INTRODUCTION TO IASA-TC 05: HANDLING AND STORAGE OF AUDIO AND VIDEO CARRIERS

DIETRICH SCHÜLLER

Abstract *IASA-TC 05 on Handling and Storage of Audio and Video Carriers is the most recent of a series of standards issued by the Technical Committee of the International Association of Sound and Audiovisual Archives. Edited by Dietrich Schüller and Albrecht Häfner, this standard explains function, composition, and life expectancy of audiovisual carriers, from the early cylinders to hard disk drives and solid states memories, describes the influence of environmental parameters to the various carries and surveys recent recommendations on handling and storage. By these background explanations the document will go beyond a mere collection of rules as it assists archivists to responsibly adapt idealised standard prescriptions to the specific, often suboptimal conditions and circumstances of their archives. This introduction also provides a preview on most recent research and experiences that have led to new insights into some of the carrier deterioration phenomena, consequently leading to an adaptation of previously published recommendations.*

INTRODUCTION OF IASA AND ITS TECHNICAL COMMITTEE

IASA-TC 05 is the colloquial term for a standard document – in this case document number 5 – issued by the Technical Committee (TC) of the International Association of Sound and Audiovisual Archives (IASA). IASA was founded in 1969 as a professional association of sound archives, later expanded to audiovisual archives, to enhance cooperation between members, to advance the profession in technical, legal, and organisational matters, and to

International Journal of Humanities and Arts Computing 7 (2013) Supplement: 216–221
Edinburgh University Press
DOI: 10.3366/ijhac.2013.0071

www.euppublishing.com/ijhac

assist strategically in strengthening audiovisual archives on national, regional, and international levels. IASA cooperates with international professional organisations (NGOs) as well as national and intergovernmental bodies (UNESCO, European Commission). The IASA Technical Committee was founded 1975 to advance cooperatively the technological aspect of audiovisual archives with a natural focus on preservation. The TC organises tutorials and workshops, consultations to audiovisual archives, and, most importantly, publishes the series *Standards, Recommended Practices and Strategies.*

THE ROLE OF CARRIER PRESERVATION IN A WORLD OF CONTENT PRESERVATION

Before introducing IASA-TC 05, which is on handling and storage of audio and video carriers, it is important to take a look on IASA-TC 03, *The Safeguarding of the Audio Heritage: Ethics, Principles and Preservation Strategy.* This document describes that audio (and implicitly video) carriers cannot be preserved in their original form. All carriers sooner or later deteriorate, and replay equipment becomes unavailable as formats become obsolete. This inevitable development will make even well preserved carriers useless. The only viable strategy for long-term preservation is to concentrate on contents – instead on carriers – by subsequent copying these contents losslessly from one digital preservation platform to the next. Analogue originals have to be digitised, digital originals converted to standardised file formats and deposited in trusted digital repositories. The time window for this ingest of contents depends on the further availability of replay equipment, and this is estimated to be only 15 years, if at all.

Although – ultimately – preservation of analogue and digital pre-IT audio and video carriers is in vain, it is imperative before digitisation can be organised. After digitisation, it is important to keep carriers as long as possible because replay and restoration methods still develop further, and originals may have to be revisited.

IASA-TC 05 follows concepts originally prepared by the co-editors for the IASA Seminar at the Congress of the International Council on Archives (ICA), Vienna 2004, and for the tutorials of the European Commission funded project TAPE (Training for Audiovisual Preservation in Europe) 2004–2008.

THE ARCHITECTURE OF THE PUBLICATION

1. Introduction

TC 05 is not a handbook of detailed knowledge in the field. Like IASA-TC 04 *Guidelines on the Production and Preservation of Digital Audio Objects*, it is

concentrated on main carriers and main problems. It is not exhaustive, but points to special publications.

2. Carriers

This chapter deals with recording principles, composition and life expectancy, deterioration by replay, sizes and formats of all types of carries: mechanical, magnetic including hard disk drives, optical, and solid state carriers.

3. Environmental factors, handling and storage

Water/humidity, temperature, mechanical deformation, dust, foreign matter, (air) pollution magnetic stray fields, light, ultraviolet radiation, x-rays, and pest are dealt with across the carriers.

