

Digitization of Sound Recordings as an Example for Preservation of Oral and Music Folklore Heritage

Basic principles and two examples from practice

Aleksandra Mežnarić Karafin
Academy of music, Library
Berislavićeva 16, Zagreb, Croatia
alexm@muza.hr

Summary

Sound recordings are the result of almost every field research conducted in Zagreb Institute for ethnology and folklore research (IEF), and Vienna Phonogrammarchiv of Austrian Academy of sciences. Documenting orally transmitted traditions, sound recordings are becoming specific witnesses of time, and they cannot be adequately replaced by any transcription. They have archival value, and their protection and preservation is of utmost importance. These recordings are mostly analogue, on magnetic tapes as carrier, which opens a set of questions regarding their preservation. Preservation professionals find that digitization may provide an answer to this problem. This paper analyzes the importance of field recordings in folklore research, and internationally accepted standards for their digitization. It also presents magnetic tapes digitization praxis in earlier named institutions, comparing approaches and results.

Keywords: folklore heritage preservation, preservation of sound recordings, digitization of sound recordings

Introduction

Since the end of the 19th century, sound recordings have been the witnesses of almost every important segment of the human practice. Speech recordings of important historical figures and recorded interpretations of great musicians are the only way of preserving for the future unique parts of history. Documentary recordings resulting from field research are essential in a study of folklore as communication process embodied in orally transmitted forms of cultural expression of all segments of society.¹ Original recordings of authentic speakers and different forms of musical expression contain spontaneous, unrepeatable elements in a way written notes could not, which then documents segments of

¹ About problems regarding definition of *folklore*, see: Lozica, Ivan. Izvan teatra (...), p. 18-31

past reality. For more than a century they have been deposited in archives and sound recordings collections of the research institutes, the oldest sound archive – *Phonogrammarchiv* of Austrian academy of science is founded in Vienna as far back as 1899.

Our ability to hear recorded sound depends on physical integrity of the carrier, sound record format, and availability and functionality of reproduction equipment. Sound carriers, analogue and digital, generally have shorter life expectancy than quality traditional printed materials, and they are more subject to damage caused by inadequate handling, storage and replay equipment. The concern about these recordings becoming inaccessible is thus objectively founded. Problem of their preservation became a subject of increasing number of discussions among expert community in last two decades. Digitization of analogue sound recordings, according to internationally accepted standards, in this moment appears to be the best solution for preservation of these endangered materials and for insurance of their accessibility. Lifetime of digital carriers, problem of selection and eventual obsolescence of digital format, independent from the media, raises then an all-new set of questions.

International expert associations, libraries and archives are recognizing the value of these materials and set of problems regarding their preservation. They are working on detailed standards, recommendations and projects for protection and preservation by digitization of deteriorating sound recordings. In United States their protection is under regulation of U. S. Congress National Recording Preservation Act (2000), and from it consequent expert bodies.² There are more and more projects (TAPE, PRESTO, UNESCO Memory of the world programme, etc.) oriented on preserving audiovisual materials and heritage. In the same time this problem, although indicated in the *Law about archive materials and archives*, remains unsolved, staying at the margin of interest of expert community. There are few possible reasons for that: **a)** in principle, value of these recordings as significant archival materials of national interest is not recognized, **b)** there is no systematic care about its archiving, protection and preservation **c)** lack of educated personnel engaged in its care and preservation.

This paper was initiated by those reasons, and its purpose is to point out the importance and problem of protection and long-term preservation of field recordings on analogue magnetic tapes. Large quantities of these tapes are the core of sound recordings collections of the *Institute of ethnology and folklore research* (IEF) in Zagreb, and *Phonogrammarchiv* in Vienna. Both collections are as a whole (Zagreb), or partially (Vienna) acknowledged as protected entities of a great value and importance. Documentation of IEF, from year 1991, is included into the Registry of mobile culture monuments of the Regional

² National Recording Registry, National Recording Preservation Foundation, National Recording Preservation Board

institute for the protection of cultural monuments in Zagreb, and so as a whole obtained the status of the monument of the highest (“0” i “I”) category. Historical collections of the *Phonogrammarchiv*, with materials from the period of 1899-1950, are included in the registry of UNESCO *Memory of the world Programme* in year 1999.

