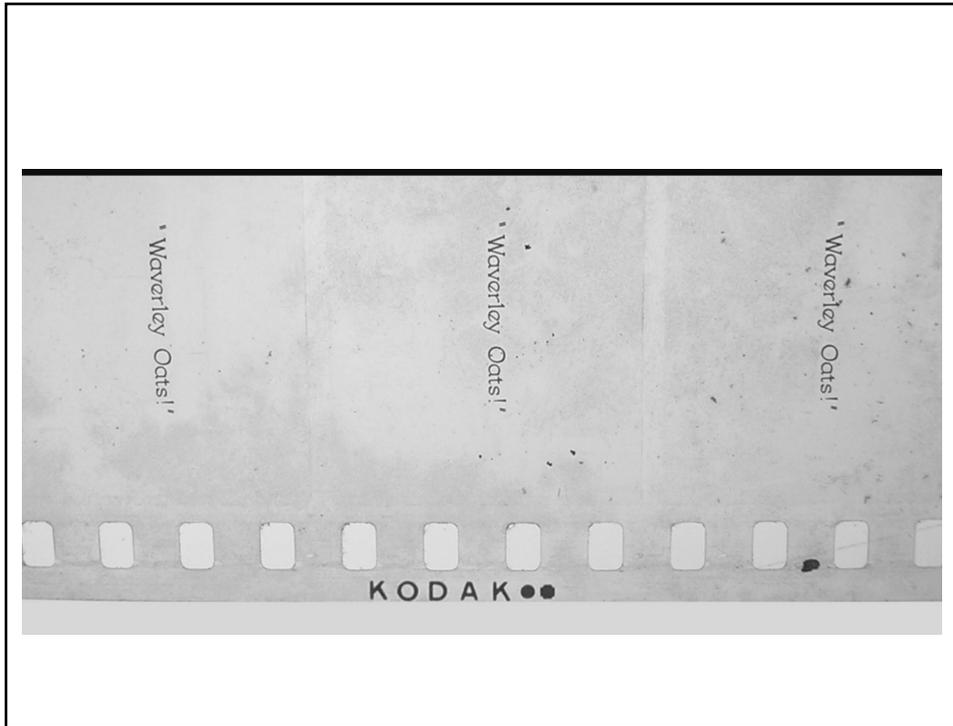
Films can be silent or sound. Sound can be magnetic, optical, or digital. You will mostly find a magnetic or optical track on a sound film. Optical tracks are read by light and look like an EKG, like this one on the left. Magnetic tracks are a type of magnetic media glued to the edge of the film, like the one on the right. Does anyone have a film with sound? If so, what type of sound? Pull out the film past the leader to make sure you are seeing the actual body of the film.



Film is either black and white or color. Black and white film is more stable. Some types of color film can fade over time. The cyan and yellow dyes migrate, while the magenta stays. This is called color shifting or color fading. Films turn “pink”. Take a look at the image area of your film. Is it color or black and white? If it is color, is it pink or off-looking?



Film inspection can also provide you with information about the content of the film. This is a big advantage over magnetic media. Look for titles, street signs, license plates, and production credits. What do you see on your sample films?

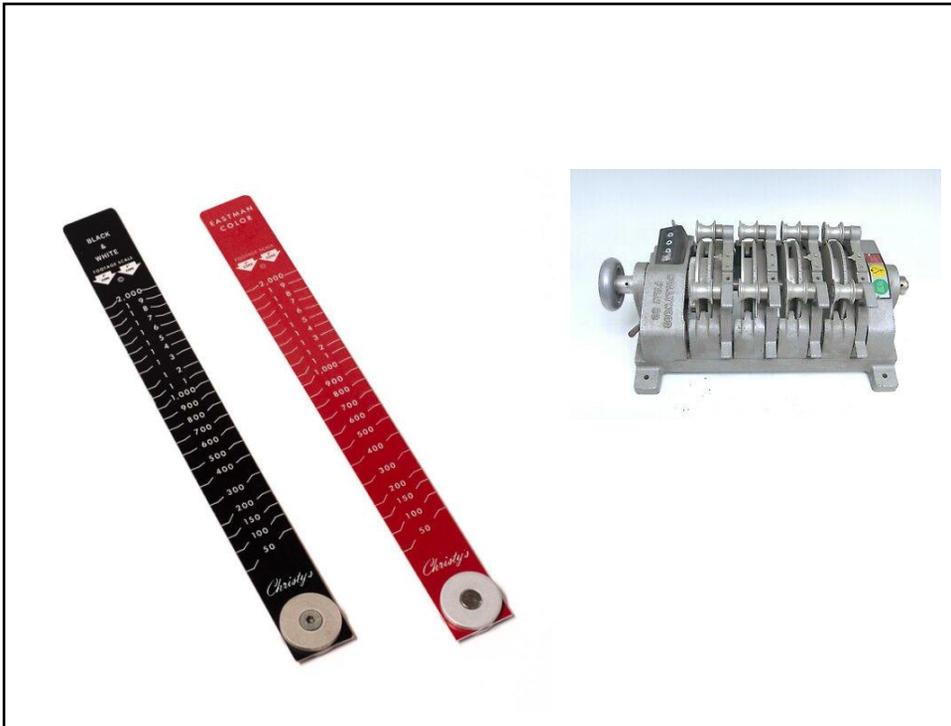


Another important thing you can find on the edge of your film is manufacturing information. Kodak used a series of shapes to note the year the filmstock was produced, and this can help you determine how old your film is. Do you see shapes on the edge of your film? Use the link with the key to determine what year the filmstock was made.