4. Building and storage facilities, transport

This part deals with storage areas and their location, construction, materials, insulation, air conditioning, shelving and transport.

5. Disaster preparedness

Apart from general considerations, fire and water is given special attention.

NEW ASPECTS RESULTING FROM RECENT RESEARCH AND EXPERIENCES

From the late 1970s onward, research in audio and video preservation had focussed on replay problems of modern magnetic tapes, caused by sticky deposits on tape guides and audio and video heads, which obstructed the optimal signal extraction from original tapes. Generally, this so-called 'Sticky Shed Syndrome' (SSS) was ascribed to hydrolysis of modern polyurethane pigment binders, which has been studied in detail in the 1980s and early 1990s. This has lead to the recommendation of ever lower levels of relative humidity (RH), from up to 60% in the late 1950s to 30–40% RH.

Adherence to recommended relative humidity (RH) levels is of absolute, while temperature – within limits – is only of relative importance only. In order underline this hierarchy, which is against general perception[1], RH levels will be quoted first, temperature thereafter: e.g.: 35% RH, 20° C. However, new insight in acetate cellulose deterioration suggests different RH values for AC tapes and lacquer discs should be kept between 45–50% RH as opposed to 40% and lower for other carriers[2].

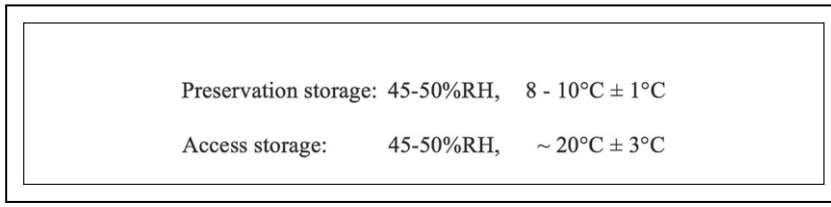

Figure 1. AC Tapes and lacquer discs.

Latest research, specifically interviews with engineers of former tape manufacturers[3], indicate that beyond binder hydrolysis several other reasons may lead to what is called the 'sticky shed syndrome', amongst them lubricant and primer exudation. These can also be cured, like binder hydrolysis, to some extent by exposure of tapes to elevated temperature. This treatment, however, does no work with sticky tapes suffering from insufficiently cross-linked binder components.

Former tape manufacturers also unanimously agree that tape stability is only to a lesser degree based on chemical composition. In addition, the production process in its great variety of variable parameters is of greatest importance. Stability, ultimately, is also a function of the mechanical integrity of tape surfaces, as scratches act as port of entry for deteriorating agents, mainly humidity, and subsequent deterioration.

Chemical analysis alone, therefore, does not lead to conclusive results because the production process is hardly analysable. The role of production may also explain different behaviour of tapes of the some type, sometimes even of the same batches. Empirical observation suggests that – under standard preservation conditions – tapes normally became sticky within few years after production, but not later. This seems to suggest that at least some of the reasons for stickiness are production related, and not an aging process proper.

In sum, research into life expectancy may not be of much use for prioritising digitisation. The best advice is to start with deteriorated and AC tapes, to be followed by the rest. Before and after digitisation original carriers must be kept under reasonable environmental conditions: *dry, cool, and clean.* Temperature and humidity shall be kept stable and low, and cyclic changes of temperature and RH must be avoided. Temperature and humidity are interrelated: both parameters must be controlled simultaneously – cool storage must always be accompanied by dehumidification, otherwise humidity may rise excessively.

IASA-TC 05 thereby confirms the usefulness of splitting conditions for access and preservation storage, as many institutions, specifically broadcasters in developing countries, still rely on daily operations based on their collections in pre-IT form, i.e., on traditional single carriers. Acclimatisation is needed

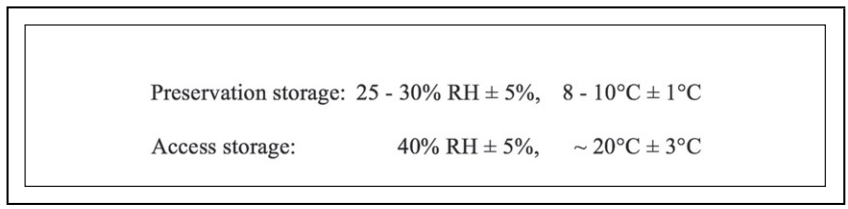

Figure 2. All other carriers.

when moving carriers from preservation to access storage and vice versa, and, additionally, tape carriers need to be relaxed.