Influence of development of the recording technologies on the field research

Sound recording technology development, which dramatically begun with Edison's invention of the phonograph in 1877, had a direct impact on the scope, focus and methods of the scientific research of traditional culture by the beginning of 20th century. After Edison placed the new, improved version of the phonograph, with which first field recordings on the wax cylinders were made, on the market in 1880, phonograph recording quickly found the place in the scientific circles. Researchers in the field of anthropology and linguistics were the first ones who used the advantages of new sound recording technology. Due to this technology they could record and preserve the sounds, speech and musical performances, which could only be partially documented in the written notes. In 1890 ethnologist Jesse Walter Fawkes recorded the first filed recordings of Passamaquoddy Indians songs with phonograph.³ Linguist Milan Rešetar recorded the first phonograph recordings in Croatia in 1901, as a part of his research of Slavic languages for Vienna *Phonogrammarchiv*.⁴ At the beginning of 20th century, Bartók and Kodály recorded traditional music of Hungary and Rumania with phonograph. In the twenties and thirties of the 20th century Božidar Širola and Milovan Gavazzi made first phonograph recordings while working in the Department for the folk music, founded in 1921 in Ethnographic Museum in Zagreb. Vienna *Phonogrammarchiv* donated the first phonograph to the Department as its branch, and Department was obliged by the contract to turn over all original cylinders to the Phonogrammarchiv, their copies were deposited in Zagreb.⁵

None of the future recording methods found its way in the filed research practice as deeply as magnetic recording technique. The U.S. engineer Oberlin Smith set basic principles of this technique as far as in 1878; it was perfected in Germany and in the U.S. during and after the World War II. Magnetic sound recording was then widely spread in the fifties. Sound carrier evolved from the steel wire and steel band, into the first magnetic tape, as we know it today. Recording equipment became more available and affordable, and practical transportable recording units that used batteries for the power supply made fieldwork

³ Brady, Erika. A spiral way (...)

⁴ Lechleitner, G. Ethnomusicology and the historical collections (...)

⁵ Bezić, Jerko. Etnomuzikološka i etnokoreološka djelatnost Instituta (...), p. 21

much easier. Vienna Phonogrammarchiv introduced magnetic tape technique in 1951; from 1958 portable tape recorders were used in the field research. In 1954, Vinko Žganec made for IEF first magnetic tape recordings on his field trip in Međimurje. These recordings are held in the sound recordings collection of IEF.

Magnetic tape technique was used as a primary field recording technique by the eighties, when digital recording technology was perfected, and came into common use. Results of the wide use of the magnetic tape recording are large collections of sound recordings that were made all over the world. They bare witness to the focus of the scientific research in home institutions, but more importantly, of significant cultural changes in this turbulent period.

Preservation of sound recordings

Problems

Only constants in the development of sound recording and sound reproduction technology are continuous and ever more rapid alternations of innovation and obsolescence in every aspect of recording, reproduction and archiving of sound recordings. Our ability to hear recorded sound depends on several elements: sound carrier, system for its reproduction, and lately, on digital format and operation system. In case problem occurs in just one of these elements, sound recording may become inaccessible. In attempting to preserve analogue sound recordings, priority is mostly given to preservation of original sound content, more then on the preservation of the original sound carrier.

