6. SELECTION OF BEST COPY AND CARRIER PREPARATION

An archive may possess multiple copies of certain content, perhaps including commercial audio recordings or motion picture films. Where holdings include more than one copy, the best example should be selected before reformatting its content. In the case of magnetically recorded or file-based sound or video recordings, an archive or production house may hold multiple versions for different purposes, e.g., a master version and a copy made for some form of distribution. Here again, care should be taken to select the most appropriate copy prior to reformatting. Additionally, cautious and appropriate cleaning and restoration procedures may be necessary to optimise signal retrieval and reproduction.

Comment:

With mass replicated carriers—specifically mechanical and optical carriers—the replay quality of different copies may vary considerably because of the way that they have previously been handled and stored. It may therefore be advantageous to extend the search for the best copies to other collections on a national or even international scale (see section 16).

Non-replicated recordings may often be available in two or more versions. For example, a recording held on its original carrier (tape, cassette, film etc.) may also have been copied to an archival master. While the archival master (or subsequent generation copy in general) may often be in better physical condition, it may be of inferior signal quality due to poorer earlier transfer technology and the unavoidable signal degradation caused by the analogue copying process. Consequently, the signal quality of the various available copies must be compared.

Appropriate cleaning and restoration procedures can significantly improve signal retrieval. However, utmost care must be taken to balance any potential benefits against the risk of further deterioration, caused by subjecting fragile or deteriorating carriers to such procedures. It is good practice to minimise the handling of carriers at all times.

Some carriers may be so heavily deteriorated that even an attempt to replay them might place their content at risk. In such cases, a careful and informed evaluation needs to be made between the likelihood of damage through replay immediately, or through delaying replay until a less risky replay technology becomes available.

7. OPTIMAL SIGNAL RETRIEVAL FROM ORIGINAL CARRIERS

Optimal retrieval of an analogue signal, where replay distortions are kept to an absolute minimum, can only be achieved by modern, well maintained replay equipment, ideally of the latest generation. When replaying historical formats, replay parameters (such as speed, playback equalisation, track format, type of time base stabilisation, etc.) must be chosen objectively, and be based upon knowledge of the given historical format.

Certain adjustments to replay equipment may be necessary, in order to align with original recording characteristics and to optimize the retrieval of the recorded signal. For example, azimuth error is common in analogue magnetic tape recordings, and can only be corrected during the replay of the original carrier at the time of digitisation. Similarly, storage-related print-through must be minimised at the point of signal extraction. Other minute inaccuracies in the tape path adjustment of original recordings can also cause a considerable and avoidable rise in errors.

For video, certain types of dropouts are best compensated for at transfer time. Where motion picture film is being copied, some scratches can best be eliminated or suppressed by the use of liquid bath in the film printer when the transfer takes place. In a digital scanning transfer, the use of specialised diffuse light sources can have the same effect.

In order to minimise possible damage to the original carriers, replay equipment must be regularly maintained to professional standards. To aid in this and to diagnose emerging problems, calibration media suitable for the replay equipment must be used whenever obtainable.

For digital carrier-based formats, different players or readers may retrieve data from the same carrier in varying ways, not all of which will successfully present the bitstream for transfer. In order to evaluate and detect such problems, error monitoring during real-time replay, or error reporting after high-speed ripping, is imperative. The presence of uncorrectable errors copied to resultant files for preservation must be documented.

Digital carrier-based formats may contain various types of sub-code information, that is, secondary information written in parallel with the primary information bitstream. Incompatibilities between recording and replay devices can result in this information being retrieved incorrectly or not at all. Understanding the properties of a given format or collection, including any sub-code information, and defining the minimum required combination of primary and secondary information prior to its digitisation, is of utmost importance (see section 2).

It is not always an easy task to assess the correct replay parameters for a given analogue audiovisual document if objective information on the recording format parameters is missing. As in other fields of historical research, the use of cautiously chosen approximations is permissible when necessary. As a matter of principle, however, all such decisions must be documented, and irreversible steps should be avoided. All unnecessary subjective treatments must only be applied to access copies.

Comment:

Inadequate signal retrieval from original documents is very often the result of a lack of professional knowledge, or the use of inappropriate equipment. It is hard to overstate the importance of operator skill and experience, as well as the availability of specialised equipment, when reformatting challenging materials. Optical sound tracks for film-based motion pictures, for example, can be very challenging to transfer, and the role of highly specialised equipment can be crucial.

In some circumstances it may be appropriate to take a multi-layered approach to choosing replay parameters. This might involve digitisation and creation of master preservation files without playback equalisation, and applying equalisation either in the creation of access files, or as a software process at the time of access.

For example where one-light transfers from film are deemed appropriate, the RGB output should be adjusted to get the maximum colour information from each channel, to correct for colour fading without introducing any clipping.

Best practices for the transfer of motion picture film for preservation are still in development, with some cutting edge work advancing under the auspices of the Academy of Motion Picture Arts and Sciences (AMPAS) and the Society of Motion Picture and Television Engineers (SMPTE). These new developments will help standardise approaches that will have a special impact on the capture of colour and the representation of tonal variation in the original film. However, systems that implement these new developments are not yet widely available and the approach is not yet employed in memory institutions.

The systematic retrieval of sub-code information from digital carrier-based formats, as a method of safeguarding useful secondary information, is still a widely neglected subject. This is largely due to incompatibilities between the sub-code formats of different players and interfaces. As yet, few if any standards have been widely adopted for the further retention of this information in file-based formats. Compatibility problems can also often be encountered in the replay of recordable or rewritable optical disks.

The principles described in this section apply unambiguously where primary information exists in the form of documentary records, whether documenting artistic performance or other forms of actuality. Where the primary information exists as part of an art object however, for example where sculpture or installation art has an audiovisual component, there may be an additional ethical requirement to preserve original reproduction distortions, and therefore diverge from these principles, in order to honour the intentions of the artist. Determining the intentions of the original creator(s) may be necessary in choosing how such art objects may best be represented in a file-based environment.

8. UNMODIFIED TRANSFER TO A NEW TARGET FORMAT

It is mandatory that transfers made from old to new archive formats be carried out with the intention of producing the closest possible surrogate. Above all, subjective alterations or "improvements", such as de-noising or de-graining of film, must be avoided. Subjective alterations effectively rewrite the historical document according to the perspective of the operator undertaking the change, thus undermining the most basic principles of preservation.

The signal that the original recording engineer intended to capture is only part of a given audiovisual document. Unintended and undesirable artefacts (e.g., noise, distortions, drop-outs) are also part of it, whether caused by the limitations of historical recording technology, or subsequently added to the original signal by general use, mishandling or poor storage.

In some instances, apparent "imperfections" in a recording may be objectively corrected at the time of digitisation, by adjusting replay parameters to optimally retrieve the intended signal (see section 7). Generally speaking however, both the signal and the artefacts should be preserved with the utmost accuracy. It is essential that the full dynamic range, frequency response and/or image resolution of the original are transferred.

The careful documentation of all parameters chosen and procedures employed in the transfer process likewise is essential.

Comment:

Alterations in transferring from old to new formats are unavoidable in some circumstances, for example when converting an analogue composite video signal to a digital colour-difference bitstream.