A View of Preservation from a Magnetic Tape Manufacturer's Perspective

Magnetic Tape is a complex series of compromises, not all of which impact the media's archivability favorably. Economic, scientific, and process considerations give all manufacturers a matrix of decision points that must be considered before bringing a product to the marketplace.

Of course, the majority of the technical design characteristics a manufacturer must consider are determined by the format for which the tape is specified. Thus, many of the factors that will determine the life of the information recorded on a particular format are dictated by the standards that comprise that format. Key components for determining the long-term robustness of a format, such as the physical dimensions of the tape and the design and function of the cassette, are all pre-determined by format standards. The magnetic media manufacturer can have an impact on the suitability of the media for archiving only within the constraints of the format. **Choose your format carefully if you intend to archive to it.**

A Brief Description of the Components of Magnetic Tape and their Archival Impact

Magnetic tape can be considered to be comprised of five major components: basefilm, backcoat, binders, lubricants, and magnetic material. All of these components have been dramatically improved upon since the first introduction of the first paper tape coated with iron oxide.

Basefilm has evolved from paper to acetate to PET and further. The change from acetate to PET has been the most important from an archival point of view. With the introduction of PET, basefilm became the least significant concern in the archival chain. While some of the newer basefilm materials offer even greater strength and dimensional stability than PET, their archival improvements pale when compared to that of PET over acetate. The dimensional constraints of some of the newer formats, and some extended length versions of more established formats, require the strengths of these more advanced basefilms in order to function properly. The improvements gained by the utilization of newer generation, ruggedized, basefilms allow more densely packed media and have not usually been devoted to making a more archivally stable magnetic tape. These improvements can also be incorporated into making existing products archivally superior, but they will add significant cost for the enduser.

Backcoats continue to be improved in order to ensure optimal runnability of the tape in any particular format. Magnetic tapes have not always incorporated backcoats, and some less expensive tapes still do not. Providentially for the archive community, the benefit of improved wind characteristics in professional applications have caused manufacturers to

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utilize backcoating in almost all professional magnetic tape products. Future changes in backcoat design will continue to facilitate improvement in the quality of the tape pack (tape pack is a seemingly simple, but extremely critical, component in determining the quality of signal reproduction possible after long term storage of media).

Lubricant packages are designed to allow the tape to travel smoothly through the tape path and over the heads. Improper, or too little lubricant will cause the tape to exhibit stiction and squeal, impeding proper playback. Excess lubricants can deposit on heads and in the tape path, attracting debris and contaminants. Our goal in lubricant package design is to not only ensure good runnability in a wide variety of disparate environmental conditions, but also to ensure that lubricants will be available at the surface of the tape throughout the life of the tape.

Magnetic materials have evolved from simple iron oxide, to cobalt treated iron oxide and chrome, to pure iron particles coated with a passivating material. As we all have seen firsthand, iron oxide is physically a very stabile material. In addition, iron oxide's magnetic properties change exceptionally little with exposure to reasonable heat over long periods of time. Ever increasing demands for higher signal packing densities have led to the use of metal particle and metal evaporated magnetic materials in more recently developed tape formats. These materials are slightly more subject to magnetic deterioration in elevated temperature environments than the iron oxide family of particles. Fortunately for the archival community, particle science and improvements in the passivation techniques have produced metal particles that that are far more magnetically robust than their earlier counterparts. The thinness of the magnetic coating of metal evaporated tapes can make them vulnerable to physical damage and subsequent loss of magnetic information.

Binder systems continue to remain a principal point of archival design focus for magnetic tape manufacturers. Increases in signal density requirements have led to higher magnetic particle loading percentages and thus dictated less percentage of binder in the magnetic coating of the tape. New binders need to be more effective in bonding particles to themselves and to basefilms than previous generation binders. The quality of the other components of the magnetic tape are of little value, if the magnetic particles do not remain attached to the tape. The binder package must remain functional for the magnetic tape to continue to be viable.

Summation

We at Quantegy continue to search for the right balance in designing a magnetic tape that performs to the desires of our customers today, and tomorrow. Archival stability of our product is a continuing goal of ours. Research into extending the effective life of our tapes continues long after the initial product introduction. In fact, we recently changed the formulation of a product that has been manufactured for 20 years solely to improve its

archival stability. We understand the value of the material recorded on our tape and we strive to make each product as reliable as the format will permit.

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