Approaches

The only way to preserve a sound recording stored on the carrier that is, even with best storage conditions and protection techniques, endangered by inevitable deterioration, is the transfer of the recording on to the new media, that is, its conversion to a new format. Still in the last decade of 20th century, some expert associations as Audio Engineering Society, National Academy of Recording Arts and Association of Recorded Sound Collections expressed the concern about use of digital technology and digital storage media, whose stability and durability were not yet confirmed in the practice in their discussions about long-term preservation of sound recordings. For this reason, as a solution for preservation and storage of sound recordings, they prefer re-recording of endangered materials on analogue magnetic tapes.⁶ Ch. A. Patton (1998) also recommends the use of analogue recording technology, and magnetic tape as a storage media in his study that covers all aspects of sound recordings preservation. Although,

⁶ "[...] because analogue tape has been proved to last, [...], and because the shelf life of digital tape is unknown, recordings should be stored and backed up, at least in the analogue tape format." Capturing Analogue Sound for Digital Preservation , p. 2

in some aspects, he acknowledges few advantages of digital technology,⁷ he finds more arguments against its use in the field of sound recordings preservation and archiving. These are: **a)** rapid change and improvement of the technology – results in rapid obsolescence of hardware, digital format and storage media, **b)** lack of consensus in the expert community regarding sample rate, bit depth and record format for sound archiving, **c)** questionable stability and durability of the storage media.

Yet in time when digitization of conventional library materials was perfected and became common practice, Abby Smith refers to digitization in 1999 primarily as to a method of providing access to rare, endangered, or distance materials, and not as to a permanent solution for preservation⁸. However, statement of E. Cohen “distribution is preservation” relays exactly on possibilities that lays in digital domain and networked environment: creating unlimited number of identical copies without the loss of original information, simple distribution of the documents, web access, permanent, media-independent preservation of digital content. Urgent conversion of analogue recordings into a digital domain is an imperative and to hesitate means to compromise preservation.⁹ Lately this approach is considered the best solution for preservation of original sound content stored on deteriorating analogue sound carriers. In the same time, preservation of the original carrier and original replay equipment is of same importance: future development of sound reproduction technology could enable the transfer of yet unavailable subtle sound content.

The main obstacle for the adequate preparation and realization of the digitization projects is the lack of financial support, but even more, uneducated personal in charge of the collection. In this sense, there is a visible difference between the archives in the narrow sense, and sound recording collections in research institutions. Institutions whose basic purpose is archiving and preservation usually have established preservation policy and ways for financing preservation and digitization projects. Collections that are part of research institutes usually have a different role – they serve as a source of materials for current research, mostly without defined preservation and digitization policy, and with no finances planed for this purpose.

⁷ “[They are] easier to edit, recording systems are inherently less noisy than analog systems. In theory [...] should be possible to “clone” digital recordings, permitting the creation of many generations of identical copies”. Patton, Ch. A. Preservation re-recording of audio recordings (...), p.207

⁸ Smith, Abby. Why Digitize? , p. 5

⁹ Cohen, Elizabeth. Preservation of Audio, p. 1

Analogue sound recording digitization: international standards and recommendations

Documents as IFLA Guidelines for digitisation projects (2002), IASA-Technical Committee Standards IASA-TC 03(2005), IASA Task force to establish selection criteria of analogue and digital audio contents for transfer to data formats for preservation purposes (2003) are setting the standards and recommended procedures for transfer and digitization of analogue sound recordings, for storage, permanent preservation, and for providing of access to digital sound recordings. They are defining reasons for digitization, selection criteria, and basic phases in the digitization process.

Reasons for digitization

Considering analogue magnetic tapes, primary reasons for digitization are: **a)** saving original sound content from endangered carrier / protection of the original carrier – digital copy preserves sound content, in the same time preventing the wear of the original carrier; **b)** easy access – replay equipment for analogue magnetic tapes became obsolete, it is complicated for handling, incompetent user can cause a permanent damage to the original tape; **c)** providing new services for the users.

