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Control and preservation of videotapes

An introduction to the handling, storage and conservation of analog and digital videotapes.

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The greater part of the videotapes that now find themselves in museum collections was once recorded on formats and systems that are now obsolete, and can no longer be played back. Forms of expression, formats and new systems (with their (im)possibilities) still come and go at a great tempo. Standards simply do not exist. The videotape has known over 50 different analog registration systems, the oldest of which dates back to 1965. About ten of these systems are still being used. The currently used magnetic tapes consist of three different layers. The video signal is encoded in the topmost layer of the tape. This top layer is a binder made of polyester polyurethane, in which the magnetic particles (the video signal) are integrated. Ageing can cause chemical deterioration in the form of oxidation or hydrolysis. Not only climatic conditions, but also, dust, dirt, ultraviolet radiation, heat and magnetic fields can affect a magnetic tape. For optimal preservation, the information stored on tape should be transferred to another carrier within seven, at the very most ten years. To prevent the tapes from blocking and oxidation, they should be wound and rewound once a year. For optimal conservation and control, the videotapes are stored under continuous conditions; preferred temperature 18°C (+/- 1°C) and humidity level 40% RH (+/-5%). Moreover, tapes will wear when they are used, and copies should be used for presentation purposes. The problem of climatic adjustment to this medium is that a 'tape' in fact consists of two components; the casing and the tape itself. Each of these consists of various kinds of materials, which in their turn are a blend of materials. It is this 'mix' that actually causes the problem. Each material has its own particular properties, and therefore also its own package of requirements for handling, storage and climatic conditions.

Temperature

All the currently used magnetic tapes consist of a formula coating on a film made of polyester (or similar material). The magnetic formula includes various chemicals, such as a head-cleaning agent, a binder, surface-lubricating agents, a fungicide, plasticizing agents, dispersants and the magnetic particles themselves.

The storage temperatures that are recommended by a great many media manufacturers are in fact determined by either the polyester base film or the plastics used for the casing of the cassette. The need to keep the dimensions of both the casing of the cassette and of the tape itself stable is a crucial factor in the determination of a suitable range of temperatures for work and storage.

The polyester base film covered by the magnetic formula coating is rather vulnerable to changes of temperature. Variations in temperature lead to shrinking or expansion of the tape. This 'increase' or 'decrease', which can be considerable, can lead to pressure in the tape pack, which could cause physical damage to the tape. The magnetic particles in the formula will remain relatively stable and unaffected even at extreme temperatures.

Humidity

Practically all magnetic tapes (except Metal Evaporated Tape) include some form of binder system. The binder is the glue that ensures adhesion of the formula to the base film. Early magnetic tapes (\pm 20 years old) were not equipped with the advanced binders with which we are now familiar. The early binders were often affected by the process known as hydrolysis. This means that the binder absorbs moisture from the air inside the cassette. This results in decomposition of the binder, which comes loose from the surface of the tape. The present-day binder systems are much more tolerant to conditions of high atmospheric humidity. Binder hydrolysis has become rare. However, storage conditions and working environment still play a crucial role in the conservation and protection of video recordings.

The general rule is: the colder the better. Storage at low temperatures and relative humidity can pose a problem when a tape has to be removed from the depot. The climatic difference between the depot and, for example, the work area can be considerable. There are two options to solve this problem: adjusting

the climatic conditions in the work area to those in the depot, which means unpleasant working conditions for the user, or allowing the tape to acclimatize in a climate box for a pre-defined period of time. Storage at low temperatures is not without complications. Moreover, it has not been proved (by simulation of ageing processes) that the storage of tapes at low temperatures and relative humidity is better than keeping climatic conditions at a constant, ideal level, both in the depot and the working area. It has been proved, however, that discontinuity of temperature and humidity levels causes damage to tapes.

Working environment

The magnetic recording process is based on a read head (either turning or not) that transfers information to the recording medium. In order to guarantee a high-grade recording, it is of essential importance to ensure that the good contact between the head and the tape is preserved.

A great many factors can cause loss of contact, and many of these are connected with cleanliness of the working environment. This should meet the following requirements:

- as to the space: clean floors (preferably without fitted carpet) and good ventilation in a smoke- and food-free environment, in order to reduce the number of dirt particles.
- as to the apparatus: good maintenance and proper cleaning should be ensured, worn pinch rollers replaced, and the components of the tape trajectory regularly aligned.
- as to the user: hands should be washed after eating and before touching the tape; no smoking or eating in the work area.

A few recommendations

General

- Keep media well away from diffused magnetic fields; even weak magnetic fields can lead to erasure of recorded content.
- Never store media on top of apparatus. Electric appliances almost invariably produce magnetic fields and heat.
- Do not use physically damaged media. Such damage can easily pass on dust and dirt to other transportation mechanisms, and affect the move-through properties of the media.
- For protection, keep media that are not being used in their original packing.

Environment for handling and use

- Never touch the surface or edges of the medium.
- Handling, use and storage of recording media should only take place in a smoke-free and food-free environment.
- When using these media, always make sure of a suitable, stable temperature and humidity level.
- Always allow media to acclimatize in the area of use. The larger the change of environment and the difference in temperature, the more time will be needed for acclimatization.

Storage and maintenance

- Media should be stored in continuous conditions with regard to temperature and humidity level.
- Reels should always be supported by their core.
- Always store media with the reels or flanges in vertical position.
- Wind and rewind media periodically (once a year) using the appropriate tractive power. This will reduce any pressure that has built up in the casing of the tape pack.
- If recently purchased (new and empty) tapes are packed in plastic bags, these should be removed from the bag, because plastic will retain any acids produced during the manufacture of the cassette.

Transportation mechanisms and recorders

- Regularly carry out preventive routine maintenance on all the components of the tape trajectory, such as guides, pinch rollers, scanners and read/write heads.

- When using cleansing tapes, follow the instructions and recommendations from the manufacturer of the apparatus.
- Always clean the complete tape trajectory as thoroughly as possible.

Cassette products

- Do not turn the reels by hand.
- Do not use the lid of the cassette as a handgrip.
- Do not open the cassette lid to inspect the surface of the media.
- Always rewind the tape completely before placing the cassette into, or removing it from, a transportation mechanism.

The above is based on:

Quentegy, *Behandel met zorg, Tips voor omgang met magnetische media* (Nijmegen) 1998

Frank van der Maden, *Audiovisuele collecties, handleiding voor beheer van bewegend beeld en geluid* (Hilversum) 1993.

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