It is also confirmed that any levels between 20–65% RH and 8–35° C (for photographic materials lower) are without immediate risk to AV carriers. But the choice of storage conditions ultimately determines speed of degradation. Levels should be chosen that can be afforded to be kept stable for 24 hours a day, all year round. Again, however, low humidity is more important, while temperature in tropical countries may be chosen slightly higher than the notorious 20° C.

END NOTES

[1] The control of temperature is easier, and cheaper than that of humidity. Therefore, humidity control is often neglected, which often leads to catastrophic damages, specifically in tropical counties, when storage areas are temperature controlled only without simultaneous dehumidification.

[2] Wallaszkovits 2012. In this research, methods of replastification of brittle AC tapes have also been developed.

[3] ILKAR Final Project Report 2012.

REFERENCES

Boston, George (Ed.): Safeguarding the Documentary Heritage: A Guide to Standards, Recommended Practices and Reference Literature Related to the Preservation of Documents of All Kinds. UNESCO, Paris 1998 web version: < http://www.unesco.org/webworld/mdm/administ/en/guide/guidetoc.htm > extended CD-ROM version UNESCO, Paris 2000.

Bradley, Kevin: Risks Associated with the Use of Recordable CDs and DVDs as Reliable Storage Media in Archival Collections – Strategies and Alternatives. UNESCO, Paris 2006 web version: < http://www.unesco.org/webworld/risk >

Edmondson, Ray: Audiovisual Archiving: Philosophy and Principles. UNESCO, Paris 2004. (CI/2004/WS/2) < http://unesdoc.unesco.org/images/0013/001364/136477e.pdf >

Henriksson, Juha, und Nadja Wallaszkovits: Audio Tape Digitisation Workflow. Digitisation workflow for analogue open reel tapes. < http://www.jazzpoparkisto.net/audio/ > (2008)

IASA Technical Committee: The Safeguarding of the Audio Heritage: Ethics, Principles and Preservation Strategy, edited by Dietrich Schüller. (= IASA Technical Committee – Standards, Recommended Practices and Strategies, IASA TC-03), Version 3, 2005 web version: < http://www.iasa-web.org/de/IASA_TC03/TC03_English.pdf > Also available in German, French, Swedish; Italian, Spanish, Russian, and Chinese.

IASA Technical Committee: Guidelines on the Production and Preservation of Digital Audio Objects, edited by Kevin Bradley. (= IASA Technical Committee – Standards, Recommended Practices and Strategies, IASA TC-04), second edition 2009 web version: < http://www.iasa-web.org/de/tc04/audio-preservation >

IASA Technical Committee: Handling and Storage of Audio and Video Carriers, edited by Dietrich Schüller and Albrecht Häfner (= IASA Technical Committee – Standards, Recommended Practices and Strategies, IASA TC-05) forthcoming 2013.

IASA Technical Committee: Guidelines on the Production and Preservation of Digital Audio Objects, edited by Kevin Bradley. (= IASA Technical Committee – Standards, Recommended Practices and Strategies, IASA TC-06) forthcoming 2013.

ILKAR – Integrated Solutions for Preservation, Archiving and Restoration of Endangered Magnetic Tapes and Cylinders: Final Project Report (DVD). Staatliche Museen zu Berlin. Berlin 2012.

Schüller, Dietrich: Audio and Video Carriers. Recording principles, storage and handling, maintenance of equipment, format and equipment obsolescence. 2008 < http://www.tape-online.net/docs/audio_and_video_carriers.pdf >

Schüller, Dietrich: Preservation of Audio and Video Materials in Tropical Countries. International Preservation News 54, 2011, 31–34 web version: < http://www.ifla.org/files/pac/ipn/IPN 54def.pdf >

Van Bogard, John W.C: Magnetic Tape Storage and Handling. A Guide for Libraries and Archives. CLIR (Council on Library Information and Resources), 1995. < http://www.clir.org/pubs/reports/pub54/ >

Wallaszkovits, Nadja: Reconditioning of brittle cellulose acetate tape. Forthcoming 2013.