Selection criteria

Selection criteria will be determined with primary function and activity of the home institution. According to *IFLA Guidelines for digitization projects* basic criteria for selection materials for digitization are:

- *Content*: priorities are determined by evaluation of intellectual value of materials, their historical, scientific and cultural significance. Priority must be given to unique materials /sources.
- *Demand*: priority should be given to the materials in constant demand. Transfer of the content into the digital form will satisfy the needs of current users, at the same time attracting the new ones.
- *Condition*: fragile and damaged unique materials have a priority in transfer into a digital domain; this minimizes the possibility of a permanent damage caused by the frequent use. Digitization process alone can be of a high-risk for the damaged materials. They must be handled with great care, some restoration procedures may be needed before the transfer. Priorities in digitization projects of analogue sound recordings are set by IASA-TC 03 § 16: **a)** documents at immediate risk / recordings on endangered media **b)** documents who are a part of an obsolete or commercially unsupported system **c)** documents in regular demand.

Standards for transfer of analogue recordings

To achieve optimal transfer of original analogue recording, it is necessary to insure maximum fidelity during the reproduction of original. Expert knowledge of original format and all of its characteristics is required, as well as availability and optimal adjustment of well maintained, and completely functional replay equipment. Lack of professional knowledge and adequate replay equipment can result in inadequate transfer of analogue sound signal and irreversible damage of original carrier. Necessary steps in reproduction and transfer of analogue recordings on magnetic tapes should be:

- Checking, preparation and cleaning of original tape. Procedure includes identification of the tape (tape base – paper, acetate, PVC, polyester), establishing tape condition and eventual damage repair (damaged splices, mould, deterioration of the tape base, oxide or binder, acetate tapes are considered to be most unstable)
- Configuration and calibration of replay equipment: **a)** setting the tape speed (most common are 4,75 cm/s, 9,5 cm/s, 19 cm/s; in field recordings often more recordings recorded at the different speed and formats can be found on the same tape **b)** defining the recording format (mono, stereo), recording and replay equalization standards (CCIR, NAB), azimuth adjustment (adjustment of the reproduction head in the same angle as it was during the recording of original)

All data about original tapes, all restoration procedures, replay and transfer parameters must be documented in details, and available for the future reference.

Sound recording digitization standards

In process of digitization, sound signal that is analogue by nature, in computer Sampling/quantization processing is divided into a specific number of vertical segments – samples. Number of those segments is defined by sampling frequency (kHz). Quantization then divides every vertical segment, which is defined by number of bits and often called “word length”. Sampling frequency and bit rate define the quantity of sound information transferred from the original source. The quality, fidelity and dynamic range of digitized sound recording are depending on them. Sampling frequency and bit rate adequate for sound archiving is the subject of many discussions among preservation experts and audio engineers. Some archivists are suggesting high sampling frequencies of 192 kHz, with arguments “just in case”, “there are hard to hear harmonics that should be kept”.¹⁰ IASA-TC 03 is suggesting 96 kHz sampling frequency, with 24-bit word length, as archival sound record standard. From archival copy user copy can be made, with downsampling to CD-Audio quality (44, 1 kHz/16 bit), and with data reduction (MP3) when needed for network transfer, etc.

¹⁰ Fleischhauer, Carl. The Library of Congress Digital Audio Preservation (...), p. 5

Unmodified transfer

Transfer of analogue sound signal to new archive format should be carried out without any modifications or de-noising. From archival point of view, secondary, "unintended" sound artefacts (clicks, noise) are considered to be part of the sound document, and are equally important as primary, "intended" sound content.¹¹ By the use of signal processing from unmodified, archival copy, modified sound document can be created for commercial presentation or to answer the users' needs.

Sound record format

To minimize the possibility that digital sound format becomes obsolete too quickly in creating digital archival sound record, widely accepted formats should be chosen. Format should support high-resolution audio records, it should be transparent (with simple coding schemes – Pulse Code Modulation is recommended, without data reduction), and should have enclosed metadata about data extraction procedures.