## APPENDIX A: EDGE CODE CHART

These charts reproduce the date edge codes from Kodak and Dupont motion picture film. To date your film, find the film's edge code and select the matching code on the chart. Kodak repeated symbols every 20 years, so you will need additional data to pinpoint the date. For 8mm edge codes used after 1965, see the Web site [www.filmforever.org](http://www.filmforever.org). Fuji film uses a four-digit code; the first two numbers represent the year of manufacture. For more on using edge codes for dating, see 3.3.

EASTMAN KODAK DATE CODE CHART				DUPONT DATE CODE CHART	
1922	1942	1962	●■	1982	●■X
1923	1943	1963	●▲	1983	X▲X
1924	1944	1964	▲■	1984	▲■▲
1925	1945	1965	■●	1985	■●▲
1926	1946	1966	▲●	1986	▲●▲
1927	1947	1967	■▲	1987	■▲▲
1928	1948	1968*	●●●	1988	+▲▲
1929	1949	1969	+	1989	X+▲
1930	1950	1970	▲+	1990	▲+▲
1931	1951	1971	●+	1991	X+X
1932	1952	1972	■+	1992	■+▲
1933	1953	1973	+▲	1993	+▲▲
1934	1954	1974	+●	1994	+●▲
1935	1955	1975	+■	1995	+■▲
1936	1956	1976	●	1996	X●▲
1927	1957	1977	■	1997	■■▲
				1970	LCT



When doing your visual inspection, you will also want to estimate the amount of footage of your film. If your film is on a core, you can use the film footage counter included in this kit. If the film is on a reel, look on the reel to see if it contains markings that tell you how many feet the film is. Look for container annotations. You can also purchase a frame-by-frame film counter, but for most purposes, an estimate is all you need. How many feet is your film?

Signs:

1. Vinegar odor
2. Dry, cracked film
3. Shrinkage, warping

Only found in acetate films  
You can test with A-D Test  
Strips



Acetate film is famous for a type of decay called acetic acid decay. It's also called "vinegar syndrome" because the off-gassing due to decay smells like vinegar. The vinegar smell indicates that your film is suffering from acetic acid decay, and also indicates that you have film with an acetate base. Films with a high level of acetic acid decay may also be shrunk, have emulsion falling off, and be dry and cracked or in a hard "hockey puck" shape. You can also use A-D strips to determine if you have vinegar syndrome. The strips change color in an acidic environment. Note if you smell vinegar, but **DO NOT ACTIVELY SMELL FILMS OR ANY OTHER MEDIA--** since debris and chemicals can be unhealthy.



Molecular sieves

There is no way to stop vinegar syndrome, but it can be slowed down. As part of your inspection process, you can add molecular sieves to film cans. These are basically like the little packets that come in a shoe box, and they trap acetic acid molecules.



Film can foster mold growth. Mold can look like a fuzzy growth on the film. Films with mold pose a health risk for people and a contamination risk for your collection. We won't cover mold in-depth here, but it should be triaged and moved from people and other films. Please put your health first and limit the handling of moldy film unless you have the proper equipment. Mold is very dangerous. Triage moldy film away from the rest of the collection, use a facemask with filter if you must handle it, and prioritize sending it to a lab that can deal with moldy film.



Look for warping and shrinkage on your reel of film.



Film may also have a bad wind, meaning that the wind is not smooth. This can cause damage to the film over time. We will see this again when we look at video. When one piece of film alone is sticking out above the film pack, it is sometimes referred to as a “popped strand”. When many pieces of film (or video) are sticking out together, it is often referred to as “stepping”. You may hear these terms, but it’s not vital to differentiate these during a basic inspection.

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Film can last hundreds of years if stored properly. Ideally, film should be stored on a 3 inch core in an archival can, horizontally, stacked only a few reels high. Remove paper, rubber bands, plastic bags, and other items from the can.



THANK YOU!



Now you can perform a full visual inspection for any film in your collection, and perform basic conservation. Congratulations! In our next webinar, we will learn to note all of this information. Here are some important references for performing film inspection. The Mellon Film guide, and the KODAK edgecodes guide.

# Thank you!



Community Archiving Workshop