IASA-TC 03 at this moment recommends following formats for digital sound archiving: WAVE (.wav), Broadcast Wave Format (.bwf), Audio Interchange File Format (.aiff), CD Digital Audio (CD-DA), with PCM or LPCM coding schemes. Formats with data reduction (MP3 is most popular) can be acceptable for access copies or transfer thru the web (web streaming), but they are not appropriate for long-term preservation of sound documents.

Storage of digital sound record

IASA TC03 suggests following principles of digital sound archiving:

- Each digital copy created in archival purposes must be checked against the imported file (verified), must be free of uncorrectable errors, with lowest possible number of correctable errors
- Each carrier containing digital recordings must be regularly checked for data integrity
- Digital content must be copied to a new carrier each time when number of error increases significantly, before uncorrectable errors occur (refreshment)
- Digital content must be copied before digital carriers, formats and/or hardware becomes obsolete (migration)
- It is essential to keep at least two digital preservation copies, and to
- use additional copies for access. The preservation copies should be kept in different location whenever possible.

¹¹ IASA-TC 03, § 8: "It is important to understand that the intended signal is only part of a given document. The unintended and undesirable artefacts (noise, clicks, and distortions) are also part of the sound document. Both have to be preserved with utmost accuracy."

Like analogue media, digital magnetic and optical storage media also have expected lifetime and stability that depends on conditions of their use and storage and they are subjected to format and hardware obsolescence. To date, in digital storage practice following storage media have been used: R-DAT, CD-R, DLT and LTO computer magnetic tapes. Currently, R-DAT is already considered obsolete and concern rises also about the use of CD-R and DVD-s as digital target formats for archives.¹² Because of the rapid changes and development of digital storage media, formats and hardware, automated, media-independent approach appears to be the solution for long-term preservation of digital sound record, its migration before format obsolescence, or deterioration of built-in error correction. Storage of digital data in repositories based on OAIS model¹³ or in DMSS (*Digital Mass Storage System*) is an ideal solution. These automated systems for storage, management, maintaining and integrity check of digital data, their preservation and distribution of digital objects with embedded metadata, are closest to solution of permanent preservation of digital objects problem. Currently, digital mass storage systems are installed in some major sound archives, but because of large financial investments required for this purpose, they are out of reach to smaller institutions and archives.

Metadata

Metadata in digital environment are extension of basic catalogue description, and they are indispensable for finding, control and usage of digital documents. Beside descriptive, administrative and structural metadata, set of preservation metadata is mandatory at assessment of technical parameters of the recording. It should contain details about the original carrier, format and preservation; equipment for reproduction and their parameters; digital resolution, digital format; operators included into a process, digital signature for document. Most used basic schemes of metadata are MARC bibliographic record and Dublin Core Metadata Element Set. They can be stored as standalone documents, or as integral part of digital document, where Standard Generalized Markup Language (SGML) is most used authentication; details about secondary sources of information.¹⁴

Examples from praxis

Institute of ethnology and folklore research

Sound recording collection of IEF is an integral part of its Documentation collection, which collects, catalogues, and preserves documents which are result of scientific research activities of Institute's scientists and collaborators from year

¹² Bradley, Kevin. Risks associated with the use of recordable CDs (...)

¹³ Fleischhauer, Carl. The Library of Congress Digital Audio Preservation (...), p. 8

¹⁴ IASA-TC 03, § 15

1948, when *Institute* was founded,. This material in unique way bears witness to Croatian traditional culture of 20th century, to other nationalities in Croatia, and to Croats abroad. As mentioned before, IEF documentation has obtained status of cultural monument "0" and "I" category. Sound recording collection of IEF stores 3,300 magnetic tapes –around 4,000 hours of recorded material.

During last war in Croatia magnetic tapes were, for the purpose of protection from war danger, stored in the only available place at this time – wet cellar of an old building in Zvonimir Street, where IEF was located. Tapes were protected by polyvinyl bags.

At year 1995 ethnomusicologist Grozdana Marošević has discovered first tapes with signs of mould, and after consultations with audio engineer of Croatian radio and founder of Samofix d.o.o company, Vito Gospodnetić, digitization of sound recording collection was initiated. It was decided to transfer magnetic tape recordings to audio CD-s. Reason for that was, in the first place, an attempt to save sound material on magnetic tapes that was showing obvious signs of decay, and then preservation of original tapes. However, plan for digitization, with defined priorities, standards for converting and storing of digital sound record based on expert archival criteria, did not exist. Overall plan, damaged tapes restoration procedures, conversion of original audio recording, digital resolution and choice of storage media were defined mostly by project proposal by Vito Gospodnetić. Project objectives in this proposal were: **a)** to make material available for larger number of users, **b)** easier browsing thru CD content, **c)** technical "make up", which would increase quality of recordings, and make them clearer.¹⁵ Choice of CD-R as a storage media is based on its wide acceptance and practical use and, at that time (1996), unconfirmed assumptions about its durability and life expectancy.¹⁶ There were no priorities set in digitization procedure; recordings were transferred in natural order, beginning from the oldest ones. Sometimes some "newer" recordings were digitized, to meet the needs of current research projects. During the period of nine years, which is how long it took to carry out digitization, recordings from 521 tapes were transferred to 659 CD-s.

Tapes were PVC based; their state of preservation was dependent on recording date, conditions of their use and storage. Older tapes were brittle because of the base PVC layer decay. This required great care in tape handling, and adjustment of tape tension thru reproduction. Some tapes had signs of mould and they needed to be cleaned, some had damaged splices that were repaired. State of preservation of original tapes, and restoration procedures carried out, were not documented. In the transfer of sound recording, according to Mr. Gospodnetić, there was procedure of "cleaning of sound content", "removal of useless situa-

¹⁵ Gospodnetić, Vito. Digitalizacija i restauracija fonoteke Instituta (...), p. 5

¹⁶ Ibid., p. 3

tions” – someone entering the room, coughing, etc. These interventions were also not documented.

Digital record is made in resolution of 44, 1 kHz/16 bit; it is stored on audio CD, in .cda digital sound format. Two identical copies in resolution, format, and type of carrier were made – one archival, and one access copy. They are both stored in the same place. All recordings are catalogued in a computer database made in File Maker Pro application. Description contains basic data about author of recording, location where recording was made, year, and title that broadly defines the content, and detailed list of recorded content. Information about original tape, recording equipment and transfer procedures is not mentioned. Description is not based on any accepted and recommended metadata scheme.

Digitization of sound collection of IEF was never formally defined as an actual project. It was carried out with difficulties in financing; it was partially financed by Institute itself, and for some time with the support from Ministry of culture, that ended in 2003. At this moment, IEF finances on its own digitization of tapes when they are needed in current projects. It should be noted, that IEF initiative of sound recording digitization was one of the first in this part of Europe. Although some solutions may be problematic in the long-term, this was, to a degree, a ground-breaking project of small unprofitable cultural institution that is worth mentioning. If project continues, it would be necessary to revise its current basic principles, and solutions according to internationally accepted standards should be defined.

Phonogrammarchiv of Austrian Academy of Sciences

Sound collection of Vienna Phonogrammarchiv has in its possession 43074 recordings on acetate, PVC and polyester magnetic tapes of different speeds. According to Dr. Gerda Lechleitner, a curator of historical collection, due to good conditions and full functionality of tapes and reproduction equipment, priorities were not defined, and there is no long term plan for digitization of collections stored in the archive. Nevertheless, archive begun with digitization in 1995, when some amount of magnetic tapes has been converted to R-DAT. Systematic digitization started at year 2000. Archive digitizes parts of its one collection, and collections of other archives and institutions.¹⁷ From the beginning, digital resolution of 96 kHz/24 bit was used. Archive uses WAVE format, and digitization is performed according to IASA TC04 standards.

¹⁷ This year, with support of EU Interreg Programme, archive completed extensive project of digitization of endangered collection of Alfred Quellmalz, containing folk music recordings from South Tyrol, from period 1940-1942. For realization of this project, prestigious Jikji Prize is awarded to Phonogrammarchiv. Prize is given every two years to promote objectives of UNESCO Memory of the World Programme: preserving and digitizing humanity's documentary heritage. http://www.pha.oeaw.ac.at/phawww/news_e.htm

According to standards, original archive sound document is not modified in any case, and it is real copy of original. There were no signal enhancements or de-noising procedures applied, except physical restoration of original sound carrier. Archival sound records and complete accompanying documentation is stored in two identical copies on LTO3 magnetic tapes. For storing, access and manipulation, combination of servers, LTO Juke Box and manual manipulation of LTO tapes is used. User copies are available online in MP3 format, 192Kb/s, and stored on server.

For metadata, Dublin Core Metadata Element Set is used, supplemented by IASA Cataloguing Rules, extending basic DC scheme.

Conclusion

Preserving field sound recordings of folklore music, customs and telling, means to preserve valuable testimonies about history of specific nation, and its traditional culture. International organizations as IFLA, IASA (International Association of Sound and Audiovisual Archives), AES (Audio Engineering Society), and numerous others projects and programmes whose objective is preservation of audiovisual materials and heritage, have defined standards and recommended procedures in this field. This paper presents the analogue magnetic tapes digitization practice in two institutions that have two things in common: scientific research of folklore, and significant collections of field sound recordings on magnetic tapes. However, they are different by their primary function (archive / research institute), staff profile, and most of all, financial possibilities.

Project of the *Institute for ethnology and folklore research* was at that point in Croatia, in year 1995 when it was initiated, in a way pioneering attempt to save unique and valuable sound collection, an already by decay endangered tapes. Project was not conducted by staff educated in field of sound recordings preservation and archiving, but by audio engineer, highly experienced in sound processing for radio, film and television. Digitization procedure was not in all segments based on expert standards for analogue sound materials digitization, but digitized recordings stored on CD-s reduced the possibility of damage to original carrier, and provided easier access and use of these recordings. Because of undocumented modifications in transfer of analogue sound signal, fidelity of digital record to original is questionable. Primary goal – preserving original sound information and all of its segments was thus not entirely achieved. Question is, will the state of preservation of original tapes permit, in some financially more favourable times, repeating of digitization procedure according to expert digitization and sound preservation standards.

On the other side, magnetic tapes digitization procedure conducted in *Phonogrammarchiv* in all aspects follows the standards of expert organizations mentioned before. Archive, by its definition, has different priorities than a research institute; it is supported by his home institution – Austrian Academy of Sciences, and has established sources of finances. In this sense significant is in-

volvement in international and local projects (EU projects TAPE, DELOS, AES Standards Committee, and Subcommittee on Audio Preservation). Archive has highly trained experts for every aspect of its work, from field research, to preservation and reproduction of obsolete sound carriers, international standards, technical and IT support. These are all necessary conditions for successful conducting of complex projects.

Field recordings on magnetic tapes are here taken as an example of material with specific function and documentary value. However, they are only a small part of comprehensive sound heritage stored on different formats, in depositories of libraries and collections that collect sound materials – National and University Library, Croatian State Archive, Archive of Croatian Radio and unknown number of private collections. In Croatia, only recently certain interest is shown regarding the preservation of sound heritage, primary by interested enthusiasts. Necessary steps that should be taken by expert societies, to change current practice of marginalizing the problem of sound heritage preservation, are:

- To encourage persons in highly responsible positions in institutions that are collecting sound materials, to recognize its significance as a part of cultural heritage.
- Education of experts in the field of preservation of sound materials
- Defining analogue sound materials digitization projects respecting international standards and recommendations
- Ensuring financial support from responsible state administrative bodies and international projects and programmes

In case that significant changes in current practice of sound recordings “preservation” thus not occur, there is a serious possibility that, because lack of interest and knowledge, a significant part of cultural heritage will be irreversibly lost.

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